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COAL AGE

With which is Consolidated The Colliery Engineer

DEVOTED TO COAL MINING AND COKE MANUFACTURE

ISSUED WEEKLY

VOLUME XIV

July 1 to December 31, 1918

McGRAW-HILL COMPANY, INC.
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COAL AGE

With Which is Consolidated
The Colliery Engineer

INDEX TO VOLUME XIV

July 1 to December 31, 1918

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COAL AGE

Volume 14 New York, July 6, 1918 Number 1

Jo Brown's Opinion

How to appreciate the other man's *point of view*

What we are going to tell about here is happening daily at nearly all mine operations, with this exception: too few managers are as wise in their understanding of human nature as the one in this story

PAYDAY afternoon at a Southern coal mine. Most of the miners negroes; carefree in disposition, but quick to sense the attitude of employer or clerk as friendly, unfriendly or neutral. As each man received his pay statement, he stepped aside and began—in most cases laboriously—the mental effort of balancing the amount due with his recollection of earnings and stoppages. Most accomplished this to their satisfaction, for the company had the reputation of being careful in its payroll affairs. These joined the long line in front of the paymaster's window. A number, however, could not verify the statements to their satisfaction. These returned to the adjustment window with such remarks as:

"Cap'en, my time's wrong; yo' sho' is done stopped too much on me."

"Boss, I'se in a headin'; yo' ain't got all my coal on dis statement."

JO BROWN was one of these. The clerk verified his statement with the payroll and found it right. He handed it back to Jo, saying, "Go get your money, nigger—that's right." But Jo was not satisfied. Not only did he dislike being called "nigger" so abruptly, but he had forgotten a cash advance of $5; and the clerk, knowing his roll to be right, could not see that Jo had any kick coming. So again he told him to stand out of the way. But Jo didn't get out of the way. He stood there studying his statement, a black picture of sullen grief, trying now and then to address the clerk again but receiving no attention.

Right here my manager friend, who had me in tow, arrived.

"What's the trouble, Jo?" he asked.

"A whole lot, Mr. Jones. I'se short-changed $5."

"Let's see your statement," said my friend. "Dan," he called to the clerk inside, "let's see the order Jo signed for this cash advance."

The clerk soon produced it, and the manager showed it to Jo and asked if he didn't remember getting it.

"Yes, sir, I 'members it now," said Jo; "but dat man just told me his payroll was right, and he ain't never showed me nuthin'."

"Well, you be in the hole Monday and make that $5 back," said my friend.

"Yes, sir, I sho' will," smiled Jo as he made for the paymaster.

"You're a good trouble adjuster," I said to my manager friend as we walked away.

"No," he replied, "it isn't that. I'm no better than Dan or any other mine clerk could be if they would only learn something I learned a good many years ago, and what, I fancy, a good many men fail to see."

"What's that?" I asked.

"Simply this: *It's the easiest thing in the world for every one else to feel that Jo Brown can't have a complaint that amounts to much; but Jo Brown can't understand why everybody else in the world can't see that his complaint is the biggest thing on the map.*

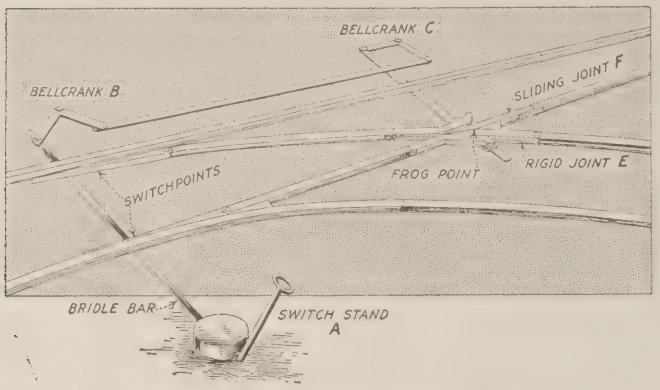
"And in this, Jo Brown is only human. I find I like my own opinions best. Don't you? So whenever I find a Jo Brown I first consider his viewpoint and adjust his troubles from that angle. He thinks I'm a wonder simply because I'm an exception and therefore something new to him, and his troubles are soon over."

I left my manager friend that day with his treatment of Jo Brown uppermost in my mind. I wish I could pass his viewpoint of individual troubles to every mine manager in the business; for don't you think it would pay if all of us—miners and managers—could learn to appreciate Jo Brown's point of view?

IDEAS AND SUGGESTIONS

Movable-Point Frog

At those mines and collieries where loose wheels are used on the mine cars, difficulty is sometimes experienced through the wheels climbing the frog at switches and derailing the car or trip. In such cases a guard rail at the frog is not always effective, since the loose wheels



DETAILS OF A MOVABLE-POINT FROG

sometimes have considerable play on the axles. To overcome this an auxiliary frog point is sometimes used. This may be placed either side up and on either side of the fixed-frog point to suit the throw of the switch



VIEW OF A MOVABLE POINT FROG INSTALLATION

points, and when so placed completely fills the space between the frog point and the adjacent rail.

To obviate this difficulty, George Thomas, outside superintendent at the Plymouth No. 5 breaker of the Delaware and Hudson Coal Co., has devised and installed a type of switch wherein the point of the frog moves from side to side in conjunction with the switch points. This frog needs no guard rail.

As may be seen in the accompanying drawing, this switch is not materially different from the ordinary type. Motion is transmitted from the ordinary switch stand *A* through a suitable elongated bridle bar to the bell crank *B;* thence through an adjustible tubular rod to the bell crank *C* and thence to the frog point *D*. The frog point is pivoted at *E*, while the opposite prong of the point is free to slide sufficiently at *F* in the fishplates attaching it to the rail to allow the point to move from side to side.

This switch has been in operation for some time and thus far has given entire satisfaction. It is not complicated and can be built at any ordinary mine shop.

Now Is the Time for Repairs

By N. H. Seaburg
Boston, Mass.

The public is being advised by the Fuel Administration to stock during the summer months as much coal as it can in order to insure against a repetition of last year's fuel famine. Although it is a well-known fact that the mines are not producing the necessary amount of coal that the current year demands, there is another feature of the problem that is being somewhat slighted, probably for the reason that there seems no immediate solution for it. This is transportation, a factor which is equally important with the mining of coal, in that no matter how much coal is produced it is of no value to the distant consumer unless it can be delivered to him.

The country depends upon the railroads to move the coal that is mined, either to tidewater or other destination, and as it is hoped this tonnage will be increased over last year's, it is evident that the railroads have been assigned a tremendous task. Taxed as they were the past winter to move that season's tonnage, they are nevertheless expected to move much more this year, with practically no addition to rolling stock or even repairs to present equipment.

The strain put upon the coal-carrying equipment last winter was unusually severe, and there has been no letup since then to allow of making the necessary repairs, except when there has been an actual breakdown. This, of course, is bad policy, and amounts to the avoidance of a temporary halt in the transportation of coal through inviting a serious tie-up, when there must come a general car and locomotive shortage. Our present course of action is plunging us headlong into such a contingency and it is folly to delude ourselves into the belief that we can tax our present rolling stock as we are doing without incurring disaster.

It is indeed time to call in the doctor. Looking after the present without thought of the future should not be the attitude of the Fuel Administration. Its desire to have the public stock up during the summer months is excellent, but to do so at the expense of the Nation's

transportation system is questionable expediency. The interdependence of production and distribution is so great that the breakdown of the one means the breakdown of the other. There is little wisdom in crippling, perhaps beyond repair, the entire rolling stock of the railroads in order to stock up coal during the next few months of the year. The trifling gain to be achieved thereby would be more than offset by the injury to the cars and locomotives this effort would possibly cause.

In order to secure the greatest efficiency from the present equipment, which is highly essential on account of the difficulty in obtaining new material, it would seem a matter of prudence to repair and overhaul immediately every defective car and locomotive in the Nation's transportation system, even though this may seriously hamper the movement of freight for a month or more. Cars and locomotives cannot be expected to last forever without attention. If repairs are neglected, there is only one alternative—the scrap heap.

Shall we wait until our equipment is ready to be scrapped before making repairs? Then, indeed, we are rushing headlong into a danger which cannot be adequately pictured. Let us not wait and call in the doctor when it is too late. Let us rather awake to our danger and take the necessary steps to remedy our ills, so that the doctor will not be required.

Of course, this will entail some inconvenience, but this is far preferable to attending a funeral. Optimism, beguiled by a false sense of patriotism, should not blind us to the great difficulties ahead which must be overcome.

Saving Materials—A Way to Victory

By NEILL HUTCHINGS
Mobile, Ala.

THIS is a war of resources. Germany will be defeated with materials. Coal, iron, steel and allied products will turn the scale of victory in our favor. Every business in America must come to realize that it can only be patriotic by using materials carefully. It is the same with the individual. In fact, "slackers" are already of two kinds: the person who won't fight and the person who won't give up the use of luxuries.

The demand for materials for war purposes is almost past all comprehension. The appetite of war for materials is voracious. If, as the editor of *Coal Age* recently set forth in an article on "War as an Industry" in the *Saturday Evening Post*, it required 9,000,000 tons of coal to produce and transport the million and a half tons of shells used at Verdun in a six-months' period, how can any patriotic coal miner or mine management fail to visualize the task ahead of the coal industry! It is no secret that the Government needs for steel for war purposes will consume the entire make of steel in this country. Neither is it a secret that it takes iron ore and coal to make steel. Every barrage fire laid down on the German lines in France has in it some of the coal mined by the very miner who reads these words.

Finally, the war will be carried into Germany. There will never be a stopping point this side of the Rhine once the scene is reversed and the Allies are pushing the Germans back. But the Rhine will never be crossed on German-made bridges. The materials for that crossing will come in large measure from the mines and mills of America. The road to Berlin must be paved with millions of tons of materials produced and saved in America for this job.

There's the real point. If everybody were permitted to use materials as they have been accustomed to, there might not be enough to pave that road to Berlin. So we have got to save as well as produce. Are you, Mr. Business Man of America, Mr. Mine Manager and Superintendent, using materials with an eye to the needs of your sons and comrades in France? Have you eliminated all the wasteful practices in your business since the war started in order there would be more oil, coal, foodstuffs, etc., for the man in France? Do you still grease your mine cars so that your tipple is caked with oil and ready to burn at the touch of a match, which means wasting the material it would take to replace it? Are you permitting rockfalls to bury good mine timbers, rails, ties, etc., when the right practice would avoid them. You say you are not—but are you sure? It's up to you to know.

Do you—whether you are the miner or the manager—do a lot of things without regard to the needs of your country for materials? If you do, you are getting dangerously close to "slacker" ground. In fact, the individual or the company that hasn't yet come to know that what one man wastes counts big in the present scheme of things is nothing short of a slacker.

Remember: If it takes a small forest to build a wooden ship, or the output of a good-sized mine for a month to build a steel vessel, can you fail to see what slack production or leaks in the use of material means?

Don't forget, too, you can waste material by simply being careless about it. Fire, breakage, improper handling and all the rest mean wasted material. There ought to be a fire inspector on top of every job of any size in this country right now, and an expert to show green men how to handle and use materials properly. Nothing should be wasted that might be saved. If you are a wise manager and a patriotic man, you will make a trip of inspection yourself to see that nothing in the way of materials is wasted and that everything that is humanly possible is done to increase your output.

Above all, keep in mind the road to victory. Remember it must be built of materials we make and save at home. Shall a single boy die in France because his countrymen—whether coal miners, mine managers or what-not—failed to make or save the material that would have saved him?

Let's pave the road to victory with the materials we can save from waste. Can any honest American want to do less? Let's carry on with the war by saving materials.



FIG. 1. NO. 6 PLANT OF THE MADISON COAL CORPORATION AT DIVERNON, ILLINOIS

Model Safety-First Coal Mine in Central Illinois

THE president of the Madison Coal Corporation of Illinois, A. J. Moorshead, has made a most careful analysis of the dangers attending those engaged in the mining and handling of coal preparatory to shipment. He also ascertained the percentage of the accidents in each class to the total number of accidents. This interesting information produced results, as it incited the official in question to action looking to the practical betterment of conditions in and around the mines of his company. Among others the No. 6 mine of the Madison Coal Corporation is literally bristling with safety devices—it is nearly as foolproof a plant as is met with in the coal fields.

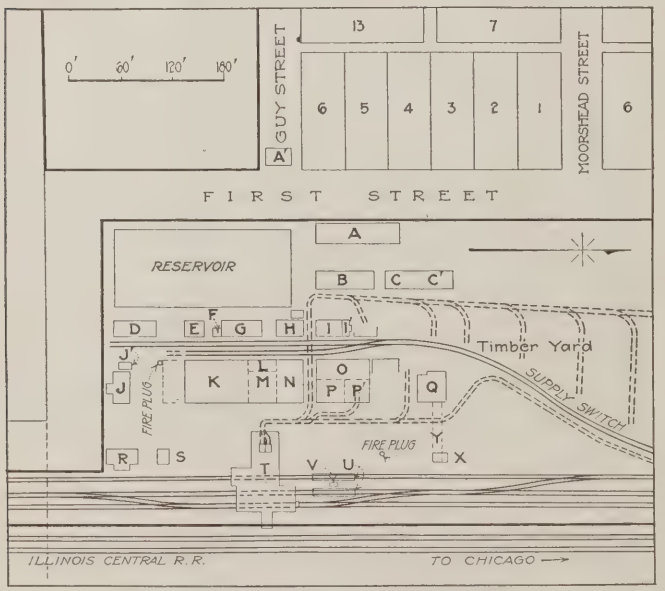


FIG. 2. PLAT OF SURFACE FEATURES OF NO. 6 PLANT OF MADISON COAL CORPORATION

The following buildings are noted: A, Washhouse; B, Lumber Warehouse; C, Cap-piece house; C^1, Masonry storehouse; D, Forage house; E, Oilhouse; F, Supply clerk's office; G, Supply house; H, Coke house; I, Lumber supply; I^1, Bosses' washhouse; J, Office; J^1, Wagon scale; K, Boiler house; L, Pump room; M, Hoisting-engine room; N, Generator room; O, Machine shop; P and P^1, Blacksmith shop; Q, Fan; R, Rescue station; S, Haulage-engine house; T, Tipple; U, Scales; V, Scale house; Y, Tunnel fan to air shaft; X, Air shaft.

Mine No. 6 of the Madison Coal Corporation is on the outskirts of the town of Divernon, Ill. It is in the Springfield district of Sangamon County, on the line of the Illinois Central R.R. In going about the plant and the town adjacent one is impressed with the neat and orderly appearance of the premises. This is in line with all well-regulated business; waste is avoided, workmen are apt to be more careful and efficient, and the appearance of a plant certainly counts for something—generally in dollars and cents.

A general view of the surface plant of the operation in question is shown in Fig. 1. A detail plat of mine and yard buildings is given in Fig. 2; the material of each building is concrete, brick or steel—fireproof construction throughout being employed in the main. The north side of the tipple is shown in Fig. 3 and the south view in Fig. 4. In Fig. 5 the longitudinal elevation of the tipple is given, on which are located the chutes, screens and other coal-handling machinery. The tipple steelwork was erected some time ago (in 1900) by the Kenwood Bridge Co., of Chicago, Ill. A straight three-track screening outfit was installed. A self-dumping cage, made by the Dunkin Foundry and Machine Co., of Alton, Ill., dumps the run-of-mine coal into a

weigh basket, or hopper, from which it goes to the shaking screens. Ordinarily, run-of-mine coal is shipped from this mine; but six sizes can be made with the combination of the shakers and the circular screen. The latter screen is over the bin shown at the south side of the tipple in Fig. 4. Near the dump an opening can be utilized in the main screen when wagon and boiler coal are desired. The wagon dump is shown at the base of the bin in Fig. 4, and the screenings from this dump go to the boilers. In the scale room at the tipple coal is weighed as each car is dumped, and coal is weighed again when loaded on railroad cars for shipment. These scales were made by the St. Louis Scale Co., of St. Louis, Mo. The Illinois Central R.R. uses run-of-mine coal from this plant and sometimes screenings are taken out for a pumping station in connection with the plant. If coal is to be re-screened it is elevated and run through the circular screen which makes the smaller sizes—1¼ in. down.



FIG. 3. NORTH VIEW OF NO. 6 TIPPLE AT DIVERNON

On the plat of the surface features, Fig. 2, is shown a reservoir which has been found entirely inadequate for the requirements of dry spells. Its capacity does not permit of the storage of sufficient water to carry the plant over seasons of drought. A large, new reservoir is being made just west of the old one to hold 12,000,000 gal. of water, at a depth of 11 to 12 ft. The creek nearby will supply water for the new reservoir, which will be filled and kept as a reserve supply.

West of the tipple is the boiler, engine and generator house. Steam is generated in eight 72-in. by 22-ft. boilers; six of these were furnished by Rhone & Sons, of St. Louis, Mo., and two by the Brownell Boiler Co., of Dayton, Ohio. The boilers are hand-fired. The 26 x 36-in. first-motion hoisting engine was made by the Litchfield Foundry and Machine Co., of Litchfield, Ill. The hoisting rope is 1⅜-in. steel and is stowed on two 8-ft. drums. The engine is equipped with a steam brake and steam reverse; also a Nicholson engine stop, manufactured by the Vulcan Iron Works, of Wilkes-Barre, Pennsylvania.

In connection with hoisting, mention should be made of the "humble hooks," an English device, of which the Macomber & White Rope Co., Kenosha, Wis., is the American agent. These hooks are locally termed "Johnny Bulls." One is kept as a reserve, and there has not been an overwind with serious consequences since they have been installed. However, the cage has been hung up several times, on which occasions the only practical damage done was a hole in the tipple roof, made by the end of the hoisting rope when it pulled over the sheave. The hooks consist of heavy steel plates and the device is about 2 ft. long and 8 in. or so wide. It is the connection between the rope socket and the cage chains, to which it is attached, by clevises. In case of an overwind, the humble hooks pass through a hole in a 1¼-in. horizontal steel plate; just enough clearance is allowed to pass the upper end of the hook; at the lower end a lug projects out at each side. The lugs are pivoted, so that as the lower ends are forced in by the plate the upper ends fly out, releasing the rope socket clevis. As the cage drops, the upper ends of the lugs settle on the horizontal plate and stop further downward movement of the cage. Back of the engine room are two 12 x 8 x 12-in. steam pumps made by the Hooker Steam Pump Co., of St.

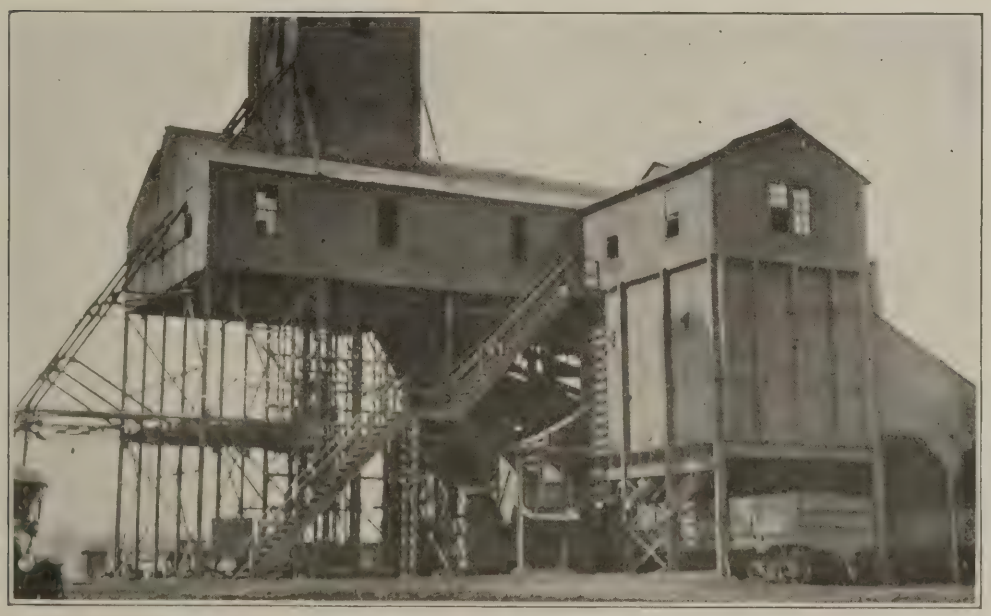


FIG. 4. SOUTH VIEW OF NO. 6 TIPPLE AT DIVERNON

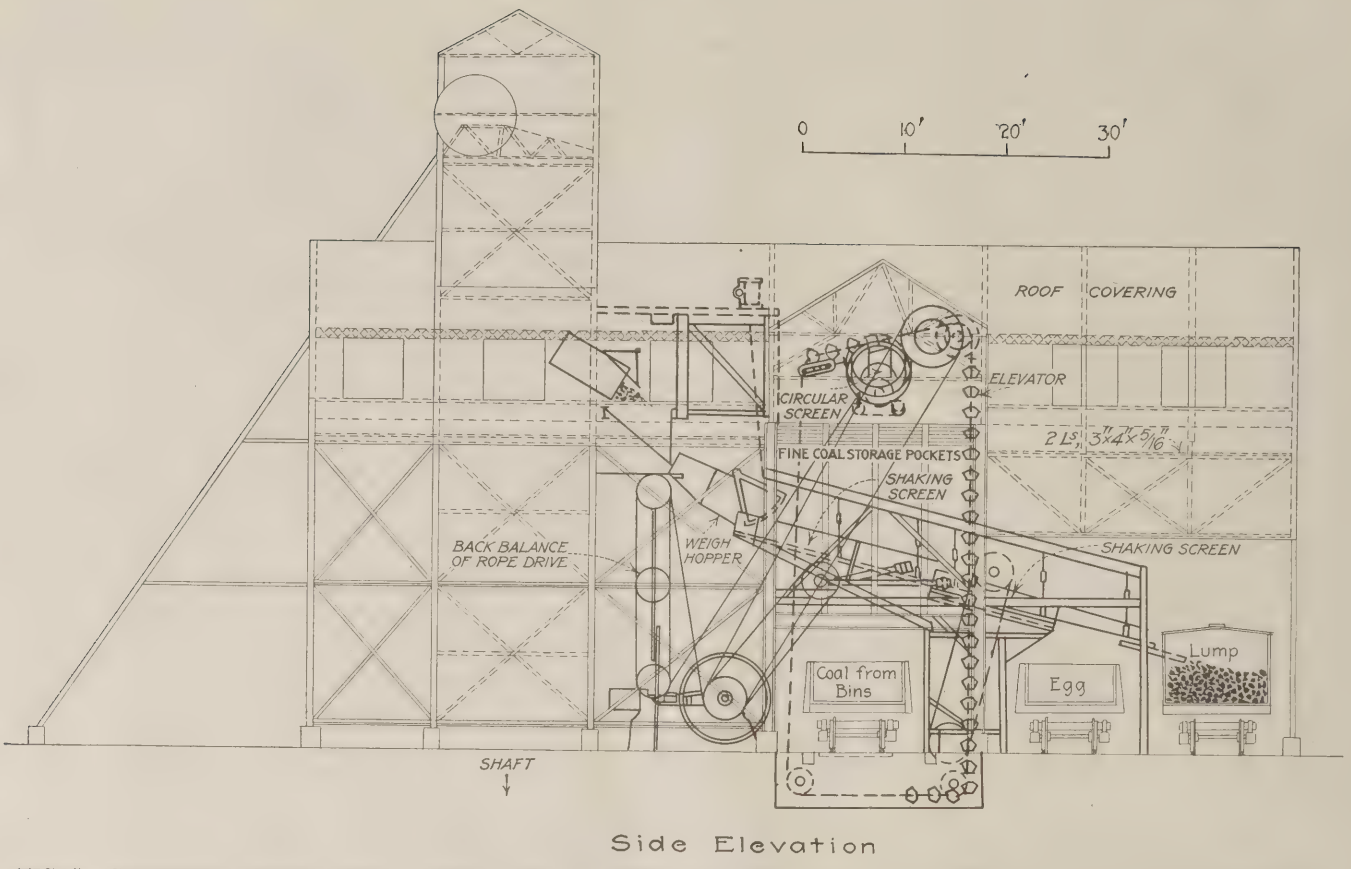


FIG. 5. SIDE ELEVATION OF NO. 6 TIPPLE OF MADISON COAL CORPORATION, SHOWING LOCATION OF MACHINERY

Louis, Mo. In this room there is also a Cochrane feed-water heater and purifier, made by the Harrison Safety Boiler Works, Philadelphia, Penn. One pump forces cold water into the heater and the other pumps from the heater to the boilers.

Adjoining the engine room on the north is the generator room, in which are three electrical units for furnishing current for power and lights. There is one 100-kw., 250-volt Western Electric Co. generator, one 175-kw., 250-volt General Electric Co. generator and one 100-kw., 220-volt General Electric Co. generator. All are direct-current machines and run by Skinner automatic engines. There is a four-panel switchboard in this room, one panel for each generator, and the fourth panel for the main circuit breaker and the switch for the main line down the shaft.

The machine shop at this plant handles all repair work at the mine, and some other jobs, such as making a lathe for turning wheels and a drill press for the local mine shop. The shop is equipped with a large lathe from J. W. Wright & Co., St. Louis, Mo., and one of medium size made by the Springfield Foundry Co.; a planer from W. C. Johnson & Sons Machinery Co., St. Louis, Mo., a radial drill, Niles Tool Works, Hamilton, Ohio, shear and punch, by New Doly Manufacturing Co., Jeanesville, Wis., shaper, from Smith & Mills Co., Cincinnati, Ohio, and a pipe die machine from Curtis & Curtis, Bridgeport, Conn. A pipe-threading and bolt-cutting machine has been ordered. At the forge in the blacksmith shop adjoining are three steam hammers which are useful in repointing bits for mining machines, among other purposes. A Jeffrey centrifugal 5 x 16-ft. fan ventilates the mine; it is run by a 22 x 24-in. engine made by the Ridgway Dynamo and Engine Co., of Ridgway, Penn. It is run at a normal speed of 90 r.p.m. The fan can be reversed and run exhaust if desired. In the haulage engine house near the tipple is the mechanism for operating the rope system which parallels the empty and loaded railroad tracks

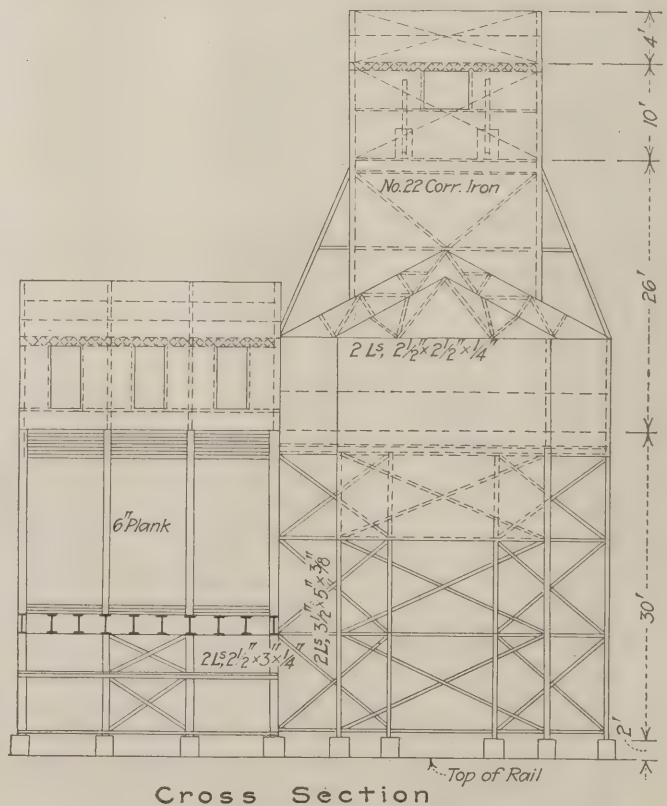


FIG. 5A. CROSS-SECTION OF NO. 6 TIPPLE

and which moves the empty and loaded railroad cars. Each end of the ¾-in. rope is attached to two drums respectively, which are driven by one shaft through friction. There are links on the haulage rope every 250 ft. which permit connection with cars by a short rope. The system is reversible; as the rope winds up on one drum it feeds out from the other.

The employees and their families are well taken care of by the Madison Coal Corporation, which believes that they should have homes and not shacks. A new town adjacent to the plant contains 100 houses which were built by the company at a cost of $1500 each, including a summer kitchen, outbuildings, fences, cistern and other improvements which add to the attractiveness of the town and act as an incentive to the men to keep their places in good shape. The camp at Glen Carbon, another plant of this company, is 30 years old, but the same conditions prevail as to neatness and order. The houses are kept in good repair, attractively painted, and probably are highly appreciated by their occupants.

The mine town at Divernon avoids monotony by having four different types of houses, no two of the same style being adjacent. This feature and the variety in the colors of the paint used on them lend attractiveness to the village. The houses are arranged in four rows, one of which is shown in Fig. 7. Note the neat division fences, the absence of a front fence, the row of shade trees along the street, other trees in the yards and the lawns at each home. Such a scene would do credit to some city suburbs. When the trees fill out in the yards, the village will be still more attractive.

All are four-room houses of the bungalow style and of the dimension and general arrangement shown in Fig. 6. The inside details are about the same for all four types. In the rear of each house is a 10 x 14-ft. summer kitchen and a cistern 6 ft. in diameter and 8 ft. deep. Each house has a lot 150 ft. deep by 50 ft. in width with a 20-ft. lawn in front. Running water is brought close to each house at the division fence, every other side fence having a hydrant which supplies the house on either side. The house occupied by J. H. Miller, the mine manager, is shown in Fig. 8. It is a commodious six-room dwelling 1½ stories in height. A large boarding house which accommodates 40 men has also been built by the company.

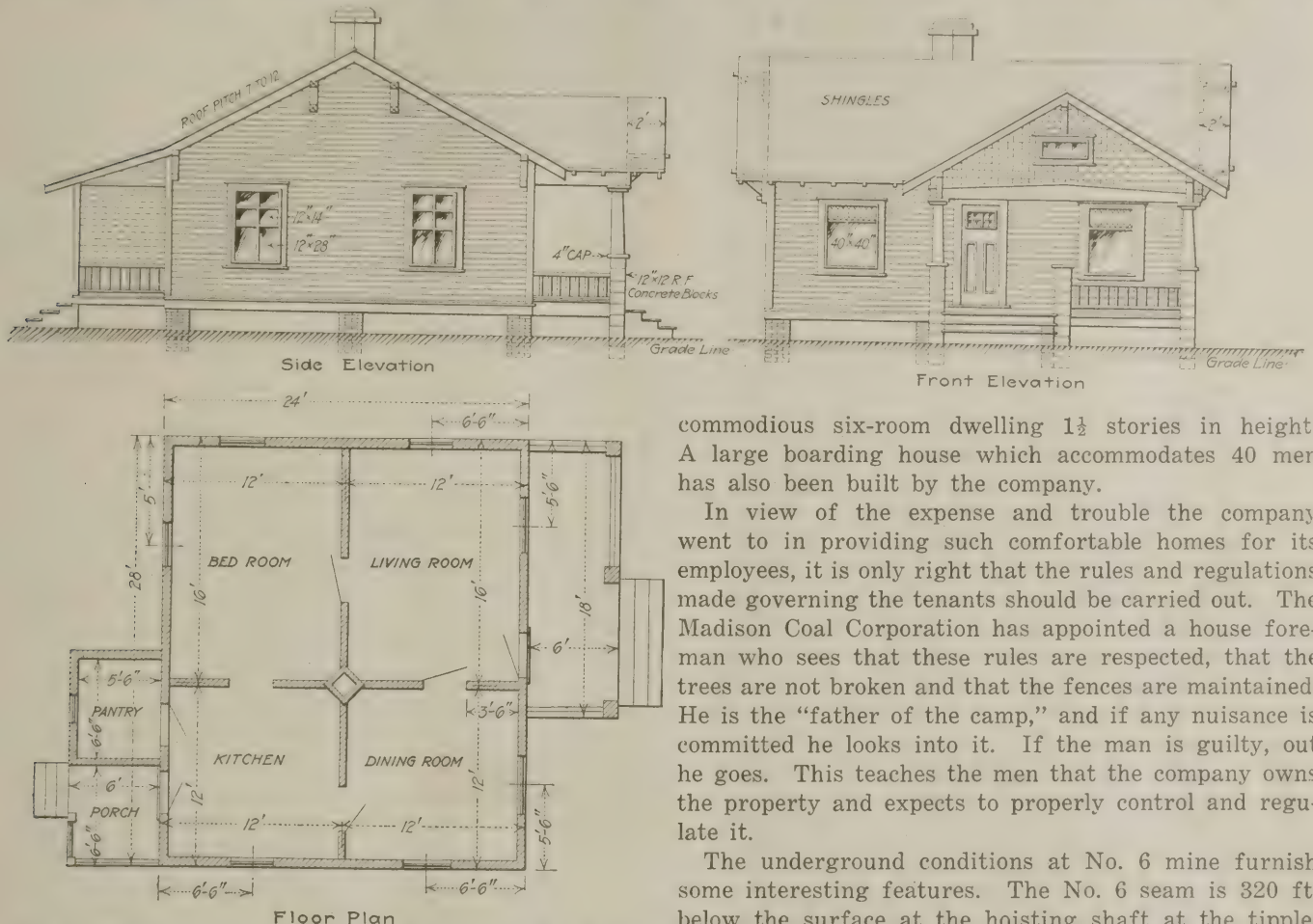


FIG. 6. ELEVATIONS AND PLAN OF ONE TYPE OF EMPLOYEES' HOUSES OF MADISON COAL CORPORATION'S NO. 6 PLANT

In view of the expense and trouble the company went to in providing such comfortable homes for its employees, it is only right that the rules and regulations made governing the tenants should be carried out. The Madison Coal Corporation has appointed a house foreman who sees that these rules are respected, that the trees are not broken and that the fences are maintained. He is the "father of the camp," and if any nuisance is committed he looks into it. If the man is guilty, out he goes. This teaches the men that the company owns the property and expects to properly control and regulate it.

The underground conditions at No. 6 mine furnish some interesting features. The No. 6 seam is 320 ft. below the surface at the hoisting shaft at the tipple, and averages 8 ft. in thickness. This is the bed which produces the greatest tonnage and is the one worked all through the central and southern coal-mining portions of Illinois. The method of mining employed here is the room-and-pillar combined with the panel system. The impurities in the seam include a blue band 2½ ft. from the bottom which runs about 1 in. in thickness. Sulphur bands and balls are also found throughout the coal. The top is generally a clod and black slate occurring from nothing to 8 ft. in thickness. It is full of seams. Above the slate is a solid limestone.

The slate weathers badly at certain times of the year and it is the custom here wherever practicable to leave up about 1 ft. of top coal as protection against this spalling of the top. Props are set with a coal top and crossbars are placed where the coal comes down, especially on entries. On haulageways, if the clod is not more than 2 ft. thick, it is taken down to the inside parting and the entry is timbered from here to the face. At



FIG. 7. EMPLOYEES HOUSES AT DIVERNON

this mine one prop is used for every 10 to 12 tons of coal mined.

No pillars are drawn and rooms are turned off on 60-ft. centers—30-ft. room and 30-ft. pillar. A barrier pillar of 20 ft. is left between the ends of rooms, and there is an entry barrier of 75 to 100 ft. At present one pair of main entries is being driven and eight pair of cross-entries. From the cross-entries, stub entries are driven of an average width of 15 ft.; the main and cross-entries are each about 12 ft. wide. The entries are run on centers, and the assistant mine manager runs the rooms with a compass. Two surveys of the workings are made during the year.

The method of mining employed at the No. 6 mine, in the main, is the one in vogue at a large number of Illinois operations. No attempt is made to extract more coal than can safely be removed without causing subsidence of surface. Also, all coal is taken out on the advance; when all the rooms in a panel are worked to the required distance, then the panel is finished. While it is expected that pillars have been correctly proportioned to opening, and will not fail in the service for which they were left, nevertheless the wisdom of the panel system has been abundantly justified in Illinois. In many instances barrier pillars have limited squeezes to the panel in which the trouble started. A force fan furnishing 130,000 cu.ft. of air per minute ventilates the mine, in which there are eight splits. The overcasts are of concrete and the stoppings are made of slate and old ties plastered with cement and sand. Three mine examiners cover the workings. They find gas occasionally, and the miners stay out of the places in question until the face bosses either brush out the gas or put up a curtain to deflect the air current which removes it. The main or hoisting shaft has two compartments. The air shaft is equipped with a stairway which is partitioned off from the portion used for ventilation. At the bottom of the main shaft is an automatic deflector arranged to be operated by the cage; this device tends to throw coal falling down the shaft away from the bottom men. As the cage approaches the landing, it engages a pawl and moves the deflector into position. Automatic caging devices are installed on the loaded tracks at the shaft bottom. Within a few hundred feet of the bottom of the shaft are a number of interesting features. Between the main and air shafts is an underground room fitted up as a rescue station to give first aid; in it is a first-aid cabinet. In the rear is a small room which is kept hot for special cases requiring such treatment. Nearby, at the air shaft, is a 35-hp. pump of General Electric Co. manufacture; it is figured for a head of 600 feet.

The main entries run east and west from the main shaft, and the tracks are graded so that the loaded cars run to the shaft and the empty ones away from it. At a short distance from the shaft, on the east side, one track is considerably lower than the other one paralleling it. As a safety precaution a pipe hand rail is in position between the two tracks, suspended from the top by brackets. Concrete has not been spared where needed on entries, traveling ways and rooms around and near the hoisting-shaft bottom. Conveniently accessible to the shaft is a waiting room for miners. Seats have been placed on both sides of a traveling way, the sides of which have concrete walls. Whitewash and electric lights contribute to the cheerfulness of the place.



FIG. 8. TYPE OF HOUSE OCCUPIED BY MINE MANAGER

Close to the shaft, also, are accommodations for the motive power for handling cars. A motor barn, with a 2-in. plank floor, has 16 separate switches so that any motor can be taken out without interfering with any other. The main haulage is done by five motors—one 15-ton Morgan Gardner, two 15-ton Jeffrey and two 12-ton Goodman locomotives. Main haulage includes four hauls of about 7000 ft. and five hauls of about 5000 ft. The 15-ton locomotives haul 25 to 30 car trips and prevented from getting together at the bottom. Mechanical gathering is done by four 5½-ton General Electric storage-battery locomotives; the Exide storage batteries used in these locomotives were made by the Electric Storage Battery Co., of Philadelphia, Penn. Additional gathering motors have been ordered.

About 40 mules assist in gathering cars at present, but these "hay burners" will be supplanted by storage-battery motors eventually. Considerable thought was

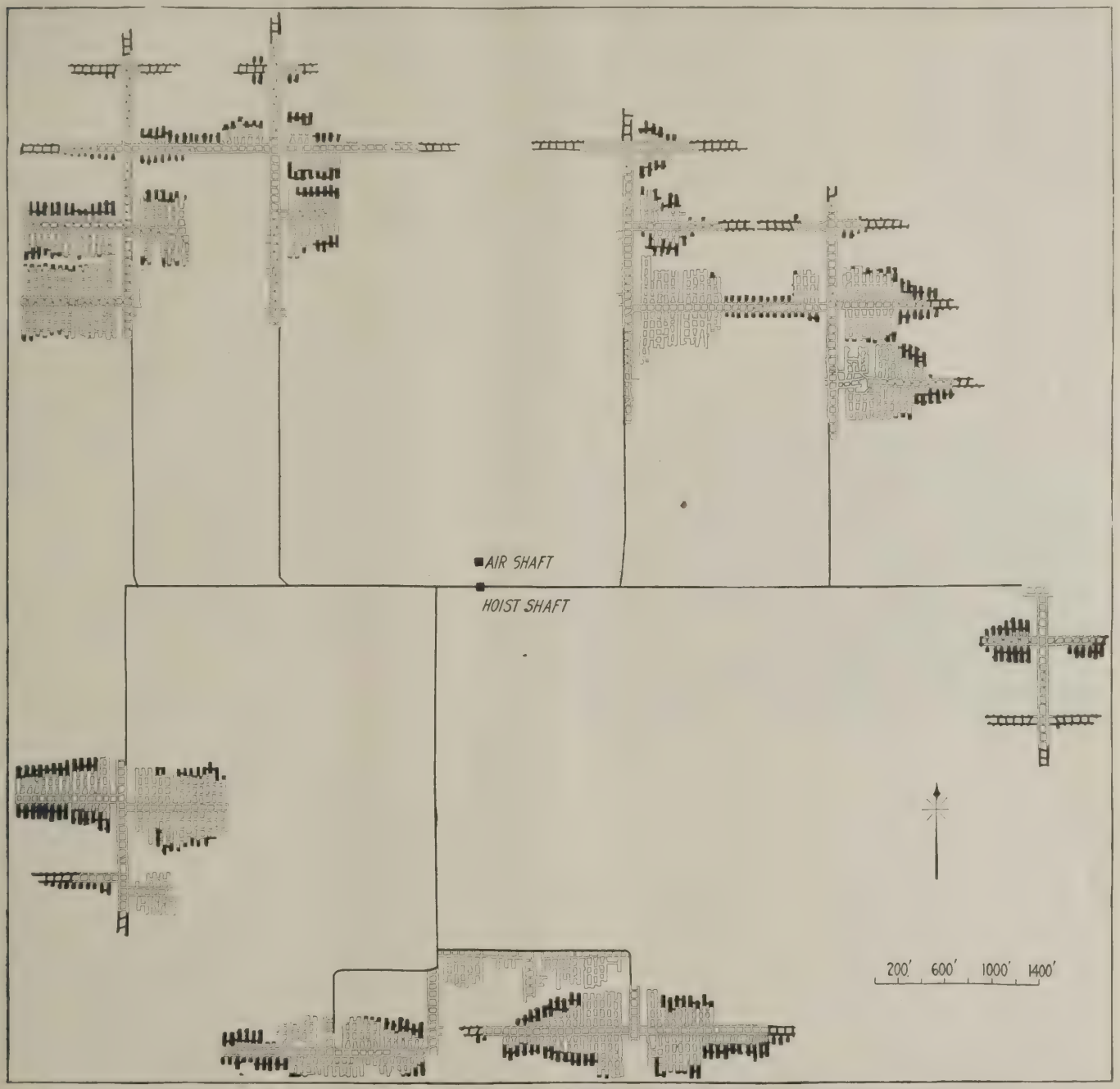


FIG. 9. MAP OF ACTIVE PORTIONS OF NO. 6 MINE OF MADISON COAL CORPORATION

Intermediate territory between the shafts and active portions worked out. The heavy lines leading from the hoist shaft to the active portions of the mine are main haulage roads; main partings are at ends of main haulage roads. Heavy black portions of workings show the last extensions made to mine map on May 5, 1918

the 12-ton motors 20 to 25 cars at a time. There are nine active partings altogether. On the mine map (Fig. 9) the parting is at the end of the main haulage in each case; the main haulage lines are indicated by heavy lines. All partings are lighted by electricity and also haulageways where mules work. On main-entry haulageways, where two or more motors travel, they are protected by a block signal system—also motors are thus given in planning the stable for the mules. Concrete floors, side walls, partitions and mangers are not only of substantial construction but fireproof as well. A sheet-iron feed box is fitted into each manger. The concrete partitions extend from the floor to the level of the top of the manger; above this level the partition consists of iron pipes. An automatic spray system runs the length of the stable both at the back and front of the stalls.

On the opposite side of the shaft from the motor barn is the machine shop; it is a room 18 x 120 ft. in dimension. It is equipped with two overhead cranes with a 2½-ton block. Motors and mining machines are repaired here, armatures wound, etc. The shop is about 375 ft. west of the main shaft.

Nineteen Goodman breast mining machines are available for undercutting at this mine; 14 machines are kept steadily at work, which gives ample opportunity for any necessary attention to the idle machines. The machines undercut to a depth of 7 ft. and 42 in. wide. A double shift is worked on undercutting and 25 cuts are made per shift by each machine, or an average of 2½ rooms. Bits generally have to be set every one to ten runs, but they have been changed four times in one run when the sulphur was particularly bad. The miners, or "loaders" as they are termed in this case, blow the coal and load it.

As this mine is dry and dusty, the water system covering the territory at and adjacent to the main shaft is an important safety precaution. A 2-in. water pipe with hose connections every 40 ft. connects with a water



FIG. 10. MINE RESCUE STATION

supply on the surface. A water car regularly sprinkles the main roads on Sundays, and the surplus work of this kind is done at night.

In order to know definitely who enter the mine and whether they leave it again, the following system has been adopted by the Madison Coal Corporation. Before a man goes down the shaft in the morning he leaves a "life check" with the man at the surface cage landing. When all the men have gone down, the checks are sent down and hung up on a board at the end of the miners' waiting room. The inside men get their checks at night and hand them in to the proper party at the bottom cage landing before they go out. If a daily record is kept of those going into and coming out of the mine, it may be valuable evidence on occasion. In some instances, in event of explosions or other mine disasters, it is desirable to have such information correct and quickly available. In normal times it might be a satisfactory arrangement to keep track of individual workers.

An automatic safety-gate device is installed at the main-shaft surface landing. It includes a lock at the gate operated magnetically; also, wires lead from the lock to contacts on the hoisting engine shaft, so arranged that the lock is only released when the cage is at the landing. Two red electric-light bulbs are mounted on the front wall of the engine room in plain sight of the engineer. These flash when the gates are raised at the landing. The engineer can release the lock at any time by a special switch.

Coming out of the mine at night the miners and other inside men resort to the wash-house before going to their homes. The No. 6 wash-house has 572 lockers in all and 30 sprays or showers. At present there are 650 employees at this plant, of which number 602 are inside men and 48 are on top. The various bosses have a separate wash-house with 18 lockers.

The mine is fortunate in having a rescue station on the ground; it is built of cement blocks and is shown in Fig. 10. The large main room in the center is utilized for first-aid work. The injured man is brought here for immediate treatment and the doctor is summoned. In the rear of this room are two small rooms which are used for storage of apparatus. To the left of the building is a bathroom and storage room for clothes. At the right of the building is a gas room in which sulphur is burned during practice times. It is equipped with ladders and the usual apparatus for providing exercise for crews training. The station has four sets of Draeger apparatus, oxygen tanks and other standard equipment.

The officials of the Madison Coal Corporation were most courteous in contributing interesting information and in every way assisting in the preparation of this article, for which favors *Coal Age* is sincerely indebted.

A. J. Moorshead is the president and general manager of the company, G. E. Leyman, general superintendent, and Anton Daenzer, district superintendent. At mine No. 6, Harry Baines is top foreman, J. H. Miller mine manager, and Thomas Bee electrician.

An Effective Recovery Plant

There has been recently erected at Sheffield, England, a plant for the recovery of metallic particles and other byproducts from furnace fumes. It was discovered about 1906 that by passing gases containing solid dust and minute liquid particles through various forms and types of electrodes, charged with 50,000 to 100,000 volts of current, these dust and liquid particles could be precipitated.

Since that time the inventors of the process, which is of American origin, have not only successfully recovered valuable materials from waste fumes, but have also got rid of smoke and the smoke nuisance. Metals such as zinc, silver, copper, lead and aluminum have been recovered besides coal-tar and other byproducts of commercial value.

The experiments made at Sheffield are yielding satisfactory results, and other firms in Britain are now beginning to install this type of equipment in an encouraging fashion. The British Government has made one installation. The process appears to provide a thoroughly efficient remedy for the smoke nuisance, but the treatment of ordinary carbon fumes is unlikely to prove a profitable proposition. For that reason the installation of the necessary equipment purely as a smoke-abatement device is scarcely within the realm of probability.

Life and Care of Hoisting Ropes

SYNOPSIS—*Hoisting ropes usually have a modulus of twelve to fourteen million pounds per square inch of wire section. The best Lang lay rope is probably that with six strands of seven wires; it is more flexible than the regular lay and will take shorter bends. Opinions differ as to when ropes should be removed. In the anthracite regions it is the practice to replace them as soon as the stretch is out of them. Ropes should be re-cut and re-coned once every three to six months to prevent undue recurrence of strain at certain points. Reversing of ropes, end for end, is likely to give a false sense of security. Interlocking, locked-coil and galvanized ropes are rarely used in hoisting.*

SOME notes from the discussion of M. H. Sigafoos' paper,[1] read before the mining section at the Sixth Annual Congress of the National Safety Council, are worthy of record here. In general the ropes used for hoisting purposes in the United States have a tensile strength of about 85 or 90 long tons per square inch. The practice among operators of late has been to favor the use of plow steel, which has a tensile strength ranging from 105 to 120 long tons per square inch, but many manufacturers prefer to avoid the use of that material as much as possible because it succumbs sooner to fatigue when wound around a drum, the higher carbon content of the steel being responsible for its more rapid depreciation. Reverse bending, over the sheave and under the drum, injures high-carbon steel much more rapidly than it does low-carbon steel.

Modulus Should Not Be Assumed Too High

The modulus of 28,000,000 lb. per square inch referred to by H. C. Behr, in his discussion, applied to a square bar. In a wire rope a much different condition has to be considered, as the rope consists of separate wires which work upon each other when the rope passes around a drum or over a sheave, and the compression of the inner wires will take up some of the bending stress—that is, will reduce the modulus. In figuring out bending stresses in ropes, a modulus ranging from about 12,000,000 to 14,000,000 lb. per square inch is used. In using 29,000,000, a bending stress close to the ultimate breaking strain of the rope is obtained, which is not good practice. The wires in a 6-strand, 19-wire rope occupy about 50 per cent. of the area of the cross-section of the rope itself, which will reduce the modulus to some extent. If the 29,500,000-lb. modulus is used in figuring out the bending strength of the $\frac{5}{8}$-in. rope, the ultimate breaking strain of the rope is almost bound to be reached.

About 120 long tons is the highest tensile strength adopted for the material used in flat rope. In the lacing or threading of such ropes a soft wire must be used. This wire accomplishes a twofold purpose: It makes a neater job where the thread is turned back and laced through the different ropes, and it prevents inside abrasion of the wires in the rope itself. The soft annealed wire used as a lacing gets all the abrasion and the strands themselves get little.

Comparative data regarding the length of service given by ropes of regular and Lang lay types, operating under similar conditions, show that at two or three mines where $1\frac{1}{8}$- and $1\frac{1}{4}$-in. ropes are used, the average service of a regular lay rope has been about 24 months. Afterward the Lang lay rope was installed at the mines, and the average service, working under practically identical conditions, has been over 30 months. In one instance the Lang lay rope that was put on gave 34 months' service, as against an average of 24 months of the regular lay. The mines worked every day, and their tonnage outputs were practically the same per day. For this reason the tonnage hoisted in one year may be regarded as about equal to that of the next.

Wires in Lang Lay Not Laid Tightly

Because of the manner in which the strand is constructed the wires in a Lang lay rope are not laid so tightly as the regular lay. The wearing surface of the wires is much greater, and the wires will stand shorter bends without breaking than will those in a regular-lay rope. The rope is more flexible, and for some purposes gives better service than the regular-lay type. Also, Lang lay rope is less likely to kink, as it will tend to spring out and lay flat. It should be used with both ends fastened firmly, one end to the drum and the other having a closed, and not a swivel, socket. In the early history of Lang lay rope, particularly in the United States, the ropes were quite "twisty"; but now they are made so that they will lay as inert as the regular lay rope. After being in service a short while, they do not give any trouble. A Lang lay rope of 6-strand, 19-wire construction working on a clam-shell digger ran 90 days, as against 25 days of service rendered by a rope of the regular lay, the quality of steel being the same in both.

The Lang lay is undoubtedly the best lay for a hoisting rope, and the best type of Lang lay is a rope with six strands of seven wires in a strand; provided, however, the size of sheaves and the diameter of drums and all other conditions under which it has to work are adapted to a 6 x 7 rope.

The New Jersey Zinc Co. is using such a 6 x 7 rope with good success. The best basis of comparison is not the length of time that a rope has been installed, but the number of foot-tons of work it has performed, because one rope may be lying idle a greater proportion of time than another.

A 6 x 7 rope is more compact than a 6 x 19. The greater number of wires there are in a rope, the greater chance there is for the softening or opening of the strands; and this seems to apply more especially to the Lang lay rope, because the strands and wires are twisted in the same direction, whereas in the regular lay they are twisted in opposite directions. The wires are not so tight in a 6 x 17 or 6 x 19 as they are in a 6 x 7 rope.

[1]Published in "Coal Age," Vol. 12, pp. 928-931, issue of Dec. 1, 1917.

A 1-in., 1⅛-in. or 1¼-in. rope of 6 x 7 construction, with plow-steel wires, is a rather stiff rope, whereas the 6 x 15 or 6 x 17 construction, although not so tight as a regular-lay rope, is less likely to open up or "bird-cage." There is one advantage in the 6 x 19 construction. When a number of the outer wires are broken, there is still a good factor of safety left in the core of the strands, or in the inner wires of the rope, which, in a majority of cases, in 6 x 19 rope constitutes a section having about 40 per cent. of the breaking strain of the rope.

Remove Ropes When Stretch Is Out

And now as to the proper time to remove and renew a rope: There is a large coal company in the western part of Pennsylvania that uses ropes 1¾ in. and 2 in. in diameter for the purpose of hoisting men, and this company does not remove its rope until the rope shows 50 broken wires in any one foot. There are many people who, not being well acquainted with the construction and breaking strain of ropes, would regard a rope with 50 broken wires in any one foot as dangerous for use in hoisting men, but the Pennsylvania company to which reference is made has never had an accident, and it has found that the rope when tested, after that number of wires has broken, still possesses a large margin of safety. The inspectors on one occasion condemned a rope having these evidences of failure, but the manufacturer claimed that it was still safe. It was thoroughly tested, and it was found that it still retained about 60 per cent. of the original breaking strain.

In the anthracite region operators believe that a good rope is the best insurance of hoisting safety they can have. It is still a question as to when a rope has rendered its service and when it should be removed. A certain company in the anthracite region takes the rope off when the stretch is out, but if the stretch is not out in two years, the rope is removed without regard to that fact. All ropes at these mines are re-coned and re-cut every six months regardless of broken wires. It is an excellent rule to follow. If any broken wires are discovered or reported, that rope comes off at once.

Utility of Interlocking Ropes

Interlocking ropes have been tried for shaft sinking, with good results, and they are all right for a small load, such as a bucket, and they give good service. One rope that was used in sinking a deep shaft has to date been in use between six and seven years, and it is still in good condition. It is re-coned every six months. The time to take off a rope depends on the nature of its operation and the condition of the rope. Operators differ in their opinions on this matter.

About twelve years ago in the anthracite region a rope broke and dropped 10 men to the bottom of a shaft, killing all of them. The rope had been in operation, according to record, about nine years, and mine officials did not know how much longer. A sample of the rope about 8 ft. back from the fracture was taken and every wire of it tested. The wires in the rope were tested about 3 ft. from the fracture, after they had already been subjected to a breaking strain, and it was found that a tensile pull of 35 tons was required in order to break them.

The engineer claimed that the rope broke while the cage was being lowered, and that he did not know that the rope was broken until the end of it came into the engine room. The engineer was coming to a stop when the rope parted; he knew something had happened, but did not know just what. The men on the rope were supposed to stop at the level, and they were about at that point when the rope broke. The cage had no counterbalance, being a single-hoisting man cage, and was lowered by jerks.

One of the last jerks was at the level, and it is thought that this tug on the rope was the cause of its failure. The rope, no doubt, was able to take care of the load it was supposed to handle, and there must have been an undue strain put upon it; but whatever may have been the cause it was not brought out at the inquest. If the balance of the rope could stand 35 tons after it had already been broken, there must have been more strain than that put on it when it broke. It was pretty well rusted, it is true, but nevertheless, as has been shown, it required considerable strain to break it at a point only 3 ft. from the point of fracture.

The rated capacity of this 1¼-in. rope was 47 tons. Of course, there might have been a much larger amount of corrosion at the break, but that is not probable. It was not known whether the rope was ever dressed or lubricated.

Re-Cone to Change Points of Recurring Stress

It broke somewhere about 150 ft. above the cage, and there may have been some relation between the position of the break and the position the rope occupied in the sheave when the cage was at the landing. The lower end of the rope was always under tension, as the cage was left hanging with the brake on the drum. When the rope broke, it was at a point coming right under the drum, which was wound with an underbend.

Ropes should preferably be re-cut and re-coned every three months. When three or four feet of rope are removed from the drum end, those spots in the rope where the cage stops have caused permanent damage are shifted and the strain is removed to other parts of the rope.

Reversing a rope will not much increase safety, because most of the breakages have been in the lower end of the rope, showing that it is the lower and not the upper end that is subjected to the greater strain. A writer on the subject has said that in view of results the rope should be tapered the other way. For moderate depths that may be all right, as there is a great margin of safety for a small depth. When the depth becomes great such procedure is dangerous, and care must be taken in regard to the size of the rope, as it is one of the factors of safety.

In an instance where two interlocking ropes were used, one of the ropes ran perfectly, but the other rope "bird-caged,"—that is, opened up—an incident that caused the operators to abandon the interlocking type. Some companies make a practice of reversing the rope. When they have occasion to take the ropes off they frequently change them end for end, on the theory that this practice prevents special strains from continuously acting on any one point in the rope; but this undesirable condition is satisfactorily taken care of by re-cutting and re-coning the end of the rope.

Galvanized hoisting ropes have been little used in this country, as the galvanizing chips off readily in passing over sheaves and drums, and it is then of little or no value. Such ropes are used along the river front in New York City for hoisting on lighters, and here they are more successful. The majority of such ropes as are now in use have been imported. American manufacturers are making few galvanized ropes for hoisting purposes. Galvanizing has some effect on the actual bending strain of the wire itself. The loss in strength varies from 7½ to 10 per cent., according to the size of the wire. Lock coils are rarely used for hoisting purposes, but are popular for tramways and cableways because of the great wearing surface and the readiness with which they are gripped by the over-running carriage.

Moral Value of Fuel Administering

By J. Crow Taylor
Louisville, Ky.

While sitting in at a conference some time ago between a committee of coal men representing about 40 city dealers and a newly appointed committee on fuel administration which had been named by the state fuel administrator, I went through the sensation of passing from a critical and cynical mood to a feeling of appreciation of the work being done. The final realization was that what is seemingly farcical in this work is in reality excellent in its effect.

The administration committee and the coal committee quizzed each other back and forth in a manner suggestive of efforts at bargain driving on both sides. The coal men wanted to know how much in the way of margin the administration committee had a mind to allow the retail dealers. On the other hand, the chairman of the administration committee confessed that the first question he had planned to ask of the coal men was what margin they desired.

Finally a representative of the Federal Trade Commission who was present and who had participated in the adjustment of retail prices in a number of cities was appealed to for data on the subject, and by reference to his notes information was obtainable with which the two committees might readily have come to an understanding inside of an hour's time, and the matter would have been done and over with.

Moreover, the state fuel administrator by conferring with this member of the Federal Trade Commission or with any well informed man could in a few minutes have set the margin allowance for most of the retailers in the state without any further trouble or ceremony. Instead he had not only named an imposing committee for the city, which was the metropolis of the state, but had named committees for every county in the commonwealth. There are about 120 counties in the state and with from three to four members on each committee, it will easily be understood that their selection and appointment became quite an imposing task, calling for much detail and requiring considerable time and work.

Moreover, the committee appointed to administer the city fuel affairs got up an elaborate questionnaire which was mailed out to the trade. This took several hours' work with the coöperation of the coal committee to even formulate the questions, and has perhaps involved the burning of considerable midnight oil among the coal men in order to comply with the request for information. The trade is fairly familiar with these questionnaires. The amount of work involved seems stupendous, especially in view of the fact that the final result would not in any case bring about any appreciable change in coal prices.

It was the thought of all this that brought the critical cynical feeling. Then another thought came, that of the moral effect, the weight all of this would have in satisfying and establishing public sentiment. The coal trade has suffered in morale, or rather it has suffered in its standing in the public mind because of the increased prices and because of tirades of abuse appearing in the news and editorial columns of the daily papers.

I recalled while this meeting was going on, that following the first conference at Washington between a committee of coal operators and the Government authorities, one of the local papers had railed at the high prices named and had finally termed this meeting a conspiracy rather than a conference. It was perhaps this persistent attitude on the part of some papers that resulted in a succeeding order of lower prices, which later had to be increased again after a thorough examination to satisfy public clamor.

I began to understand why so much elaborate procedure instead of being looked upon as farcical (because an understanding and agreement could have been reached in a few minutes) actually became a momentous matter, of importance in satisfying the public mind that the coal dealers were not robbing them but were serving them fairly and only getting a reasonable profit.

If the committee of coal men and the administration committee had, for example, got together and in a few minutes adjusted the matter of local retail prices, which I am satisfied they could have done, loss of time and much detailed work would have been avoided, work that from a cold business standpoint would seem unnecessary. Yet the necessity for this work is plain if one but views it in the right light—it serves to satisfy the public that it is getting a square deal.

After committees of reputable business men, having the full confidence and respect of the community, go thoroughly into the details of the business and report upon the results, then there can no longer be a question remaining in the public mind of hold-up or conspiracy or unfair dealing. The skirts of the coal men are cleared beyond a question of doubt, and the moral value of this "administering" becomes easily apparent. Moreover, it is a value of considerable moment.

There can no longer be the usual outcry on the part of newspapers, whose editors lacking definite information are naturally clamoring for public welfare—men who assume that because prices are high the people are being held up.

So if one feels inclined to criticize at times and become impatient over the formality, elaborate ceremonies and the mass of detailed work involved in administering fuel, he should stop for a minute and think the matter over. There is a moral value that weighs much, and the coal trade today stands in need of a greater measure of public approval. In the final analysis it will be found that the fuel administering will prove a benefit to the coal dealers as well as a protection to the public.

Changing from Isolated to Central Station Power

By FRANK HUSKINSON
Lafayette, Colo.

SYNOPSIS—*It was decided to change from isolated station steam-electric power to energy purchased from a central station. After all preparations were completed the shift was made in a few hours without mishap and without a single calculation being found in error.*

At Sugarite, New Mexico, the St. Louis Rocky Mountain & Pacific Co. operates two mines, with an average daily production of 1000 tons of mine-run coal. The village, tipple, shops and power plant are located in the bottom of Chicorica canyon, with the mines on each side some distance up the mountain. The trips of coal are lowered to the tipple by gravity, a double-drum and heavy steel cables being used on the inclines. The loaded trip pulls the empty cars up. The trips of coal land on the tipple from the mine on opposite sides, the tipple being built across the canyon. Each side of the tipple has its own dump, but the chutes converge, delivering the coal to the railroad

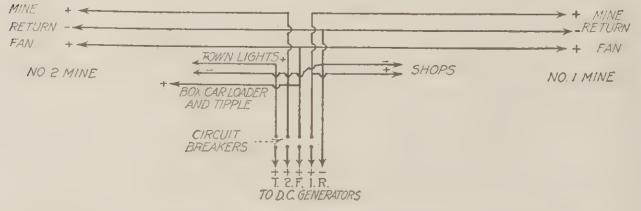


FIG. 1. DIAGRAM OF ORIGINAL POWER HOUSE CONNECTIONS

cars. The trips are hauled from inside the mines to the top of the inclines by electric locomotives.

The steam-electric generating plant located at the tipple furnished direct current at a potential of 500 volts, for the operation of the mine locomotives, ventilating fans, mining machines, pumps, tipple equipment, shops and town lighting system. The power plant equipment consisted of three marine-type boilers and two Ridgway simple, four-valve engines belted to the generators. The switchboard consisted of two feeder panels each with two separate circuits and two generator panels.

The arrangement of all feeder lines leaving the power house before the change to central station power was made is shown in Fig. 1. These consisted of three 4-0 bare copper wires to each mine, and two No. 4 weatherproof wires for the town lighting system. The fans for the mines were on the same circuit. The town lighting system was so arranged as to have two 260-volt lamps in series. The houses for the most part were of four rooms each and this made it necessary to have at least two lamps burning instead of one.

It was decided to put in central station power and have all outside machinery operated by alternating current. Direct current would thus be used only for the underground equipment. At the time of making the change the mines were working full force and every other Sunday, so that it was necessary to arrange to

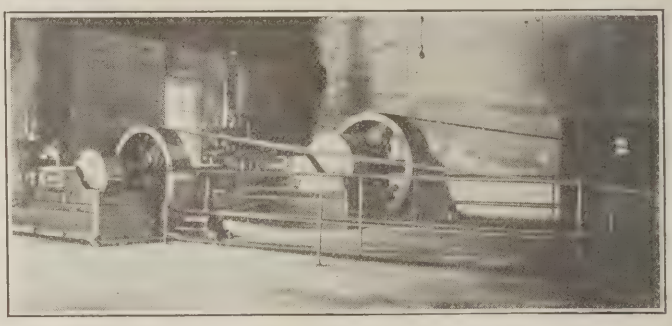


FIG. 2. POWER HOUSE ENGINES BELTED TO GENERATORS

make the change with the least amount of delay possible.

Fig. 2 shows the steam engines in the power plant. Directly in front of these engines the foundations were put in for the large synchronous motors that were to take the place of the engines for driving the generators. A 200- and a 100-kv.-a., 2200-volt, three-phase synchronous motor was placed directly in front of the engines with the pulleys lined up with those of the generators, as shown in Fig. 3. This arrangement did not interfere with the operation of the engines or generators.

The addition of three more panels to the switchboard was made for handling the alternating current—a panel for each synchronous motor and a feeder panel with two three-phase circuits on it. In order to make room for the equipment at the rear of the switchboard it was found necessary to move the original four panels forward a distance of more than 2 ft. This was done without interrupting service, and the three additional panels were then put in and all wiring completed. The three new panels were put in line with the original four, making the seven-panel board which is shown in Fig. 4.

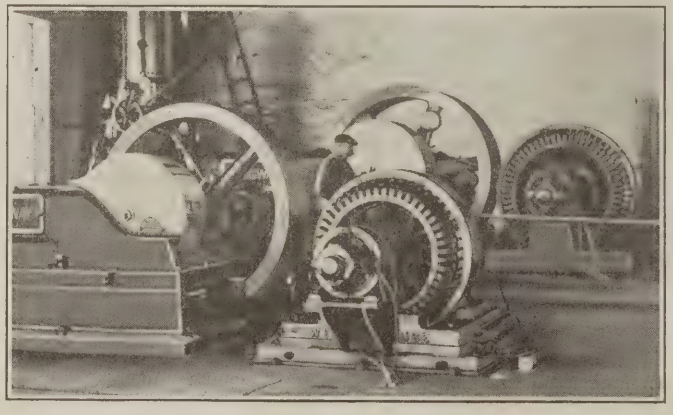


FIG. 3. MOTORS REPLACING ENGINES FOR DRIVING GENERATORS

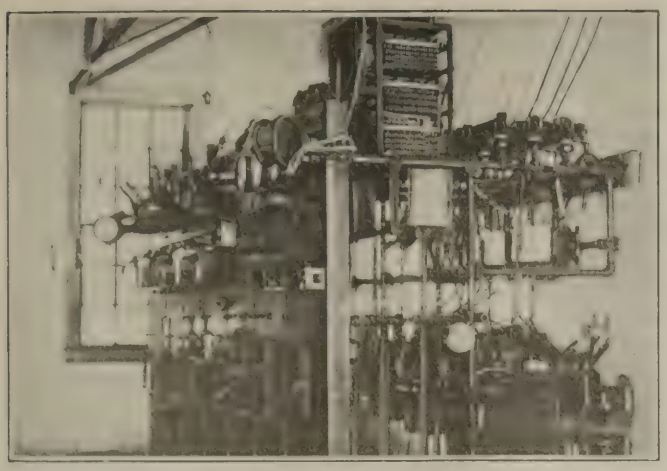


FIG. 4. SWITCHBOARD IN THE SUBSTATION

The three 4-0 bare copper feed wires to each mine were lowered to new cross arms placed on the poles 4 ft. below the top cross arms. Then three No. 6 bare copper wires were put in on the top cross arms from the power plant to each mine fan. A 15-hp., 2200-volt, three-phase induction motor was wired and made ready to be quickly slipped into the place of the old direct-current motor, and arranged so as to use the same belt. This was done at each fan, also a ½-kv.-a. transformer was installed at each fan, reducing the 2200 volts to 110/220 volts for lighting service.

The tipple equipment was run by a 15-hp., direct-current motor. A 20-hp., 2200-volt, three-phase induction motor was wired and made ready to be quickly put in its place, using the same belt. The main well pump was operated by a 15-hp., direct-current motor and also the shops. A duplicate of the fan motors was wired and made ready to be quickly put in, utilizing the same belts, etc.

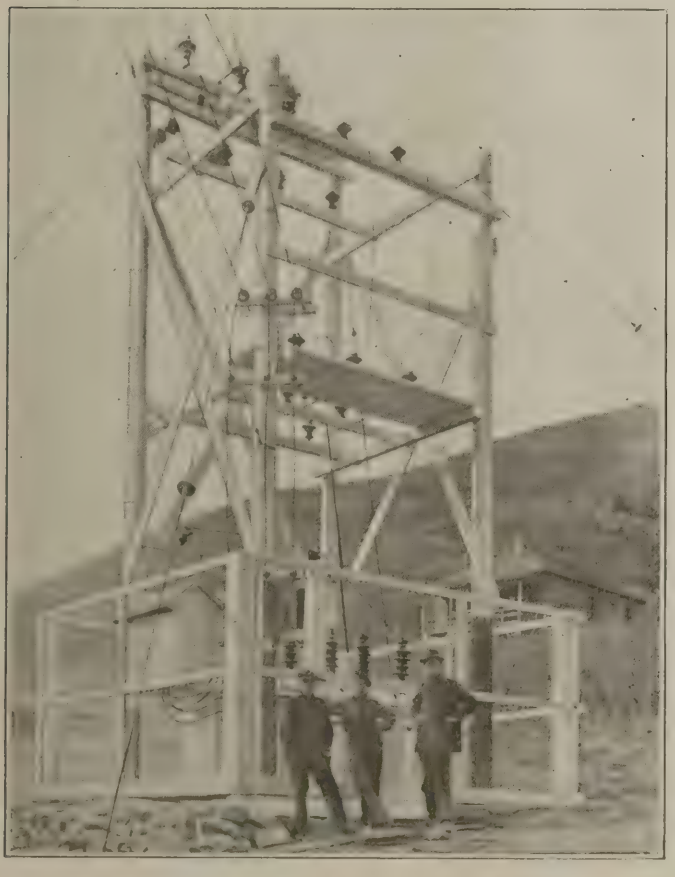


FIG. 5. OUTDOOR TRANSFORMING STATION

A third wire was run with the town lighting wires and five transformers were installed and wired up at different locations in the village and at the shops, reducing the 2200 volts to 110/220 volts for the lighting systems.

The central station power was received from Trinidad, Colo., a distance of about 35 miles. This power was delivered at the transformer tower at a potential of 44,000 volts, but was here stepped down to 2300 volts. The transformer tower was of the outdoor type and is shown in Fig. 5. This tower is only about 100 yd. from the power house. After all the new feeder lines and circuits had been installed the arrangement of lines was as shown in Fig. 6.

When all was in readiness for the change the mine was closed down at noon on Saturday, and by 7 o'clock that evening the generators, mine fans, tipple, shops and town lighting system were working on central station power. The entire system of house lights had to be changed from series to multiple wiring. This was done in three days. For temporary service one lamp socket in each series was plugged with a fuse and this allowed the use of the other socket.

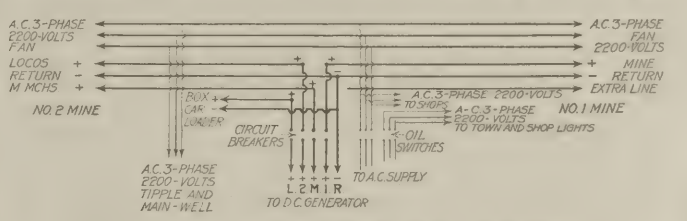


FIG. 6. DIAGRAM OF COMPLETED ELECTRICAL CONNECTIONS

The new installations were a success, and the operation of the substation now only requires one man where before it required the services of three high-priced men as well as the part time of several others. The substation is operated only during the day, as the fans, lights, shops, etc., do not depend for their current on the operation of the substation.

It will be noticed in Fig. 6 that the original direct-current fan breaker and switch were utilized, as was also the extra 4-0 copper feed line to No. 2 mine as a separate feeder line for the mining machines, thereby taking this load off of the feeder line for the mine locomotives. The circuit breaker and switch that had been on the town lighting circuit was utilized to advantage by placing it on the box car loader motor circuit. This was the only direct-current motor left in use outside. For various reasons it was decided to leave this motor in operation rather than change to an alternating-current machine. No mining machines were in operation at the No. 1 mine, so that there is now in place an extra 4-0 feed line to this point. It was decided to leave this line up for future use.

The change from isolated to central station power was successfully made without delay or accident. The use of induction motors on the mine-fan drives eliminates much of the trouble always experienced with the direct-current type of motor.

The change from a series system of lights at a high voltage to the standard 110/220-volt, multiple system is a decided improvement.



Northwest Needs Man Power

By CHARLES P. NORTON
Seattle, Wash.

SYNOPSIS — *The mines of the Pacific Northwest require more men in order to operate to capacity, and only by operating to a maximum will a local fuel famine be averted next winter. Living conditions in this region are excellent and opportunities for promotion many. Interrupted operation can be avoided by an extension of market. This would be particularly advantageous to the small mine.*

SHALL the country have a coal shortage next fall and winter, with all of its consequent suffering and delay to war work? Last winter the Pacific Northwest was the only section that did not suffer. Having just completed an investigation of conditions, I can forecast now what is liable to happen during the coming winter, even in the favored Pacific Northwest. This is a warning that should be voiced with vigor.

There is certain to be a shortage of coal in all markets. This will include household fuel, as well as steam coals, even if the output of the mines is maintained at the highest rate possible. In the Pacific Northwest, where conditions are most favorable, the maximum production cannot be reached unless at least 1000 additional laborers are found.

In all the mines of this region during June there was a shortage of men. The demand was great, the laborers were few, and men were leaving the mines every day —drifting into the cities and the shipyards. The mines of the Northwest were running June 15 at 75 per cent. of capacity. This was an improvement over the previous month, when the man power was about 60 per cent. The smaller mine owners are the ones who need the greatest encouragement from the Government in the way of enlarging the market, because, when the market becomes slack, the larger concerns with efficient and well organized sales organizations get the lion's share of the available business. The small mine is restricted, as a rule, in the possession of available capital, and cannot readily resume maximum operation after having suffered a slack period.

The percentage of lump or household coal produced is small, averaging 20 per cent. perhaps, of the total output. The remainder is used for steam coal and industrial purposes. If work slackens the mines can not produce household coals any faster than they can dispose of the 80 per cent. of finer (steam) coals. A good demand for household coals would make no appreciable difference.

What remedies can be applied? First, the market should be enlarged. A coal shortage exists all the time to the eastward. Therefore, coal should be kept moving east from the western district.

Harvesting and its demands upon man power will not affect the coal-mining labor supply to any marked extent, because few men of the mines go into the fields. The nationalities now represented at the mines are, in the order of the numbers employed, Italians, Swedes, Austrians, Slavs, Finns, Welsh and American.

Working conditions in the Northwest are good. The mines are well ventilated, the air underground being as good as it is above, while the working places are cool and comfortable. At all the mines the men with families can rent comfortable cottages, with large yards on which grass has been sown; and that may be kept up for $7 the month, plus 50c. for water (which is of the purest) and 50c. for electric light. At the company stores provisions and necessities, including desirable delicacies, are sold at just enough above wholesale cost to pay the expense of operating the store. Here

many commodities are offered at prices less than those demanded at even the largest stores of the metropolis. Government food regulation may change all this, but the *a priori* facts are as stated.

Wages at the mines are satisfactory. Underground miners get $5.89 a day; laborers $5.20; outside laborers $4.65. The boy supply in June was adequate. Outside boys get $3.40; underground boys $4 to $4.10.

The miners may work on a contract basis, and some who do so earn as much as $300 a month. They pay $2.50 to $3.50 per ton for the best lump house coal—less than it costs to take it from the mine.

The latest equipment, to reduce necessary man power, has made possible the firing of boilers by a greatly reduced force at one of the mines. Waste coal is handled by three men, where before there were twelve. The work has been coördinated also and simplified.

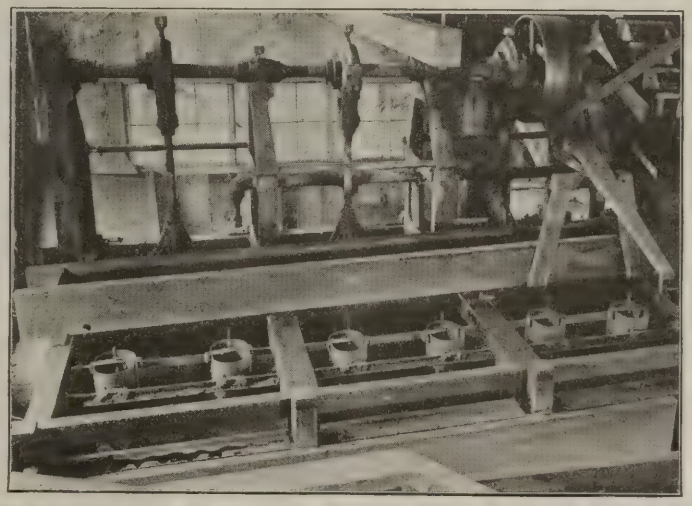
On account of slack production, coal cannot be produced and delivered any cheaper in summer than in winter. This might be done if production were full, but this is never the case in summer. The coal mines are dependent upon some one railroad line, as a rule, to deliver their output to market. In winter the rain and snowstorms impede the railroads and delivery of coal is uncertain. Teams and trucks cannot handle it.

Community welfare work at the mines is progressive. A welfare nurse has served admirably during the last three years. She started first to do her work with the school children, teaching cleanliness and sanitation. The children's teeth were examined and general work was done without cost. Small fees were paid by those who could afford it and who preferred to do so. Eyes were examined and glasses were supplied. Physicians in Seattle generously donated their services, or accepted small fees from those who desired to pay. This beneficent work started before the war, and during the slack market period, when the men were working half time and the foreigners were sending their surplus money to the "old country," so that they had a narrow margin above actual living expenses.

A model cottage was built at Black Diamond—the Seattle coal center—to show the miners how to establish a comfortable home, easily within their income. Women and children met frequently in the cottage, to learn scientific methods of housekeeping, cooking and sewing. This work has spread to all the camps and, in some way, reaches into the daily lives of all employees.

Social gatherings are held regularly at the mines and athletics is encouraged. The Black Diamond soccer team, for example, is noted for its championship performances in the cup tourneys of Seattle. Most of the coal-mining towns have baseball parks and also picnic and amusement grounds. Some places, especially Franklin and Coal Creek, have excellent bands. Practically all of the married miners have war gardens.

The coal-mining communities of the Pacific Northwest were among the first to inaugurate the practice of contributing regularly to the Red Cross. All the miners regularly give 1 per cent. of their wages, while the officials give 1½ per cent. In the third Liberty Loan, Black Diamond challenged all other towns of its size in America to equal its subscription. Its allotment was $6000 but its cash subscription was $63,650. The thrift stamp campaign also is well organized and the miners are continually increasing their investments. At each mine in the Pacific Northwest there is a committee of protection, to safeguard against treasonable acts of aliens. These organizations are formed exclusively of the employees, who constantly exercise the strictest surveillance over everything.



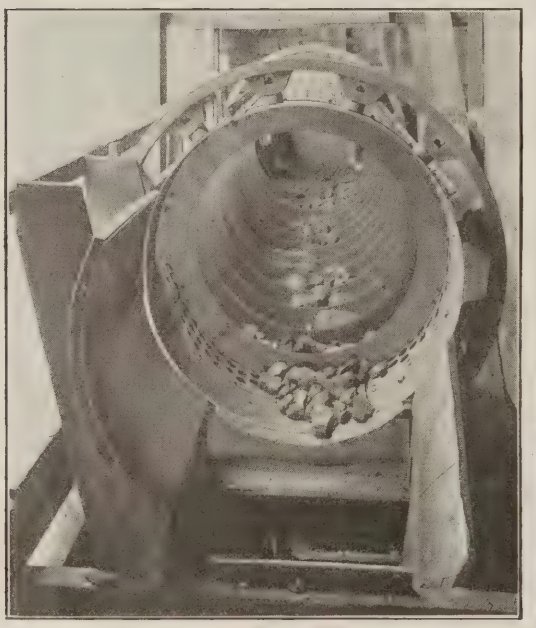




VARIOUS TYPES OF PREPARATION EQUIPMENT IN USE IN THE PACIFIC NORTHWEST



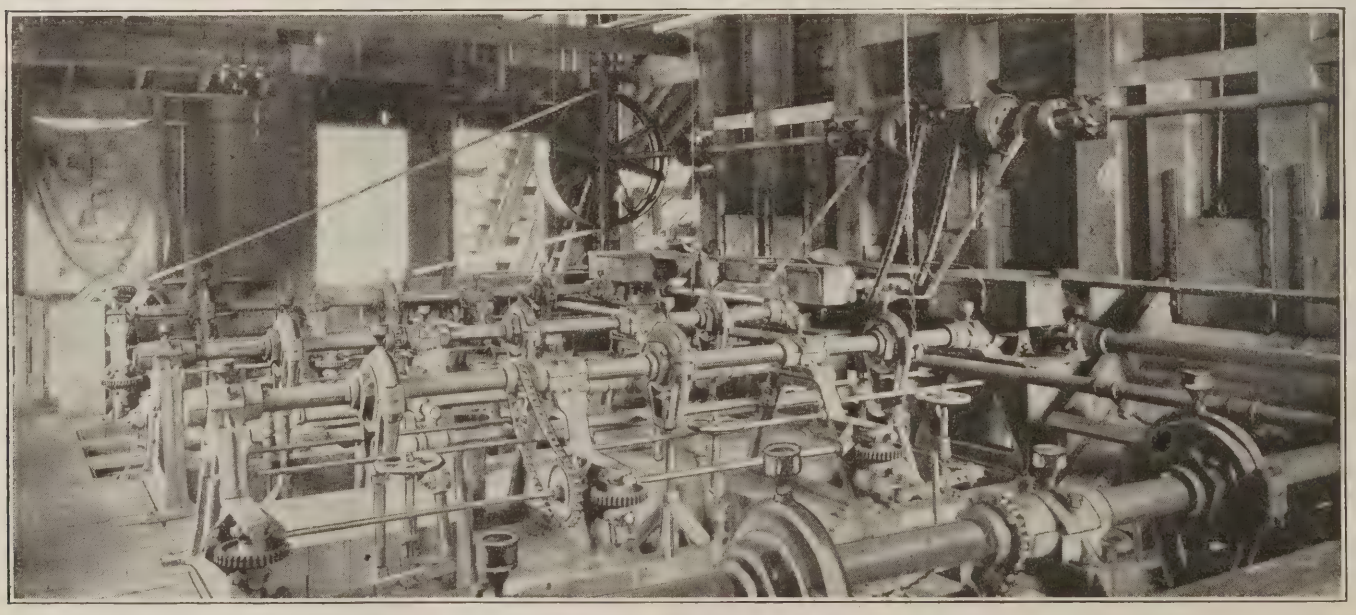
STREET IN A NORTHWEST MINING TOWN



REVOLVING SCREEN FOR SIZING COAL



TIPPLE AT A BRITISH COLUMBIA MINE



A BATTERY OF JIGS IN A PACIFIC NORTHWEST COAL TIPPLE

Opportunities for the men to advance their positions at the mines are excellent indeed. There is always a demand for experienced men who can qualify as foremen, superintendents, firebosses, etc. For example, a few years ago a certain employee of the Pacific Coast Coal Co. was driving a mule 12 hours a day for a wage of $1.80. He is now a superintendent. A chainman, who saw his first coal mine with the same company, a few years ago, is now a vice-president in charge of mining and general operations. There are many similar examples. Merit here comes to the top, and there is always room at the higher levels. In fact a majority of the officials of the Pacific Coast Coal Co. started at the bottom as miners or laborers, and a majority of the executives and foremen are men from the ranks.

The whole Northwest is now being combed, by a unique personal method, to find experienced men for the mines. One man, for example, having an extended personal acquaintance with miners, devotes his entire time to looking them up and inquiring for others. He frequents the hotels and amusement places and every miner whom he meets tells him how to locate others. This system is producing good results and man power is being somewhat augmented.

In these mines most employees can save at least 50 per cent. of their wages. Many of them are putting away more. The aggregate saving is thus enormous. The wash-houses at the mines, installed by the companies, become the property of the employees through the payment of a nominal sum monthly to cover interest and depreciation. The houses are equipped with shower baths and baskets for clothing.

The hospital association service, controlled by the men, costs $1 per month for each worker, and they employ their own physicians, who attend the miners and their families.

At least 500 more miners, preferably men with families, are wanted in the Pacific Northwest in order to secure maximum operations during the summer, fall and winter. If they are obtained, there will be no local shortage, and with maximum operation there will be a large surplus of coal for the Eastern markets.

On account of Seattle's importance in ship production for the Emergency Fleet Corporation, it is desirable that every effort be made to prevent a shortage of coal. In addition to ships the 1200 industrial plants at the Seaport of Success are now on a war efficiency basis and will be working night and day from now till the end of the war. Even after the close of hostilities they will be kept going full blast for years to supply local demands and those of Alaska, Siberia and the Orient.

Plant of Conemaugh Smokeless Coal Co.

By Charles Martin
Smokeless, Penn.

The Conemaugh Smokeless Coal Co. has made many modern improvements recently at its plant at Robindale, Penn. This village is located about 8 miles west of Johnstown, on the main line of the Pennsylvania R.R. and directly across the river from the town of Seward, with which it is connected by a swinging bridge.

The town is laid out with avenues paralleling the railroad and streets running at right angles thereto. A large plot near the center of the town has been left open and will be used as a playground and amusement park. The streets are graded and provided with tile sewers, while each street intersection is illuminated by an electric light.

The houses are of modern construction, being built of tile. Four- and six-room bungalows, five-room double and six-room single houses have been built. All are electrically lighted and provided with running water.

The town water supply is derived from a mountain stream. From this stream the water is pumped to a tank at the works that has an elevation of about 70 ft. This gives ample pressure everywhere in the town, but the water mains are also connected to centrifugal pumps at the mine, so that these can be used in case of an emergency, such as a fire.



SURFACE PLANT OF THE CONEMAUGH SMOKELESS COAL CO. AT ROBINDALE, PENN., AND A VIEW OF ONE OF THE STREETS

The coal is reached both by shaft and slope. The mine is electrically equipped throughout and the coal undercut by means of Sullivan shortwall machines. It is hauled to the shaft bottom by electric locomotives and hoisted on self-dumping cages. At the top of the tipple it is discharged upon a conveyor that carries it to the railroad cars.

A new 9 x 4½-ft. double-inlet reversible Sirocco fan, driven by a 205-hp. McEwen engine, to which it is direct-connected through the medium of a Frankie coupling, has recently been installed. This machine is capable of producing 200,000 cu.ft. of air against a 4-in. water gage. At present, however, it will be necessary for this fan to operate only at 82 r.p.m., at which speed it will produce 57,000 cu.ft. of air per minute.

Lunge gives a list of over 200 compounds which have been found or may reasonably be presumed to exist in coal-tar. In contrast with gaseous hydrocarbons those which are liquid and solid contain a much larger number of carbon atoms in the molecule and consequently deposit more carbon when they are cracked.—*Bureau of Mines Bulletin No. 135.*

Who's Who In Coal Mining

F. E. Herriman

F. E. Herriman, who was recently appointed to the new position of Coal Traffic Manager of the New York Central, began railroad service in 1874 as clerk to the superintendent of the Cincinnati, Sandusky & Cleveland, and served consecutively as secretary to the general manager, assistant to the president, and purchasing agent of that road, and coal and lumber agent of the Chesapeake, Ohio & Southwestern, at Louisville, Ky. In 1885 he was made General Freight and Passenger Agent of the Beech Creek, where he remained for 14 years. He then came to the New York Central as division coal agent of the Beech Creek district, and in 1901 was made General Coal Agent of this road and of the West Shore, where he remained until Oct. 1, 1905. He was also General Coal Agent of the Boston & Albany and other New York Central lines. Since the acquisition by the New York Central of the great Beech Creek coal properties and the railroad extensions into that bituminous coal region, Mr. Herriman has had charge of the commercial development. The problem was not the simple one of mining coal and selling it. In his relations with the other coal carriers, as well as with the users of coal, his work was probably as difficult and delicate as any that comes to a traffic officer. His was the duty of "butting in" with a new supply and a new line, and of course his instructions were to get a fair share of the business.



F. E. HERRIMAN

He continued as Coal Traffic Manager of the New York Central lines east of Buffalo until he was invited in September of last year (after 33 years' service as a traffic official of the New York Central lines) to join the staff of President A. H. Smith as the active head of the coal development policies of the New York Central lines. On June 19 Mr. Herriman was appointed vice president of the Clearfield Bituminous Coal Corporation.

Vancouver Island Production in May

The coal produced by the Vancouver Island (B. C.) mines during the month of May totalled 143,379 tons. This is 4718 tons less than was produced in April, which is accounted for by the May holidays. The tonnage produced by the various collieries was as follows:

	Tons
Canadian Western Fuel Co., Nanaimo colliery	63,807
Canadian Collieries (D) Ltd., Comox colliery	50,163
Canadian Collieries (D) Ltd., Extension colliery	19,781
Pacific Coast Coal Mines, Ltd., South Wellington	7,660
Nanoose Collieries, Ltd., Nanoose colliery	1,968
Total	143,379

The coal produced by Vancouver Island collieries for the five months up to and including May, 1918, totalled 717,266 tons, as follows:

	Tons
Canadian Western Fuel Co., Nanaimo colliery	328,299
Canadian Collieries (D) Ltd., Comox colliery	232,255
Canadian Collieries (D) Ltd., Extension colliery	97,781
Pacific Coast Coal Mines, Ltd., South Wellington	42,764
Nanoose Collieries, Ltd., Nanoose collieries	16,167
Total	717,266

In spite of the fact that the Jingle Pot Mine, Nanaimo, has been closed all year; that Nos. 1 and 2 slopes of the South Wellington colliery of the Pacific Coast Coal Mines have been abandoned; that No. 4, Extension colliery, of the Canadian Collieries (D), Ltd., also has been abandoned; that No. 6 Mine, Comox colliery, Canadian Collieries (D), Ltd., has been closed; and that some of the other mines have been put on single shift because of lack of labor, the tonnage of the Island mines has been maintained to last year's standard, within a few thousand tons. To date the Western Fuel Co. has made a gain over last year's tonnage of 60,000 tons and the Nanoose collieries of 9786 tons.

New Plant for Connellsville Region

A corporation known as the Rainey-Wood Coke Co. has been organized by the W. J. Rainey interests, operating coal mines and coke works in the Connellsville region, and the Alan Wood Iron and Steel Co., with blast furnaces and steel works at Swedeland, Penn., for the purpose of constructing a large byproduct coke plant of 330 ovens at Swedeland, Penn. The coal for this plant will be furnished by the W. J. Rainey mines in the Connellsville region. Work has been started on the first unit of 110 of these ovens, and it is expected to have the plant in operation within fourteen months.

This first installation will supply coke, gas and tar to the Alan Wood Iron and Steel Co. and will have sufficient additional capacity to furnish foundry coke for the Eastern market. A complete byproduct recovery plant will also be constructed for the purpose of furnishing sulphate of ammonia and toluol to the United States Government.

It is proposed to install the remaining units at the earliest possible date, in order to insure a continued coke supply for the independent blast furnaces in the Schuylkill and Lehigh Valleys.

After the soot has once been formed it is difficult to burn it in the atmosphere of the furnace. This fact has been observed by many investigators, and some of the early writers on combustion even considered soot as noncombustible.—*Bureau of Mines Bulletin No. 135.*



Alleges Great Profits Were Made by Many Coal Operators

Nothing short of a sensation was caused in Washington by the report of the Federal Trade Commission dealing with the profits of various industries. The commission finds that the bulk of the coal production has been marketed at large margins under the Government's prices. After reviewing the situation in the flour-milling industry, in which large profits were made, the commission says:

The situation in coal gives still another angle of view to the same problem. Maximum prices were fixed by territorial divisions. Many of the coal producers have not taken the maximum, but due to the fact that in a given field there is a very wide range in the cost of the coal produced in that field, it follows that certain low-cost producers have made very large margins under the system of governmental fixed prices for the field. Many high-cost producers have made small margins. The bulk of the production of course enjoys the large margin. Information on the return on the investment, now being collated, will reveal the exact amount of profit. Percentages of profit worked upon investment will obviously be very large in the case of low-cost companies.

The experience with steel, flour and coal shows that a high stimulating fixed price, while stabilizing an ascending market, produces an economic situation which is fraught with hardship to the consuming public and with ultimate peril to the high-cost companies through increasing the power of their low-cost competitors.

Continuing, the report has the following to say with regard to coal:

In connection with the distribution of coal it may be pointed out that prior to the official regulation of jobbers' and of retailers' margins in August, 1917, there was evidence that many of the margins were unduly high when compared to the pre-war margins. Details can be found in the Report of the Federal Trade Commission on Anthracite and Bituminous Coal, June 20, 1917. Since the regulation was established most of the jobbers' transactions have been carried on within the fixed margin, and whenever violations have been detected the jobbers have been forced to refund the overcharges. It should be understood that jobbers' and retailers' margins do not represent net profits alone, but also include all expenses incurred by them from the time coal is purchased until it is sold.

Generally speaking, the bituminous coal operators in 1917 had very much larger margins than in previous years. While in 1916 the margins (what operators actually received for coal sold over f.o.b. mine cost) may be regarded in some cases as lower than normal, yet the margins of 1917 were often two or three times the normal return. In the figures for 1916 and 1917, mentioned below, return on investment must be covered in margins shown. The increase of margins is illustrated by an examination of the returns for 1916 and 1917 of 23 typical bituminous coal companies in the central Pennsylvania field. The average margin of these companies in 1916 was 20c. per ton, and in 1917 was 90c. The highest margin for any company of the 23 companies in 1917 was $1.85. The corresponding margin for this company in 1916 was 41c. Similarly, the lowest margin for any of these companies in 1917 was 27c., the corresponding margin for the same company in 1916 being 13 cents.

Maximum coal prices f.o.b. mines were authoritatively fixed Aug. 21-23, 1917, by executive order, and subsequently modified by the Fuel Administration. Contracts made before that time were not invalidated. In some fields as high as 90 per cent. of possible production was sold under contract prices. While some contracts were below legal maximum price, probably much the greater part of the coal sold under contract went at prices substantially in excess of legal maximum prices fixed for current sales.

April realizations contain relatively little coal sold on contracts made prior to Aug. 21, since most such contracts expired Apr. 1, 1918. Sample reports for April operations, covering 12,619,274 tons actually mined in West Virginia, Pennsylvania, Ohio, Indiana, Illinois, and Kentucky, show an average margin between claimed f.o.b. mine cost and actual realization from sales of about 54c., as against a pre-war margin of an average of 10 to 15 cents.

In anthracite the average receipts per ton, including all sizes, during the year 1914 (13 companies, producing 79 per cent. of the total tonnage in 1916), were $2.86 per ton. The average receipts per ton of anthracite, including all sizes, allowing for later obligatory summer discounts on prepared sizes, during the period January-March, 1918 (six companies, producing 50 per cent. of the tonnage in 1916), were $4.26 per ton. The average labor cost increase per ton since 1914 was $0.76, and if this is deducted from the 1918 average receipts per ton an increase of $0.64 per ton (or 22 per cent.) in average receipts is indicated without allowance for increased cost of supplies and general expense.

In Charge of Clean Coal Inspectors

Inspectors charged with examinations to determine that the clean-coal regulations of the Fuel Administration are being carried out have been placed under the immediate direction of J. M. Roan. Mr. Roan's headquarters will be at Columbus, Ohio.

To Save Considerable Coal by Economy in Industrial Power Plants

Fully 20,000,000 tons of coal will be saved this year, the Fuel Administration expects, as an outcome of savings which are being effected at power plants. There are 250,000 industrial power plants in the country. At many of these, the amount of waste is considerable. Every power plant east of the Mississippi River is to be visited by an inspector and given a rating based on the thoroughness with which the owner of the plant carries out the conservation recommendation. The plan is based

on the use of the present equipment without the installation of fuel-saving apparatus.

Administrative engineers will be in direct charge of this work. Thomas R. Brown, of Pittsburgh, will direct the conservation program in western Pennsylvania. George R. Henderson, of Philadelphia, will be in charge in eastern Pennsylvania. The campaign in the State of New York will be directed by Edward N. Trump, while W. R. C. Corson, of Hartford, will be the engineer administering the work in New England. Henderson W. Knott, of New York, will manage the field force from headquarters in Washington.

Price of Lump Cannel Coal Increased

On securing a permit from the Fuel Administration, lump cannel coal may be sold at $1 per ton in advance of the run-of-mine price of bituminous coal in the same district. An additional charge of 50c. is permitted if it is loaded in box-cars.

New Ohio Coal Prices Announced

Price revisions for Ohio were announced the latter part of last week and were distributed by the Southern Ohio Coal Exchange. As the new prices were made effective at 7 a.m., June 29, the changes were made at short notice. The most noteworthy readjustment made was that of naming counties and townships in the making of prices. The coal is not classified solely as of thick- and thin-vein, as in the former price list.

The counties of Hocking and Athens, and the south half of the township of Monroe, in Perry County, is defined as the thick-vein field, and the new prices are: Mine-run, $2.55; prepared sizes, $2.80; slack, $2.30.

Prices for Bailey Run, or No. 7 seam, which is defined as thin-vein, are: Mine-run, $2.95; prepared sizes, $3.20; screenings, $2.60. In Guernsey and Muskingum Counties, which is also classed as thin-vein, the prices are: Mine-run, $2.70; prepared sizes, $2.95; slack, $2.45.

In Meigs County, which is known as the Pomeroy Bend field, the prices are: Mine-run, $2.80; prepared sizes, $3.05; screenings, $2.55.

Jackson prices are reduced about 15c. on the ton to the following: Mine-run, $3.45; prepared sizes, $3.70; screenings, $3.30.

Prices in eastern Ohio, or Pittsburgh No. 8 seam, are unchanged.

Weekly Production Statistics

Production figures for the week ended June 22 are as follows: Bituminous coal, 12,016,000 tons; anthracite forwardings, 41,170 cars; beehive coke, 604,000 tons; byproduct coke, 489,542 tons. With the exception of byproduct coke, each of the totals is a decrease, as compared with the accomplishments of the week preceding.

While the decrease in the production of bituminous coal was 5 per cent., as compared with that of the week preceding, the output was still safely above 12,000,000 tons. The fact that that figure has been exceeded for three consecutive weeks has caused great encouragement at the Fuel Administration. The total production for the last twelve weeks has been 137,705,000 tons. The production for the week ended June 22 was 60 per cent. greater than that during the corresponding week of 1917.

The decrease in anthracite shipments was 1.9 per cent., as compared with the week preceding, but is above the average number of cars forwarded weekly.

Shortage of labor was the only important factor interfering with the production of beehive coke, during the week ended June 22. Owing to the inability to secure yard labor, it is estimated that the production of 106,000 tons of beehive coke was lost. Cars could be had in ample quantity at practically every oven. Byproduct ovens were operated at practically 90 per cent. of maximum capacity. Necessary repairs to plants was the chief limiting factor, to which was added some loss of production, due to labor trouble.

Figures referred to in the foregoing are estimates made by C. E. Lesher, the geologist in charge of coal statistics for the United States Geological Survey.

Needless Illumination To Be Cut Out

Failure on the part of nearly every city and town in the country to prevent a waste of electricity has made necessary new action on the part of the Fuel Administration to save the coal which is being used for needless illumination. This action is taken, Dr. Garfield says, because "the country needs now—and for the whole period of the war will need—more coal than it can possibly produce and transport."

Profits Made by Coal Companies Exaggerated

Of the 2698 corporations engaged in mining coal during the year ended Dec. 31, 1916, only 1833 were conducted with a profit. This fact was brought out when the Treasury Department made public its compilation of income-tax returns for 1916. The disclosures of this report are held to be the best indication that the conclusions of the Federal State Trade Commission with regard to profits of coal-mining companies are exaggerated.

Brief Washington Notes

R. C. Norfleet, of Winston-Salem, has been named state fuel administrator for North Carolina.

The United States Fuel Administration has taken direct charge of fuel requirements for the District of Columbia.

Joseph H. Frantz, of Columbus, has been appointed fuel administrator for Ohio. He is vice president of the Columbus Iron and Steel Company.

Twenty-five additional inspectors have been appointed by the Fuel Administration to guard against the shipment of coal for bunkering purposes which is not up to standard.

Back up those who are offering their all—buy War Savings Stamps.

When you buy War Savings Stamps you do not give—you receive.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

Already restrained as to the prices at which they sell their coal, the operators are now to be restrained as to the wages they shall pay. This restriction they are quite willing to approve; in fact, it seems to have been first advocated by certain of them. Central Pennsylvania appears to have had more than her share of fly-by-night mines which were ready to pay all manner of bonuses and ready to give all kinds of prizes. No one objects to anything which will encourage production, but the action of bonuses and prizes was not so marked apparently in the stimulation of output as in the increase of turnover. The men were always being coaxed from the employ of the mines paying the regular wage scale to enter some other mine where a lordly bonus added to the earning.

Central Pennsylvanians have always been keen competitors. They formerly competed bitterly as to sales and railroad cars; now their competition is for men. In either case the energy of their business methods results in making their industry unprofitable. The drift of men from mine to mine makes it hard for the railroad to apportion cars equitably, because the capacity of a mine depends on its working forces, and where men are drifting around, no one on the railroad can tell how many cars any mine should have. Moreover, when men are shifting back and forth with their families, there is a minimum of output and in the long run no one is the richer.

NAY AUG IS GOING TO TRY THE NINE-HOUR DAY

The anthracite region's difficulties are but little changed, though the energy which the operators are exhibiting in "Win the War" propaganda promises success. The Nay Aug Coal Co., a small company at Dunmore, in the Scranton district, has induced its men to work 9 hours.

In the Lansford district many men are refusing to sign production pledges. They say it requires of them too uncompromising a promise to work whenever physically able, but their contract already demands this and nothing less than this. They cannot strike now without violating binding obligations. But this new pledge being signed personally, not collectively and by delegate, is more solemn than the wage agreement, even though it is not balanced by any return pledge on the part of the operator. The mine workers, therefore, balk at signing it. It is no time for such a decision as they will soon find if they persist in working irregularly.

In Illinois, Belleville and Taylorville have been chosen two of the subdistrict headquarters. Next year's subdistrict convention in the Belleville district goes to Collinsville. A labor temple will be built in Belleville after the war and every subdistrict will probably have a similar building to house its activities.

CHARGED WITH THREATENING TO BLOW UP MINE

Dominick Coma, of Edwardsville, Ill., is under arrest, accused of threatening to blow up a mine at Troy, Ill. He is also said to have interfered with the draft. It is stated that he drew the pay checks of two miners who disappeared just before the time at which they were required to register for the draft.

Because Senator L. V. Sherman has denounced the labor disturbances in and around Springfield as unpatriotic, the mine workers of that district to the number of 12,000 resolved recently that "by his tactics of stirring up class hatred he is rendering aid and comfort to the enemy" and should be "interned during the war."

The operators of this country have always been opposed to propaganda. Nothing has been harder than to arouse them to the necessity for an expression of their views as to the way in which their employees should meet the industrial conditions. But at last in a fuller measure they are beginning to realize their leadership.

When they come to present their views to their men, perhaps those views will be somewhat modified and amended and that perhaps will not be at all unfortunate. It is well to be obliged to study the reactions of others. It sometimes enables one to see the other man's point of view, which will be found not entirely devoid of reason.

In the Southwest the publicity campaign has taken the form of issuing the minutes of a conference relating to the production of clean coal in large quantity. Perhaps the mine workers will wade through this cumbrous document and learn that the nation and not merely the operator is calling on him for clean coal. But the Southwestern mine worker must be a studious fellow if he will do more than glance at the lengthy pamphlet with its fine type, copiously signed as are the resolutions in it, on behalf of the union, the operators, the fuel administrators and the coal inspectors.

HOLD A CLEAN-COAL CONFERENCE IN SOUTHWEST

The conference referred to met on June 17 at Kansas City and was attended by the Southwestern Interstate Coal Operators' Association, the Oklahoma Coal Operators' Association and the Iowa Coal Operators' Association, the presidents of the union in District 13, Iowa; District 25, Missouri, and the vice presidents of the union in District 14, Kansas, and District 25, Missouri. H. N. Taylor was present as district representative for Production Zone 17, with Charles Means, who is general manager of the Inspection Department of the United States Fuel Administration.

A patriotic poster issued by the Southwestern Interstate Coal Operators' Association tells the story regarding the need for more coal in words that cannot fail to appeal.

It is interesting to notice that mine workers in Illinois are now striking to compel the employment of a woman at a mine job. On the other hand, a few days ago the anthracite miners were threatening to strike to prevent the employment of women, and they could not be pacified till the women were ousted.

But neither operator nor mine worker dare be satirical about this. The story could be told in another way. The operator in Illinois who refuses to employ this woman and would rather have a strike of his men than engage her is acting in a manner almost exactly contrary to the operating company in the anthracite region that put on several women and tried to make the mine workers permit of their employment.

Some special reasons made the mine workers favor her and doubtless special reasons may make her employment undesirable to the operator. But on the face of the situation as presented it is not possible to declare either mine workers or operators the more unjustified in their contradictory stand, but this should be added, that a strike, especially a strike to disturb the present status, is not now justifiable.

Will Not Collect Death Benefits

The Susquehanna Collieries Co., with many other coal corporations in the anthracite region, has a matter of dispute with its employees that should be settled without delay if steady production is to be maintained. In the issue of June 15 the difficulty of the Lehigh & Wilkes-Barre Coal Co. in the matter of funerals was discussed. The Susquehanna company has a somewhat similar trouble. Three men were killed in a cave-in of the Short Mountain colliery, one of the Susquehanna operations, on June 17. On June

20 and 21, 1000 men employed at that colliery refused to work, declaring that such work on the day of the funeral of a victim of the operation of the mine was against the provisions of their local union.

It appears that the Susquehanna Coal Co. at the request of the mine workers' union agreed that whenever one of its men was killed it would deduct 25 per cent. from the wage, for a single day, of every mine worker employed at the plant. After the company was required by law to compensate the mine worker's family whenever an accident occurred, this seemed an unnecessary provision. The argument of the company was that the men could make any private collections they saw fit, but the Susquehanna Coal Co. did not feel that it was right to compel men to pay a compensation to people who were already well protected by law.

This is the attitude of the Susquehanna Collieries Co., which has recently succeeded the Susquehanna Coal Co. The funeral of two of the three victims occurred on June 20. The third was buried on the day following. The employees of the colliery observed both days as a holiday, declaring that only in this manner would the company suffer them to show their sympathy with the bereaved. About 4000 tons of coal would have been mined in the two days had the miners worked steadily. It must be understood that these funeral strikes begin and end on the day of interment of the unfortunate mine worker involved.

Which Men Aid Their Country Most?

Loyalty demonstrations still occur from time to time in the Illinois field. In Edwardsville, where a jury acquitted the lynchers of Robert Paul Prager, German enemy alien, 35 men went the other night to the home of Jacob Gent, a coal miner. This man's loyalty had been brought into question because he wrote to Governor Lowden denying the alleged disloyalty of the Rev. J. D. Metzler, a Catholic priest, who had been driven out of the town. He was made to swear his loyalty and kiss an American flag, which was then erected in front of his home.

Now that the railroads are giving a better car supply, the wonderful efficiency and patriotism of some miners and companies is being attested by the large earnings some of the miners are now making. It may be added that such efficiency and patriotism is not only creditable to those exhibiting it, but pays big dividends to the efficient and patriotic. Among all the miners of large production in Illinois George Weiss, of Freeburg, in St. Clair County, claims the first place. In his last pay envelope was $240. It was the earnings for only two weeks' work, eight hours a day. During that time two half days of time were lost. The previous record for two weeks' work in the Illinois field is said to have been $198. Men who quietly occupy themselves in mining coal do more for their country than those who run around hounding men like Prager and Gent against whom no charges can be substantiated.

Banning Bonuses and Overpayments

A meeting of the coal operators of the District of Central Pennsylvania, was held at Washington, D. C., on June 26. It was called to consider a remedy for the evils growing out of the so-called "bonus system." The following resolution was unanimously adopted:

"Whereas, it has been brought to our attention by the Fuel Administration that many coal operators are granting bonuses and other inducements for labor, thereby causing unrest, unusual labor turnover, and interfering with the maximum production of coal;

"Resolved: That we recommend that the Fuel Administration close down those coal mines in central Pennsylvania, as being wasteful and too uneconomic to operate during the present war, where the wage rates or conditions offered exceed the rates and conditions in effect under the Washington Agreement, as applied to the Central Pennsylvania field, or decisions of the U. S. Fuel Administration thereunder.

"That a board of five members be constituted by the Association of Bituminous Coal Operators of Central Pennsylvania, which shall determine in each case, after hearing the statement of the operator, whether he is operating wasteful and uneconomic mines such as are above described. The findings and recommendations of this board are to be subject to appeal to the Fuel Administration by any aggrieved party."

This arrangement having the approval of both the Association of Bituminous Coal Operators of Central Pennsylvania and the Central Pennsylvania Coal Producers Association, was naturally regarded by the United States Fuel Administration as a practically unanimous request from the coal industry in central Pennsylvania. The Fuel Administrator approved of the proposal but ordered that the board should have nine members, five to be nominated by the Association of Bituminous Coal Operators of Central Pennsylvania and approved by the Fuel Administrator and four others, consisting of the Presidents and Secretaries of the Association of Bituminous Coal Operators of Central Pennsylvania and approved by the Fuel Administrator and four Association.

The authors of the resolution proposed that a penalty be provided for those violating the Washington agreement, but this did not satisfy the Fuel Administration.

Peoria Subdistrict Organized

Subdistrict No. 2, District No. 12, United Mine Workers of America, has been organized at Peoria. The new subdistrict includes Peoria, Tazewell, Fulton, McDonough, Rock Island and Mercer Counties, as well as the mines at Sparland, Ill. W. E. Sherwood, of Canton, was elected president; M. Gallagher, of Hanna City, vice president; and W. H. Thrush, of Hanna City, secretary and treasurer. The compensation of the president and secretary-treasurer was fixed at $2035 and expenses per annum. The compensation of the vice president was placed at $6.50 per day when actually on duty. The headquarters will be at either Peoria or Canton. The new subdistrict was organized in a blaze of patriotic fervor and a determination to produce coal for the nation in greater quantities than ever before.

Illinois Miners To Mine More

President Frank Farrington, of the Illinois miners, speaking at the district convention at Springfield, said that the shortage of coal next winter would be more keenly felt than last winter, and that it was the duty of the miners to work every day so as to mitigate the famine which is sure to come. "Five million men will soon be fighting in France under the American flag," he said. "Many of these will never come back. Many will return crippled for life. How can a man who has not done his full share associate with the men who have given so much for their country? Can a man who refuses to do an honest day's work look these men in the face?"

The Springfield district convention adopted a resolution imposing a fine of $25 upon any miner who fails to drive a 12-ft. room neck a full 12 ft. wide. It was decided to lodge a protest with state mining officials against the high prices now being paid by miners for blasting fuses. It is said that though the fuse is expensive it is nevertheless faulty and dangerous. The state officials will be requested to take the matter up with the National Government.

In Illinois Union Backs Minerettes

Chivalry and patriotism are being invoked by 600 miners employed by the Chicago, Wilmington & Franklin Coal Co. at Thayer, Ill., to justify a strike which has continued two weeks and which officers of the United Mine Workers of America have been unable to settle. The demand of the men is that a woman with two children, whose husband has gone into the army, shall be given the job of the weighman at the mine, William Shutt, who was called to the colors two weeks ago.

When Shutt went away the war widow, who lives at Virden, was an applicant for the vacancy, and the miners favored her application. But the company employed Frank

Riva. The top men immediately filed an objection and were backed up by the diggers. Demand was made upon the company for the removal of Riva and the appointment of the woman. The company refused to give her the place and the men quit work. In the two weeks since they threw down their tools they have worked only 10 hours.

On Friday of the first week of the shutdown state officials of the union visited Thayer and prevailed upon the men to return to work. They worked five hours that day and five hours the next day, which was the day of election of union officials, and for this reason was a short working day. By Monday morning the effect of the officials' arguments had evaporated, and the men have continued to absent themselves from the mine. A Canadian army recruiting officer who happened to be in the neighborhood tried his hand as a peacemaker, but had no success. Pressure has been brought to bear upon Riva to resign, but he refuses. He is said to have been threatened. Many of the miners, pending a settlement of the dispute, have been helping in the harvest fields.

Missouri Miners Make Demands

Missouri is not much of a coal-mining state. The coal mines of that commonwealth are farther away from the river towns of Missouri than are the mines of Illinois. As the river towns include St. Louis, it is easy to see how sadly the Missouri mines are left in the cold. The refineries of the eastern part of the state are far closer to Illinois mines than to Missouri mines, and the Joplin lead and zinc district is almost equally remote from both Missouri and Illinois fields. However, Kansas City and St. Joseph are notably nearer the Missouri fields than those of the rival state.

The Missouri mines thus have a considerable handicap, which might not be decisive if the coal were purer and thicker. Unfortunately, the seams are quite usually thin and not exceptionally clean. As a result the mining field of Missouri has not been a regular and important producer.

The mine workers in the Fulton district, Callaway County, are demanding such large increases in wages that the operators are unable to pay the increase unless they can increase the selling price. This they are unable to do without Government permission. They are quite willing to have the Government take over the mines if it can be induced to do so. The miners are now getting $1.62½ a ton (6½c. a bushel) for open rooms and $1.87½ a ton (7½c. a bushel) for corner rooms. They demand $2 and $2.25 a ton (8c. and 9c. a bushel) respectively. For day work the mine workers are getting $3.25 a day. They demand $4.50. For room turning they want an increase from $7 to $10, and an extra payment in rooms where it takes two men to push out cars. The operators will have a meeting in a few days with County Fuel Administrator Harry Atkinson, who adjusted the wage controversy last year. There are eight mines in the district.

Judging by the comparatively low day wages, the digging of coal in the Fulton district mines must be accompanied with many difficulties or otherwise the miners would make many times as large a wage as the day men.

New Light on Production Problem

One can trust the union to look upon the production problem from a different angle to the operator, but it is well to see the union point of view. It is apt to be not entirely unjustified. While urging the mine workers to work on the Fourth of July, work being the best kind of patriotic demonstration, President J. R. Kennamer and Secretary J. L. Clemo are sending to every local union a questionnaire.

The first question is one which an operator might ask: "How many days or hours were lost during the week on account of miners lying idle?" After this come a lot of questions which show that there are joints in the armor of the coal operator. He might well be asked to consider them. Bunching the questions together they run: "How many days or hours were lost during the week; (2) on account of miners having no timber for their places? (3) on account of bad air? (4) on account of water? (5) for lack of switches or track? (6) on account of the coal not having been cut in time for the loader by machine cutters? (7) from lack of railroad cars? (8) by reason of the necessity for handling coal two or three times before loading? and (9) by waiting for mine cars to be placed?"

Other questions inquire: "How many men were sent home every day in the week on account of grievances with officials of the company? What is the average car turn per miner per day? How many cars could be loaded per day by each miner if the company would keep a square turn and supply an ample number of cars?"

There are two sides to the mine-car question. Give the miners all the cars they can load as soon as they can load them and they will load what they want of them and go home. Consequently, there is no disposition to create "rush-hour" conditions by excessive equipment of cars, mules, locomotives and what not, nor by the employment of large numbers of drivers and motormen so that the work of the day can be done in the early part of the morning.

If the men would work hard for eight hours a day, the operator would be repaid in buying enough cars and equipment to give every man a turn equal to his utmost capacity. But they will not do so, and when an operator has sufficient equipment to bring out in a full day what the men are willing to load he is not disposed to buy more. The length of day having been shortened in Alabama, and equipment being exceedingly expensive and hard to obtain, the probabilities are that the equipment supply is somewhat inadequate. In fact, at most mines if the men show a disposition to do their utmost the equipment, which is only attuned to ordinary industrial effort, fails to respond to the great demands made on it.

How They Do It in Pascagoula, Miss.—The shopworkers of Pascagoula, Miss., give one day's pay for four months in aid of the Red Cross. Edmon J. Lane, chairman of the Red Cross Fund, says to Chairman Hurley, of the United States Shipping Board, in a telegram, "They are the finest bunch of generous, patriotic, true American citizens a community ever boasted and we are proud of them. These same shipworkers were responsible for our county making five times oversubscription on third Liberty bonds.

Must Seek Unskilled Labor from Government—The United States Employment Service has now been greatly developed and separated from the Immigration Service. After Aug. 1 the Employment Service will be the authorized medium through which to obtain unskilled labor, though men applying for work at a plant may be engaged. On June 17 the President solemnly urged "all employers engaged in war to refrain after Aug. 1, 1918 from recruiting unskilled labor in any manner except through this central agency."

Employes of Two Companies Get Favorable Wage Decision—On June 17 Charles P. Neil, the umpire of the conciliation board decided in favor of the men at the Clinton colliery of the Delaware & Hudson Co., awarding them an increase in their wage of 7 per cent. instead of the 3 per cent. that had been paid them under the company's interpretation of the last contract. The footmen at the Packer No. 3 colliery of the Lehigh Valley Coal Co., near Shenandoah, also received a favorable verdict, men receiving 27c. per hour being awarded 32c. by the umpire.

Mining Pays a Young Man Far Better Than Teaching—School teachers and high-school graduates are recorded to be entering the mines in Harrison County, West Virginia, which forms the southern half of the Fairmont field centering around Clarksburg. A score of teachers are already at work in the Fairmont district. Some of the younger men have been compelled to enter the mines by the pressure of the regulations against idleness, both Federal and local. The wages earned are large now that work is reasonably steady. One Syrian miner made $148.39 in two weeks, yet there was one day of lost time in that period. Many miners are making from $126 to $140 every two weeks.

EDITORIALS

Foreigners Expect Hardships; Why Not Disappoint Them?

THE laboring man of Europe comes here from a picturesque little village. It may not be sanitary, nor comfortable, nor commodious, but it is almost sure to be pretty and homelike. The men who come to our mines from foreign countries are mostly farmers, not miners or city dwellers. Their homes are embowered in the verdure of trees and gardens, with many a quaint and artistic adornment.

They come here to make money, and make it quick, and go home. They do not worry much about where they live or where they work. They are quite generally not intending to become naturalized when they arrive in America. Citizenship is quite rarely what these farmers expect to seek when they come here.

What do we do with them? We fall in with their ideas. We give them a chance to make money, lots of it. We house them as they are quite willing for a time to be housed. But home was never like this, and eventually they go back to the pretty home they left.

They take a lot of American ways with them. They wear American clothes and show by their new modes of life and democratic self-recognition that America has left its impress on them. They cause more foreigners to try their fortunes in America. These come, not intending to stay, though many ultimately make it their home. Perhaps we work out our destiny in this way as well as if we kept every foreigner who entered our ports. These homegoers send us recruits; they preach our gospel of equality, and they start weaving kindly fairy tales about us, as people quite generally do about the lands where they spent their earlier years.

But if we really want to keep them, naturalize them and rivet them to the soil, we must give them comfortable homes and beautiful surroundings and not merely such a house as they will accept as their temporary barracks.

They are like us. They like beauty just as much as we do, though most of them are not voluble in the expression of it, and many not overcareful in its preservation. Art in all its many forms is at least as indigenous to Europe as it is here. The people of Europe are more imaginative and impressionable than we are. Yet we think they will call a barracks home, and living in a squalid village will learn to become magniloquent about America. We all know it can't be done.

The America they know is the America they live in. The nation they know is not the nation expressed in ideals, but the nation expressed in the living conditions with which their lives are environed. The foreigner has no reason to complain. He came for money and he gets it. But though this is true, it is equally true that too often he has no reason to stay when the money is made. He wishes to spend his last days in a smiling environment, so he goes where nature smiles, and where he has friends who welcome him. He can hardly be blamed. He leaves without rancor, but he leaves nevertheless.

Do we want to hold him here? If we do, we must let him see something in America that will appeal to his inner temperament. He is more apt to talk about money than anything else, but is there nothing else he thinks about? Most of us find it hard to express the finer motives that actuate our lives. How much harder it is for the man who, not speaking our language, lacks even the vehicle of that expression.

Fair and Unfair Taxation

THE PUBLIC is being brought by Congress to favor reasonable principles in its treatment of war industries. The disposition of Congress is not to single out for taxation the profits of war industries, but to put the burden on all excess profit from whatsoever industry obtained. A jeweler or platinum jobber who makes a large profit by keeping platinum on hand while the price soars is just as much entitled, and in fact far more entitled to pay a tax than the manufacturer who is making something in platinum that will serve our war interests.

The reply is, of course, that the manufacturer of useless things is going to be put out of business or restricted in his operations—after a while. Meantime he is allowed to go on his way almost unmolested, and there is a disposition with some to subject him to a taxation lighter than that put upon the man on whom the burden of war preparation falls.

We have recognized by our large pay to shipworkers the necessity and even the justice of allowing a generous reward to those who give up their regular occupations and tear themselves from their homes to engage in a war industry. We acknowledge that without this reward men would go on working at their old jobs around their own homes. The change to a new job in a new town involves expense and risk for which we are willing to pay them, for which, indeed, we must pay them, unless conscription of labor is to be resorted to.

Sometimes we cannot see that capital is equally entitled with labor to be rewarded for effectual service in war industry. But if we can not apply to capital what we apply to labor, we may, at least, concede that it is entitled not to be penalized for its support of the war.

The Federal Trade Commission has been investigating the production of essentials and found that some persons are making big profits in the manufacture of war necessities. It must be remembered that the Commission did not inquire into the production of nonessentials, but if it had it would have found that large profits were made in this work also. The natural result is to direct the public indignation against the industries thus exposed and leave the others, the less honorable businesses, free of censure.

It is like the attitude we take to the idler. Never having worked, we accept his idleness as a natural condition; but of the worker we demand that he shall come to work at the hour and for the time designated. We have learned to rely on him, and we turn on him uncompromisingly when he shows a disposition to be as undependable as the idler. It was as a reaction to this report that the war-industries tax was advocated. Reflection shows that the worker industries should, at least, have equal treatment with idler industries and pay no larger proportion of their receipts to the state.

A straight excess-profits tax applicable to all industries, essential and nonessential, does not penalize the manufacturer of war-worthy materials, nor does an income tax. Of all imposts, the income tax is the most equitable, while a tax on the income from luxuries is the most directly effective in putting us on a war basis. No one has ever been able to bring any other reasonable charge against the imposition of an income tax except its ease of evasion, and it would seem that with the freedom with which the Federal Government now investigates all business it should be easily possible to check all statements of income so as to remove the solitary objection to providing an extension to this form of impost.

However, it must be remembered that even the income tax makes no allowance for depletions of capital. All losses must be borne by the individual without relief from taxation. He does not pay on the real increment of his fortune, but on the increment only of his profitable investments. If the gain on the latter is not far greater than the loss on the others, he will inevitably lose heavily should the income-tax rate be made prohibitively high.

Standardization of Mine Statistics

UNDER THIS title the Bureau of Mines has published a bulletin of forms for the gathering of mine statistics. The tables were prepared with the purpose of reducing the complications resulting from the division of authority between the Bureau of Mines, the state inspectional forces and the state workmen's compensation boards. All these various authorities desired reports on accidents and equipment.

All were apt to view the matter from a slightly different angle, and that fact made the collection of data laborious for the state and Federal authorities and even more trying for the owner and his agents at the mines. Albert H. Fay's knowledge of the industry and of the science of statistics and the recognized ability of the members associated with him in the committee on standard forms appeared likely to assure us that the task to which they applied themselves would be carefully and adequately performed. Unfortunately, the upshot was that the excellent forms prepared by Mr. Fay for accident statistics were considerably modified, not at all for the better.

It appears from the "First Report of Injury to Employee" that the superintendent or manager of the mine is asked to state of all accidents whether they occurred in the mine or on surface and also what were the mining methods in use. It would be interesting to know more than this; for instance, whether the accident occurred at the face, in some part of the room away from the face, or in the entry, or slope. Mr. Fay has been collecting that information and surely he has been fully justified. We might reasonably desire to have the form ask what the person injured was doing or presumably doing at the time of his death or injury—undercutting by hand or by compressed air or electric machine, timbering, loading, brushing, walking or resting—for accidents from falls of roof have a direct relation to the kind of work being performed. Thirdly, it would be interesting to know whether the operation was on the advance or in the skipping or the drawing of pillars, or again in longwall. For some reasons, which we cannot divine but which are possibly more or less imperative, many of the matters so interesting and suggestive in both the Pennsylvania and Illinois reports and in the reports prepared by Mr. Fay are omitted in the schedule that the committee on standard forms now presents.

In the name of mercy we have wished that the example of Great Britain might have been followed and some record have been kept of the fatalities of the mining stock. The industry is unfortunately not any too kind to the mine mule. These poor animals are allowed to stumble along in a dark mine without a light, with cars on the road and all kinds of bad traveling conditions, including open ditches and slippery planks, stepping over high ties on a run and lifting their feet with difficulty out of morasses of mud. Their treatment is none too creditable to the hearts of their masters, and something should be done to make their woes and ill treatment a matter of record, especially as many of their accidents jeopardize not only their own lives but the lives of their drivers and of passers by in the narrow and winding mine roadways.

As for the table on power-plant equipment given in the bulletin, the classification of boilers into cylindrical and tubular is insufficiently complete and seems a relic of earlier conditions and older statistical tables. If we cannot have names of boilers and must be general in our listings, and such generalizations have their advantages, let us list the boilers as flueless, nontubular boilers, fire-tube boilers, water-tube boilers and then let us have some divisions based on the method of firing—by hand, by automatic stoker, or with powdered fuel. It would be well also to obtain some information regarding the use of ropes for haulage. It seems incongruous to ask about the number of horses and mules engaged and to inquire about the number of locomotives of four principal types—gasoline, steam, compressed-air and electric—and then ask no questions as to the number of hoists in shafts, entry and room haulage. Furthermore, the trolley locomotive should be differentiated from the storage-battery locomotive, the reel locomotive and the combined battery-and-trolley locomotive.

The cylindrical boiler, or flueless nontubular boiler, is an obsolete type. Bold and enterprising explorers in the anthracite region, it is said, can surprise such rare birds in covey, when the game wardens are not watching, but we understand that in no other coal regions have these early fuel wasters been able to resist the progress of industry and perpetuate their existence. In justice to the anthracite region, it must be admitted that the cylindrical boilers are only stand-bys to be used in emergencies when floods make the draft on the standard colliery equipment more than usually heavy.

DEPARTMENT OF HUMAN INTEREST

Kansas Has School for Mine Workers

Night courses, especially adapted to the needs of bituminous coal mine workers in the Pittsburg (Kan.) coal fields, have during the past fall and winter brought to these men a technical knowledge of mining methods which will, it is hoped, result in the greatest output of coal with the least waste of life, machinery and effort.

These courses have been given in classes of from 25 to 50 men to a class in various cities and towns throughout this field. The instruction has been given by Prof. J. A. Yates, head of the Department of Physical Sciences, and Prof. J. A. G. Shirk, head of the Department of Mathematics of the Kansas State Manual Training Normal School at Pittsburg.

The courses have been arranged so as to give the mine worker just the instruction necessary to more fully develop the art of scientific mining. Many of the men are miners of long experience, yet they have performed their work with little understanding of the principles of scientific mining, which include the study of gases, the causes of spontaneous combustion, ventilation, the causes of explosions, haulage, the analysis of air, humidity and various other subjects of real value in lessening the probability of explosions with their consequent loss of life.

This instruction has been given by Professor Yates, who met his classes at stated times in the various towns in the vicinity of Pittsburg, where large mines and strip pits are located. The courses are not exclusively limited to actual coal mining, but include a thorough study of machinery in and around the mine, comprising steam engineering in all its branches, fuel economy, draft control, boiler construction, safety appliances, lubricants, cable tests, safety catches, signals, valve setting and other important phases of efficient engineering. Professor Shirk gave this instruction, meeting his classes each week.

When the present war made imperative the greatest possible production in all lines of industry, President W. A. Brandenburg, of the Kansas State Manual Training Normal, determined that the school should be made of the greatest possible value to the nation in the crisis. He felt this could best be done by giving laboring men a scientific knowledge of their work. Being located in the heart of a large coal field, it was at once evident that this object could in no way be better accomplished than by offering special courses for miners, stationary engineers and firemen, thus enabling them to maintain a maximum production of coal with the least waste.

In consequence of this determination the following cities and towns in the coal field were visited and miners' night classes organized: Mulberry, Arma, Ringo and Scammon. The school being centrally located offered an excellent place for such classes, and many miners and engineers have evinced much interest in the movement. In consequence of the training the Kansas field is becoming a greater asset to the nation at war. Professor Yates' courses are planned to develop a habit of coördinating the work of brain and hand, thereby improving working conditions in the mine, insuring better health to the miners, and making the miner's lot a happier one. The courses also give information which if utilized will reduce the number of accidents in the mines.

Miners and engineers of many nationalities and of varying ages have enrolled in these courses. After a day spent in the mines at laborious work, it is no small effort for these men to spend an evening in study, but so eager are they to become of the greatest value to the nation in this present war crisis that attendance during the term now drawing to a close has caused President Brandenburg, Professor Yates, and Professor Shirk to plan already for a still greater, wider and successful effort in this line during the coming school year.



A CLASS OF MINE WORKERS AT RINGO, KANS., WHO ARE STUDYING THE MYSTERIES OF THEIR EMPLOYMENT
They believe that the art of mining needs study as much as the art of farming or of any other industry

Contributed 508 Tons in One Month to Beat the Hun

An Ohio Miner of American Birth loads 508 Tons of Entry Coal in Month of May



In 22 Working Days of 8 Hours. Coal only 3 feet 8 inches high and Entry 15 feet wide.

Ed Blagg, a loader in No. 1 mine of the Buckeye Coal and Railway Co., San Toy, Ohio, averaged 23 tons per day during the whole month of May, working every day he had a chance. This is about 3 tons for every working hour or one ton every 20 minutes.

Blagg is of draft age, and he is ready any time to be called; meanwhile he intends to help in the war by mining all the coal he can. He is 27 years old, married and has one child. He is of American ancestry, being born and raised near Ironton, Ohio. He has contributed liberally to the Red Cross and Y. M. C. A. and bought $100 of War Savings Stamps.

Joe Swagda is his nearest rival. He loaded 462 tons in May and has subscribed liberally to all war activities. The miners of San Toy have already bought $21,000 worth of War Savings Stamps.

Discussion by Readers

Carbide vs. Electric Mine Lamps

Letter No. 1—I have read with interest the article "Electric Lamps in Nongaseous Mines," *Coal Age*, Feb. 2, p. 239, by George H. Deike. As this article has evidently been prepared and submitted in the interest of electric mine lamps, in disparagement of the popular carbide lamps, I am led to offer a few comments in justification of what I claim is an ideal lamp for use in nongaseous mines.

In the first place, would not the ordinary precaution of testing for gas by a protected safety lamp of an approved type have prevented the gas explosions mentioned as occurring in the Cleveland water tunnel, the Michigan copper mine and the salt workings near Ithaca, N. Y.? If, as Mr. Deike states, the presence of gas may be looked for in such operations, it would appear readily possible to detect it and guard against such accidents by an ordinary fireboss test with any approved safety lamp.

Of the eleven points of advantage claimed by Mr. Deike for the electric lamp, with the exception of the first two, every one may be claimed for the carbide lamp with equal or even greater force. As an offset to those two, may be set forth the detection by the flame of the carbide lamp of an atmosphere deficient in oxygen content, which is obviously impossible with the electric bulb; and fatalities due to this cause have not been unknown.

Advantage and Safety of the Carbide Lamp

With regard to fires caused by open lights, Mr. Deike has failed to differentiate between the carbide flame, with its tiny pencil of burning gas, and the old-fashioned oil torch, with its large wavering flame, falling sparks and burning wicking. Tests made by one of the largest anthracite companies some years ago on what may be termed the relative "zone of inflammability," as between oil and carbide lamps, thoroughly established the great difference between them, and caused the recommendation of the latter as an eminently safe illuminant, with reference to fire risk.

Referring to the extinction of lamps by air currents, Mr. Deike is possibly not aware that the development of the art has produced an attachment for carbide lamps, which will hold the flame in the strongest air current met with under working conditions. Relighting devices have also been perfected that make the relighting of the lamp very simple and quickly accomplished.

A similar criticism may be made of Mr. Deike's conclusion regarding the time lost in adjustment and regulation of lamps. While his statement may be correct as to conditions of a few years ago, improvement in manufacture has now reached a point where the carbide lamp is practically self-regulating; and, with ordinary care, may be depended on to give a satisfactory working light, with little or no adjustment.

On the question of operating cost, Mr. Deike's figures are not altogether convincing. He has complacently pigeon-holed the two interesting items of first cost and depreciation; and has assumed a minimum figure for carbide (again classing it with oil) of from 6 to 7c. per shift. I can offer as against this an actual cost for carbide of 2½c. per eight-hour shift, based on figures submitted to me by a leading anthracite company.

In conclusion, let me say that I have no desire to urge the use of carbide lamps in any mine where there is the slightest doubt of their safety. It has been my practice for years, in cases of this kind, to recommend the use of electric and safety lamps, but in reading Mr. Deike's article I feel that he has done scant justice to the real merits of the carbide lamp, in its own particular and well-recognized field; and I wish definitely to enter my protest to some of his conclusions.

Scranton, Penn. Francis H. Coffin.

Surveying and Mapping

Letter No. 7—In discussing this subject in *Coal Age*, not long since, little or no mention was made in respect to the character of mine maps. The mine map is the chief and generally the only means of recording the information relating to the shape, extent and condition of the workings underground. Notwithstanding this fact, it is too often neglected.

Most states require that an accurate survey shall be made and platted to a given scale, at stated times, so as to insure a complete record of the excavations made beneath the surface being always available for future reference. Such a record has often proved of the utmost importance, both in respect to surface damages that sometimes ensue, and as affording an accurate knowledge of the proximity of old and abandoned workings, in the development of adjoining properties.

The Complete Mine Map

For completeness of information, the mine map should show fully the surface plant and should include the boundary lines of all properties owned or leased by the company, the location of such physical features as lakes and water courses, together with all surface improvemnts, such as railroads, highways and buildings. The surface plant should be laid out in detail and show the tipple and various buildings, supply yards, reservoirs, pipe lines and drains, together with the location of the mine openings and the outcrop, if any, of the coal.

The underground workings or mine plan may be drawn on a separate sheet; but this is frequently combined and drawn on the same sheet with the surface plan, which enables a closer inspection and reference to be made in determining the relation of the underground workings to the surface features. The under-

ground plan is a projection on a horizontal plane. The plan should show the mine openings, shafts, slopes or drifts, and all airways, roads and passageways in the mine, together with all pumprooms, enginerooms, stables, tool shanties and other openings driven in the seam, besides the many working places in the mine.

The plan should also show the location of all faults and other disturbances or irregularities of the seam, together with information regarding the dip or pitch of the seam, thickness of the coal and the advance of the working face from year to year, as determined by each successive survey. The position of all drillholes should be marked on the map together with the depth of the hole, or the elevation of the seam at that point, and the thickness of the coal. This will enable the work of development to be carried forward intelligently.

Additional Information on Mine Maps

In addition to the surface and underground plans, there are often required longitudinal and transverse sections. The former may be either a vertical section or one lying in the plane of the dip. The latter is usually platted on a plane at right angles to the former. Certain geological data relating to the changes of dip and strike are important in the future development of the mine, particularly when contiguous seams are worked at the same time or through the same opening. All plans should be made, as far as practicable, on the same scale, which will facilitate their reading. The ground plan should show fully the direction of the ventilating current. Complete mine plans are of the greatest importance in case of an explosion or other mine disaster.

In the case of a mine explosion or serious disaster, many of the rescuers who flock to the mine to offer their aid are wholly unacquainted with the underground workings and the ventilation of the mine. It is on such occasions that the need of an accurate map showing all the underground features, including the ventilating current, doors, stoppings, air bridges, etc., is absolutely essential in order to cope efficiently with the disaster. All mine maps should be dated and signed by the engineer or surveyor who took and plotted the notes and who is responsible for their correctness.

Golden, Colo. Fred L. Services.

Pillar Workings

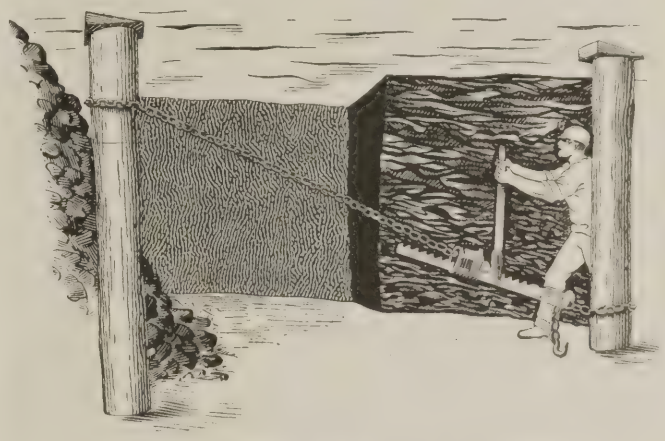
Letter No. 1—Like many other mine officials confronted with the problem of safe pillar drawing, I have given much attention to this feature of coal mining. The numerous references made to this class of work, in *Coal Age*, and particularly the letter of W. H. Noone, which appeared in last week's issue, June 29, p. 1210, tempt me to give a few of my own impressions regarding the recovery of timber in pillar workings.

The records for the year 1915 show 934 fatalities inside the mines of Pennsylvania. Of these 527 occurred in the anthracite and 407 in the bituminous region. Of the 407 lives lost in bituminous mines, 78 were due to falls in pillar workings, which is a large percentage considering the comparatively small number of men employed in that work. In his classification of mine accidents, Mr. Noone makes no direct mention of those that occur in the drawing back of pillars, although he probably includes these under the head of "falls of rock and coal."

Recovering timber by hand with the aid of an ax or sledge is dangerous work, in spite of every precaution that may be taken by experienced men. It seems strange that with the adoption of mechanical appliances, in practically every branch of mining work, the custom still prevails of knocking out posts with a hammer or ax and taking the chance of being caught under the fall of roof that is liable to follow.

As a safety measure in the drawing of timber, a mine official is often instructed to supervise the work, although it is generally the case that the men in his charge are as practical as himself. For this reason, the measure adopted can hardly be considered as a safety measure. A real safety measure would be the adoption of a mechanical post puller that would enable the men performing the work to stand beyond the danger zone while thus engaged.

One of the most practical devices of this nature is the Sylvester device, sometimes called the "Sylat post puller." The accompanying figure illustrates the practical use of this device, in the drawing of timber in



DRAWING TIMBER IN PILLAR WORKINGS

pillar workings. By its use, the man performing the work is protected against any possible fall of roof, and accident from this cause is avoided.

It is a theory of mine that a number of roof falls occur, particularly in pillar workings where there is apparently no actuating cause, and that these may be due to a vibration set up by a vibrating sound that is properly attuned. The boulder that falls from the roof may be large and weigh, say 100 tons and yet have been so balanced that it required but a vibration to throw it out of poise.

The singing of a man with a powerful voice has been known to break a fragile vase. The same singer, by the vibration set up by his voice, caused a glass of water to spill. It seems to me that it is not impossible that such innocent causes may act to produce a fall of roof in the mine, in certain instances.

In pillar workings, when the coal has been taken out, the roof naturally rests on the timbers and is often in a balanced condition that requires but a slight cause to make it fall. There are many vibrating causes occurring in the working of a mine, and this condition alone emphasizes the need of adopting a device or method that would place the workmen out of harm's way when drawing timber.

In studying over this question, under varying conditions, it has occurred to me that when the pillars are mined with a shortwall machine it is possible to make use of the feed-line of that machine for drawing timber. The feed-line is of ample strength to withstand a hard pull, as it is ⅜ in. in diameter. Also, since it is generally 40 ft. long, there will be no difficulty in reaching any timbers that it is desired to pull and still keep the machine in a safe place.

After fastening the line to the timber to be drawn, the machine could be moved back along the track, by its own propelling power, and this will generally result in pulling out the timber. However, should the timber resist the movement of the machine and cause the wheels to slip on the rails, it is possible to brace the machine and apply the power to the feed-drum. But this will only happen when the timber is so banked with slate as to give it greater resistance to the pull. It often happens that when a post is knocked out by hand it is covered up and lost by the fall. This cannot occur ordinarily when the post is drawn by any mechanical device such as I have described.

———, Penn. ROBERT LITTLEHALES.

Mine-Rescue Work

Letter No. 1—When is a man brave and when is he foolhardy in the face of danger, and what is the dividing line; or is that a matter of individual judgment? I am led to ask these questions after reading the incident cited at the close of Fred B. Hicks' letter on "First Aid to the Uninjured," *Coal Age*, June 1, p. 1029, when 13 men lost their lives in a fruitless attempt to recover the bodies of two of their comrades killed by an explosion in the mine workings.

We have had, in the history of mining, many sad catastrophes and, no doubt, will have more in the future; but the saddest of all is the fate of many heroic rescuers who sometimes, without precaution, rush to the aid of their less fortunate fellow workers.

Lessons Taught by Previous Mine Disasters

Speaking for myself, the lesson of taking many precautions in attempting rescue work was learned at the terrible Harwick mine disaster, which occurred at Cheswick, Penn., Jan. 25, 1904, and resulted in the loss of 178 lives. Immediately following that explosion the mine fan was repaired and an exploring party went down in a hoisting bucket, as the cages had been blown out of the shaft by the force of the blast. The rescuers followed the air into the mine, but in their eagerness to reach any men who might have survived the explosion, they failed to notice one place where the air was short-circuited. As a result, the leader of the party, who was my first engineering employer, lost his life in the afterdamp into which they plunged.

Who that is interested in coal mining fails to recall the sad result of the brave attempts made to rescue the unfortunate men trapped in the Cherry mine, in Illinois, when a fire occurred in that mine, at noon, Nov. 13, 1909, and 259 lives were sacrificed as a result? Volunteering for rescue work, a party of trained, professional men, and miners who worked on the night shift, were lowered to the first level and succeeded in saving many half-suffocated miners.

Before long, however, the shaft bottom became untenable by reason of the great heat and the rescuers were forced to get on the cage to be hoisted to the surface. My information is that, through a misunderstanding in the signals given, the cage was hoisted but a few feet above the bottom, where the men were burned to death.

At the Port Royal disaster of June 10, 1901, Port Royal, Penn., a party of 15 rescuers lost their lives in a venturesome and vain attempt to recover the bodies of four men who had been sent into the mine that night to do some bratticing. The men continued to advance, notwithstanding they had been warned of the conditions existing at the place by others who had attempted the rescue and were forced to return.

Origin of the "Safety First" Slogan

Most of our large mine disasters might have been prevented had their methods of operating been changed and certain precautionary measures employed. I recall a terrible explosion that occurred in the early nineties, whereby one of the largest coal-producing companies in the country learned a lesson that resulted in the adoption of the slogan "Safety the first consideration." Safety rules and regulations were posted and enforced in all their plants.

The company operated scores of the deepest and most gaseous mines in the bituminous coal fields, and were pioneers in the great safety-first campaign that followed. The record of that company since is absolutely clean and free from disasters, and the rules and methods they adopted at that time are the foundation of our present state and insurance regulations.

Rescuers Lose Lives in Recent Disasters

At Villa, W. Va., May 20, this year, a fire occurred in the mine of the Mill Creek Cannel Coal Co., costing the lives of 14 men. In the attempt to rescue the men entrapped in the mine, seven of the rescuers were overcome by the fumes and gases of the fire and were, with difficulty, resuscitated. An item regarding this fire appears in *Coal Age*, June 1, p. 1033, and a fuller account of the disaster is given in the same journal, June 15, p. 1106.

Only a few days ago, a series of terrific explosions extending over a period of five hours ruined a high-explosive manufacturing plant a mile and a half from here and caused a death list of between 100 and 200 men, many of whom were rescuers. Three of our men living in that vicinity assisted in the work of rescue.

Hurrying to the scene, I assisted in removing possibly 30 badly maimed and injured men to the nearest physicians. The plant lay in a deep valley and covered about 15 acres. In our work we were partially protected by a projecting spur of the hills from the force of following explosions, which killed many of the rescuers who were less fortunate.

While thus engaged, two terrific explosions occurred about 10 min. apart, throwing flaming acids hundreds of feet into the air. Having finished our work in that vicinity and being informed that there were thousands of pounds of the highest known explosives that would shortly be reached by the fire, we left the place and an hour later this last heavy explosion occurred, killing many rescuers, among whom was one of our

own employees who had volunteered but two minutes before the blast occurred.

Miners, as a class, are noted for their bravery in the face of danger and are often assigned to the most important work on such occasions. It frequently happens that the best judgment of rescuers is biased by the wails of women and children whose loved ones are in danger. To enter a mine ahead of the air is nearly always fatal, as a second explosion may often occur when fresh air is forced into the workings and mixes with the accumulations of heated gases, or forces fresh gases over a fire smoldering in the debris.

While breathing apparatus can often be employed with advantage when exploring a mine ahead of the air, or in fighting mine fires, it is generally the case that where the mine air is sufficiently foul to require the use of breathing apparatus it is too foul to support life, and there is little hope of rescuing men by this means.

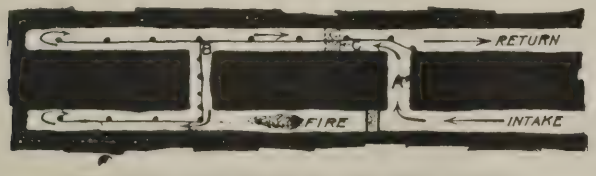
Artificial resuscitating appliances also have their uses. If I am correctly informed, however, a number of deaths have occurred within the last few years from respiratory diseases, after such resuscitation. While we should always desire brave men for rescue work, they must not be foolhardy, but take every precaution to avoid unnecessary danger. J. S. GELSTON.

Noblestown, Penn.

Sealing Off Fire on Intake

Letter No. 1—Permit me to refer to the inquiry of "Ancora," *Coal Age*, June 22, p. 1173, regarding the sealing off of a fire on the intake side of a pair of headings. The inquiry assumes there are no rooms on these headings and that only a small quantity of gas is generated, making safety lamps unnecessary, and asks for the proper order of building stoppings to seal off the fire.

The danger encountered in performing this work arises from three causes: (1) The formation of an explosive mixture of marsh gas and air at the face



STOPPING OFF FIRE ON INTAKE AIRWAY

of the heading. (2) The generation of carbon monoxide in the region of the fire when the supply of air has been limited or cut off by the building of a stopping. (3) The ill-effects experienced by the workmen in the return airway, due to the gases generated by the fire.

In discussing this question, let me say that my experience has taught me that there is more danger to workmen required to work on the return airway after the supply of air to the fire has been partially cut off. The limited air supply results in the production of carbon monoxide, which is extremely poisonous.

I remember, on one occasion some years ago, that it was necessary to repair a couple of stoppings, which had been built to seal off a fire and were leaking. The men doing the work were quickly seized with violent headaches and palpitation of the heart. On another occasion, we were able to put out a fire that was not sealed off but had a plentiful supply of air and the workmen suffered no ill-effects from the gases generated.

BUILDING THE STOPPINGS

With this explanation, I want to outline my method of proceeding to seal off this fire. Referring to the accompanying figure, I would open up the stopping at *A* sufficiently to short-circuit a portion of the air, before starting to build the first stopping on the intake, which should be placed as near as practicable to the fire. At the same time, starting from the outby rib of that crosscut, on the return side, I would extend a line of brattice up the return airway toward the face. Carrying sufficient fresh air with me, I would extend this brattice through the inby crosscut at *B* and carry it up to the face of the intake heading, as shown in the figure.

If necessary, I would do the same on the return heading, so as to avoid any accumulation of gas at the faces of these headings. The smoke and gases from the fire would pass out on the return side of the brattice. In the meantime, the building of the stopping on the intake has proceeded. When that is finished all of the air will be short-circuited at *A* and carried by the brattice to the face of each heading.

The stopping on the return heading is now started at *C*. As work on this stopping progresses and nears completion, a portion of the air can be short-circuited at *A* and permitted to pass out of the mine on the return airway. It should not be difficult to build a stopping on the return with a canvas brattice running up the entry in the manner indicated. A piece of pipe should be built into each of these stoppings and provided with a valve or plug to permit the air to be tested, from time to time, to ascertain the progress made in the extinction of the fire. When building the brattice, frequent tests must be made of the air on the return side.

Thomas, W. Va. W. H. NOONE.

Interpreting Mining Laws

Letter No. 4—Referring to the interesting question raised by Charles Martin, *Coal Age*, June 8, p. 1080, I understand the meaning of the Pennsylvania Bituminous Mine Law to be that crosscuts, in room pillars, shall not exceed 35 yd. or be less than 16 yd. as stated in Art. 9, Sec. 3; while the same law, in Art. 6, Sec. 4, permits a distance of 200 ft. between crosscuts, in entry pillars.

Although the law does not so state, specifically, it is my opinion that the latter provision has reference to nongaseous mines only. Likewise, I believe that the longer distance of 35 yd., in room pillars, applies to nongaseous mines only, while a shorter distance, not less than 16 yd., refers to gaseous mines.

The specifying of shorter and longer distances, depending on the condition of the mine with respect to gas, makes possible a great saving in yardage on the entries, as well as the strengthening of the pillars in both rooms and entries, when the conditions permit the driving of crosscuts further apart as described by law.

It would seem to me that this is the proper interpretation of the law and that most practical mining men

would take this to be the intention of the law makers. The mine foreman is able to determine when the crosscuts can be driven at a greater distance and when this distance must be decreased in order to keep the face of the heading clear of gas, and this is left wholly to his judgment.

Referring to the question asking at what point the air current should be termed "return air," in the meaning of the law, Art. 9, sec. 1, reads, "The return air from each split where from 70 to 90 persons are employed shall be conducted by an overcast or an undercast into the return airway, which shall lead to the main outlet."

I take this to refer to the last crosscut in each split or section of the mine. From the mouth of the split, the air current is conducted through the workings on the intake airway and, on reaching the last crosscut, passes into the return. From this point until it reaches the overcast and is conducted by the main return airway out of the mine, the current is called the "return air."

In closing, permit me to say that 200 ft. is too far apart to drive crosscuts, without the use of a brattice to conduct the air to the face of the heading. Such a distance is too far for men to work ahead of the air. The brattice should extend to within 20 or 30 ft. of the face of the heading. These are important questions in mine ventilation, and I hope to see them fully discussed.

Worley, Ky. OSCAR JONES.

Letter No. 5—The recent discussion that followed the inquiry regarding the provisions of the Bituminous Mine Law of Pennsylvania, in respect to ventilation, which appeared in *Coal Age*, June 8, p. 1080, interested me greatly. This discussion showed the need of clearly understanding the meaning of the law, to do which one must read carefully the entire statute bearing on the points in question.

Referring to the question regarding the distance apart of driving breakthroughs in room and entry pillars, it is true that Art. 9, sec. 3, provides a maximum distance of 35 yd. and a minimum distance of 16 yd., in all room pillars, and makes no mention of entry pillars. In the same connection, attention was drawn to the reading of Art. 6, sec. 4, which states, "said entries shall be separated by pillars of coal of sufficient strength, and shall not be driven more than 200 ft. beyond the last cut-through, except for exploratory purposes."

Let us look, for a moment, however, at Art. 4, sec. 2, the second paragraph of which reads, in part, as follows: "He shall also see that proper cut-throughs are made in the pillars of all rooms and of all entries, in accordance with sec. 3 of Art. 9 of this act, and that they are closed when necessary so that the ventilating current can be conducted in sufficient quantity through the last cut-through to the face of each room and entry by means of check doors."

It is clear that the reading of this section makes the provision of Art. 9, sec. 3, to which we have just referred and which is here particularly mentioned, apply to both room and entry pillars, notwithstanding the fact that entry pillars are not mentioned in that section of the law.

In my opinion, the Bituminous Mine Law of Pennsylvania does not permit breakthroughs in entry pillars to be driven 200 ft. apart, except in the special instance to which reference is made in Art. 6, sec. 4. In order to understand this reference, it is necessary to read the entire section. In doing so, we find that this section refers to the driving of the main entries, from the first and second openings, in new, gaseous and nongaseous mines, providing further for mines opened as nongaseous but in which gas has appeared later.

LAW REGARDING MAIN ENTRIES

This section of the law provides for the driving of at least four main entries, two of which shall lead from the main opening and two from the second opening, into the body of the mine, in all mines generating gas in sufficient quantity to be detected by an approved safety lamp. In mines where locked safety lamps are used exclusively and a large acreage is to be developed, requiring a length of 5000 ft. or more on the main entry, this section prescribes the driving of at least five entries, two connecting with the main opening and two with the second opening, while the fifth entry is to be used as a travelingway.

The law is very specific and provides, likewise, in nongaseous mines, for at least two main entries, one leading from the main opening and the other from the second opening, into the body of the mine; except where a large acreage is to be developed, requiring a length of 5000 ft. or more on the main entries, in which case the law specifies that three such entries must be driven, one for use as a travelingway only.

Following this reference, the section states "Said entries shall be separated by pillars of coal of sufficient strength, and shall not be driven more than 200 ft. beyond the last cut-through, except for exploratory purposes." I understand this to refer to the thickness of coal that must be left as a barrier against a possible accumulation of gas or water beyond these headings, since the law provides (Art. 4, sec. 2) that no rooms shall be turned in advance of the last cut-through, thus insuring a solid pillar of coal beyond that point to the head of the main entries, except as the latter are extended for exploratory purposes.

WHAT CONSTITUTES A "RETURN AIRWAY"

The question of what constitutes a return airway should present no difficulty to the practical mining man. In regard to the gob section, mentioned in the inquiry to which I have referred, and lying between two live sections ventilated by a single current, such an arrangement would seem to be contrary to the reading of Art. 9, sec. 1, which requires the ventilation to be conducted through the entries and to all working places "in sufficient quantities to dilute, carry off and render harmless the smoke and dangerous gases generated therein, to such an extent that all working places and traveling roads shall be in a safe and healthy condition for the persons working and traveling therein."

It would not be possible to comply with the law were the ventilating current permitted to pass through a gob section and be then conducted into live workings. In such a case, the ventilation should be so arranged, by the building of an overcast, that the current after passing through the gob section would be conducted immediately into the return airway and pass out of the mine.

Leckrone, Penn. M. H. G.

INQUIRIES OF GENERAL INTEREST

Overcome on Reaching Fresh Air

An instance of men being overcome on their return to fresh air, after inhaling bad air in their working places for a considerable period, was brought to my attention sometime since. It has caused me much thoughtful reflection and I have often wondered if my conclusion in regard to the cause is correct. The facts as they were told me are as follows:

In a certain mine in this state, the men working in one section found the air in their places rather heavy one morning when starting for work. Owing to a door having been left open during the night, the ventilating current had been cut off from that section and the air was bad. Closing the door, the men proceeded to their work; but it was not long before they began to realize that something was wrong. There was a growing feeling of depression and all decided to quit work and go home, which they did without further delay.

Reaching the fresh air that was traveling on the main intake airway, the men were quickly overcome and fell unconscious in the entry. Here they laid for a short time when consciousness again returned and they were revived by breathing the pure air passing.

Studying over these facts as they were told to me, I concluded that the men were overcome by breathing a small percentage of carbon monoxide, which I assumed had accumulated in their working places. I understand that the symptoms resulting from carbon monoxide poisoning are somewhat as follows: tendency to dizziness, palpitation of the heart, shortness of breath, drowsiness, weakness of the limbs and final loss of consciousness. Later, conversation with the men convinced me that they had experienced all of these symptoms. Still, I am not confident that this is the real cause of the loss of consciousness when the men reached fresh air, and I shall appreciate being better informed on the matter.

Springfield, Ill. ASSISTANT SUPERINTENDENT.

There is no ground for supposing that the men, in this case, were overcome by breathing carbon monoxide. Had such been the case, they would have fallen unconscious in their places and not been able to reach fresh air. The occurrence may be explained as follows:

The cutting off of the circulation in that section of the mine, by the setting open of the door the night before, caused an accumulation of blackdamp in the working places. Shortly after starting to work, the men felt a dizziness and shortness of breath and very wisely decided to withdraw from the place.

Experiments have shown that there is an automatic regulation in the process of breathing air containing small percentages of carbon dioxide, whereby the percentage of this gas remaining in the lungs is maintained practically constant, averaging about 5.6 per cent. The breathing of air containing a greater proportion of this gas automatically causes a deeper inhalation followed by panting, due to the effort made to throw off the excess of gas from the lungs. The labored breathing causes palpitation of the heart and a rush of blood to the head, producing dizziness.

In this condition and with their lungs holding an excess of carbon dioxide, these men reached fresh air. But, the result of inhaling pure air when the lungs are partly filled with gas is to cause a temporary suspension of breathing and a state of coma or insensibility follows. The effect, however, is only temporary and in a short time the action of breathing is resumed.

This condition has often been observed upon bringing men who have been exposed to gas, to the surface. The victims will frequently lapse into unconsciousness in the cool, pure air, and this we assume was the case in the instance mentioned by this correspondent. Similar instances can probably be cited by readers of *Coal Age* in their varied experiences in coal mining.

Travel of Electric Current

Kindly explain the manner in which a current of electricity travels in a wire conductor. Does the current flow over the surface or through the wire; and, if both, does the same quantity pass through the wire as over its surface?

Benham, Ky. STUDENT.

This is a mooted question, in regard to which electricians have held different opinions. Formerly, many were led to believe that an electric current flowed over the surface of a conductor rather than through its body. We believe the prevailing opinion, at the present time, is that it is more probable that the entire body of the conductor is permeated with the current to a greater or less extent, but in what proportion it is impossible to state.

Referring to tables giving permissible capacities of wires of different diameters and of like material, as established by underwriters, it appears that the allowable current capacity of insulated wire conductors (which is an index of the heating of the wire by the passage of the current) varies as the square root of the cube of the diameter of the wire. For example, a wire having twice the diameter of another wire has a permissible current capacity of $\sqrt{2^3} = \sqrt{8} = 2.8$ times the capacity of the second wire.

While the connection between the size of a wire conductor and the heating caused by the current passing through it is not simple, the observed relation here expressed would seem to suggest that the mass of the wire is involved or concerned in the passage of the current. This relation does not appear to support the idea that the current flows over the surface of the conductor only.

Coal Age will be glad to have some of its readers who are expert electricians throw any new light on this subject that experimental investigation may afford.

EXAMINATION QUESTIONS

British Columbia Examination, First Class, May 14, 1918

(Selected Questions)

Ques.—Under what conditions may afterdamp become explosive?

Ans.—The afterdamp of a mine explosion may, and often does, contain unburned marsh gas, which becomes explosive on the addition of fresh air. The afterdamp may also contain sufficient quantities of carbon monoxide and fine dust floating in the air to render it explosive in the presence of fresh air. On this account great caution is needed when an exploring party enters the mine after an explosion has occurred therein.

Ques.—At the same temperature and pressure, which is the heavier, dry air or the same volume of air fully saturated with moisture?

Ans.—Air containing moisture is always lighter than dry air, bulk for bulk or volume for volume, because the density of the water vapor in the air is less than that of the air itself. The weight of water vapor is about five-eighths of that of the same volume of dry air, at the same temperature and pressure.

Ques.—With a barometric pressure of 30 in. and a temperature of 60 deg. F., (a) what effect would be produced on a given volume of air if the barometer should fall to 29.5 in.? (b) What change in temperature would be required to maintain a constant volume of air under this fall of barometer?

Ans.—(a) Assuming a constant temperature, a fall of barometer from 30 in. to 29.5 in. would cause an expansion in the volume of a given weight of air. In other words, for a constant temperature, the volume ratio is equal to the inverse pressure ratio. Hence, in this case, the ratio of increase in volume would be 30 : 29.5 = 1.017. That is to say, 1000 vol. of air at 30 in. barometer would be increased to 1017 vol. when the barometer falls to 29.5 in., temperature constant.

(b) In order to maintain a constant volume in a given weight of air, the absolute temperature of the air must vary as the barometric pressure. In other words, the absolute-temperature ratio must equal the barometric ratio, which gives, in this case, calling the required temperature x,

$$\frac{460 + x}{460 + 60} = \frac{29.5}{30}; \text{ or } \frac{460 + x}{520} = 0.983$$

$$x = 520 \times 0.983 - 460 = 51+ \text{ deg. F.}$$

That is to say, to maintain a constant volume in a given weight of air when the barometer drops from 30 in. to 29.5 in., the temperature must drop from 60 deg. to 51+ deg.

Ques.—If a certain pressure produces 20,000 cu.ft. of air per min., in an airway 6 ft. in diameter, what quantity of air will the same pressure produce in an airway 12 ft. in diameter, assuming the airways have equal lengths?

Ans.—In the ventilation of circular airways, for the same pressure, the volume of air in circulation varies as the square root of the fifth power of the diameter of the airway. In other words, the volume ratio is equal to the square root of the fifth power of the diameter ratio, which gives, in this case,

$$\frac{x}{20{,}000} = \sqrt{\left(\frac{12}{6}\right)^5} = \sqrt{2^5} = \sqrt{32} = 5.657$$

$$x = 20{,}000 \times 5.657 = 113{,}140 \textit{ cu.ft. per min.}$$

Ques.—The total rubbing surface of a square airway being 160,000 sq.ft., the length of the airway 5000 ft., and the quantity passing 80,000 cu.ft., find the velocity of the air current in feet per minute.

Ans.—The perimeter of this airway is 160,000 ÷ 5000 = 32 ft. Since the airway is square in section, the length of each side is 32 ÷ 4 = 8 ft.; and the sectional area is therefore 8 × 8 = 64 sq.ft. The velocity of the air, in this case, is, then, 80,000 ÷ 64 = 1250 ft. per minute.

Ques.—Explain the meaning of the term "manometrical efficiency," as used in fan ventilation, in estimating the efficiency of a fan.

Ans.—Manometrical efficiency is an expression indicating the ratio of the effective pressure due to the action of the fan, to the theoretical pressure or head of air column derived from the formula, $h = u^2/g$. The term has no practical value in estimating the efficiency of a fan, for the reason that the pressure a fan will create is determined by the resisting power of the mine. For this reason, the efficiency of the fan estimated on this basis will vary when operating on different mines.

Ques.—What must be the sectional area of a square airway that is required to pass 50,000 cu.ft. of air per minute under a 1-in. water gage, the length of the airway, including the return, being 1 mile?

Ans.—The airway being square, the length d of one side is calculated thus,

$$d = \sqrt[5]{\frac{4klq^2}{p}} = \sqrt[5]{\frac{4 \times 0.00000002 \times 5280 \times 50{,}000^2}{5.2}} = 11.5 ft.$$

The sectional area of this airway is therefore 11.5^2 = 132+ sq.ft.

Ques.—If the ventilating machine was permanently disabled by an explosion of firedamp, what temporary means would you employ to restore ventilation in the mine?

Ans.—At all gaseous mines, provision should be made for such an emergency, by the installation of a second fan that can be brought into immediate use should occasion demand. However, in the absence of such extra equipment and temporary repairs being impossible, it will be necessary to improvise some means for producing circulation of air in the mine. The means most effective and convenient is a steam jet placed in the upcast shaft. A fire basket hung in the shaft would be dangerous.

COAL AND COKE NEWS

Harrisburg, Penn.

According to figures compiled by the Central Pennsylvania Coal Producers Association, coal production in the central district is steadily increasing. The total for the month of June will not be far from 4,500,000 tons, making June the banner month of the present year. Production is still curtailed to some extent by car shortage, but not seriously.

The production for the week ending June 15 set a record, as 1,166,752 tons were turned out. The week ending June 8 was not far behind, with 1,166,494 tons, while the week ending June 15 showed a production of 901,839 tons.

The loss in production for the week ending June 15, because of inability to obtain cars, was 38,933 tons, while the loss for the week ending June 8 was 16,465 tons; for the week ending June 1 it was 14,359. Cars are equitably distributed among the producers, and thus none derives an advantage at the expense of the others, and the labor problem is in a fair way of being permanently solved.

It has been agreed among the miners and producers that production in the soft coal fields can be increased without resorting to either conscription of labor or lengthening of the working day. The miners are making good wages and there is little dissatisfaction.

The famous barrier pillar between New Boston and Mill Creek collieries, which contains half a million tons of coal, is to be mined. Court was informed during the week that the litigation which has been in progress twelve years to maintain this great pillar is ended.

The trouble began when the late John Curran, mine inspector of the 18th anthracite district, got an injunction against the coal companies to prevent the removal of the pillar, as otherwise the lives of the miners would be endangered by the sudden inrush of water. But both colleries are now being operated as one colliery, and State Mine Inspector E. G. Evans has informed the Schuylkill County court that under the present methods proposed continuance of the pillar is unnecessary.

About 150 representative coal operators of the central Pennsylvania district, meeting at Washington on June 27, recommended that the Fuel Administration close down any mine persisting in the practice of paying miners a bonus or otherwise violating the Washington wage agreement or the regulations of the Fuel Administration.

The action of the operators was taken on the warning of fuel officials that the bonus system threatens to unsettle the labor situation throughout the bituminous field. A resolution was adopted providing for a board of five members, composed of members of the association of bituminous coal operators of the central Pennsylvania field, which will be charged with the task of trying offending operators. Its findings will be subject to appeal to the Fuel Administration.

The membership of the board will be determined by a vote of the operators, and letters have been sent out through the central field asking for suggestions.

Fairmont, W. Va.

Last week proved to be another good week for the Fairmont district, with cars plentiful for loading. On last Tuesday, with 1754 cars in the Fairmont region, not a mine of the 174 reporting was shut down because of any lack of cars. It is stated by Fairmont operators that the good car supply in the region has been so well maintained that miners who have been following other occupations are returning to work in the mines. Still greater results are expected as the plans of the Fuel Administration, the United Mine Workers, the National Coal Association and the Central West Virginia Association are matured.

Much interest has been manifested in southern West Virginia in the proposal contained in the bill of Senator James Hamilton Lewis, to purchase 125,000 acres of coal land in West Virginia with a view to operating mines for the purpose of supplying the Army and Navy with coal, and to purchase the Virginian Ry. property. Of course, if the railways in the state, it is pointed out, are owned by the Government, the state will lose the taxes now paid by the Virginian Ry., and any other railways which the Government might acquire, and of course the additional tax burden would have to be met by the individual taxpayer. For that reason the purchase of the Virginian does not strike a responsive chord.

Charleston, W. Va.

That with fair transportation facilities the mines of the state are able to speed up production was demonstrated in the coal fields of Kanawha during the week ending June 22, when the total output was increased over 20,000 tons, the total net tons for the week ending June 15 having been 171,000 tons and for the week ending June 22, 193,885 tons, the increase being made possible simply because more cars were furnished and because the miners put in more time in the mine, as shown by the fact that the total number of hours worked was 7176—an amount much in excess of the time usually put in by miners. The hours lost due to car shortage were reduced from 2190 hours to 709 hours. On the other hand, the hours lost because of labor shortage jumped from 151 to 585 and further loss of time was caused by power shortage. Between June 1 and June 26 33,820 loads were delivered from the Kanawha district, 33,533 empties being received.

Even as mines in the Kanawha district on the C. & O. side of the Kanawha River had a plentiful supply of cars, so mines on the opposite side of the river reached by the K. & M. Ry. also enjoyed an excellent run of cars and were enabled to maintain their output. The supply this week is proving to be unusually good on both the K. & M. and in other parts of the district, averaging between 75 and 95 per cent.

New River mines were turning out coal this week at a rate which indicated an unabated determination to reach the apex of coal production if possible, and although the mines in the New River district have had to contend with power shortage at intervals during the last month, the companies operating in that district have managed to keep production up to a reasonable mark, especially since the Virginian has begun to furnish more cars.

Duquoin, Ill.

The firm of Dowell & La Font, of Duquoin, Ill., recently negotiated deals for land for the Union Colliery Co. and the E. G. Scott Co. The former coal company is opening up a new plant about five miles south of Duquoin. Other deals were in the interest of the Paradise & Franklin County Coal Co. and a stripping proposition for the Hamilton Coal and Mercantile Co., of Weir, Kan. A deal is just now being closed with the J. R. Coon Co., of Pittsburg, Kan. This company is one of the big stripping concerns of Kansas. Geo. W. Dowell, the senior member, of the firm of Dowell & La Font, is the chairman of the executive committee of the Perry County Council of Defense.

The E. G. Scott Co. proposition is the only stripping in this section of the state. The company controls about 150 acres of land on which there is a 6-ft. seam of coal. The overburden runs from 18 to 35 ft., including a little blue shale in places of an average thickness of 2 feet.

A Bucyrus shovel with a 90-ft. boom and 8 cu.yd. dipper has made the first cut, or box pit, and everything is in readiness for shipping coal. The steam shovel graded a track into the pit of 1.5 per cent. for 2300 ft. Railroad cars will be taken into the stripping and coal will be loaded into them by a small steam shovel. Shipments of coal will be made this month.

Terre Haute, Ind.

Car shortage is blamed for the decrease in total output for coal in the State of Indiana for the week ended June 22. A car shortage of 13.33 per cent. resulted in a loss of production of 142,520 tons by Indiana coal mines, according to reports to the district representatives of the Federal Fuel Administration. As a consequence there were hoisted during the week 588,211 tons as against 621,500 tons during the previous week. The car shortage was greater than it has been during any of the recent weeks. There was a loss of production of 3.24 per cent. because of labor trouble, and a loss of 5.88 because of mine disability. The greatest car shortage was on the Pennsylvania system, which lacked 30.33 per cent. of a full car supply. The shortage on the Chicago & Eastern Illinois R.R. was 11.11 per cent., and on the Chicago, Terre Haute & Southeastern 8.23 per cent.

Victoria, B. C.

No. 3 Mine, Crow's Nest Pass Collieries, in which an explosion causing the death of 34 miners occurred on Apr. 5, 1917, has been opened to the face after 14 months of unremitting work. When the inquest took place a few weeks after the accident only 22 bodies had been recovered. All are now accounted for, the majority having been found as the level was cleared and the last four about 10 days ago, when the face was reached. It is thought likely that the inquest will be reopened, the verdict returned last April having been that "death was caused by an explosion, but from the evidence adduced the jury is unable to assign the primary cause." It is claimed by those who have held that the explanation of the disaster would be found when the scene at the most remote working place could be surveyed, that the position in which the last four bodies was discovered to an extent bears out their contention. The evidence, however, seems to be conflicting. The men practically died at their posts. In each case their posture was such as would indicate that they had had some warning and had instinctively tried to shield their heads with their hands. One of their safety lamps was broken, and it is argued that this may have happened prior to the outbreak and be responsible for it. George Wilkinson, Chief Inspector of Mines, has left Victoria to make a careful examination of the mine and of the additional evidence secured.

PENNSYLVANIA

Anthracite

Inkerman—Announcement was made on June 29 of the closing down of No. 7 shaft of the Pennsylvania Coal Co. to make repairs and widening of the shaft, which will enable the company to use the standard-size mine car. The shaft is also to be sunk from the present Pittston vein to the Red Ash vein, a distance of 242 ft. While the rockwork in the shaft is progressing extensive inside improvements will also be made. It is estimated the improvements will take several months. The plans include a new steel tower and new first-motion engines. About 250 men employed at No. 7 will be given employment at No. 4 colliery.

Delano—The Hollywood colliery of Pardee Bros. & Co., Inc., abandoned 30 years ago as worked out, will be reopened this summer because of the great demand for fuel. A shaft cutting lower veins, deemed inaccessible in the 80s, has been driven, and tunnels are now being run to get out the coal. A complete electric equipment will furnish power. Work for several hundred miners will be furnished and the tonnage of the Pardee colleries will be materially increased.

Bituminous

Butler—The first coal-stripping operation in this county was put in operation July 1 when the first shipments were made from the pits of the Daylight Coal Mining Co. at Wahlville, near here. It is located on the Knauff farm in Forward township. The new operation is equipped with modern machinery throughout, with special means of preparing and cleaning the coal. The production at the start will be about 500 tons per day and will be shipped over the Buffalo, Rochester & Pittsburgh Ry. The general office of the company is at Indiana, Penn.

Punxsutawney—The former operations of John McCleavy & Co. near here, which were sold recently to Thomas A. Furniss, of this city, are in full operation again pending a temporary shutdown while many improvements were made to the mine. The new

mine, which was opened in the upper vein, is producing a high-grade coal. Shipments are made over the Punxsutawney branch of the Pennsylvania Railroad.

Republic—A contract has been let by the Thompson-Connellsville Coke Co. for the erection of 20 miners' houses here.

Connellsville—The Dawson-Connellsville Fuel Co. of this city will develop a tract of 100 acres of coal land near Fairmont, W. Va. The coal is the Sewickley vein. Frank A. Tarr, S. D. Henry and G. E. Moore are among the prominent Connellsville men interested in the new company.

Aultman—The Jefferson and Clearfield Coal and Iron Co. is building two new houses for its mine officials here. They are modern in every respect and are located near "the old farm house" near the company office. When completed they will be occupied by the superintendent and assistant superintendent.

Heshbon—A. J. Carnahan, Sr., has sold his coal lands near this place to "Square Deal" Campbell, a famous politician of Indiana County. Mr. Campbell, together with some New England capitalists, has formed a company and a drift has been opened in the "B" Miller vein. A railroad siding will be built up Palmer Creek from the Black Lick branch of the Pennsylvania R. R. to the new operations. The company will be known as the Square Deal Sulphurless Coal and Coke Company.

Johnstown—Colleges and historical associations in the bituminous region of Pennsylvania are petitioning for an unusual relic of the early days of mining, found in a pool in an abandoned working where it had lain submerged for many years. It is a coal car, 73 to 75 years old, which looks like a toy when compared to the cars of today. It is now in the possession of M. J. Bracken, general manager of the Inland Coal Co. The wagon is only about 2 ft. long and 18 in. deep, and would hold about five ordinary buckets of coal. It is constructed of wood. The wheels and axles are of wood. Over the wheels are tin "mud guards."

WEST VIRGINIA

Charleston—The Elkland Coal Co. of which C. L. Voglesang is general manager, having completed its plant on the Coal & Coke Ry., is now mining and shipping coal.

Crown Hill—A number of new houses will be built by the Crown Hill Coal Co. at Crown Hill for its miners.

Mahon—A number of new mining machines are being installed in the mines of the Eagle Byproducts Coal Co. at Mahan, on Paint Creek.

Thurmond—Operations will soon be resumed by the Stone Cliff Coal Co. which was forced to shut down its mine at Stone Cliff about two weeks ago when the monitor ran away, killing two men and injuring others. The incline and tipple were damaged, but repairs on them have been nearly completed. During the enforced idleness of the Stone Cliff mine Chesapeake & Ohio engines have been coaling at the Newlyn mine.

The Elkhorn Collieries plan to award a contract in the near future for the construction of 30 miners' houses at the headwaters of Colly Creek. The same company a little later will build 100 miners' houses on Thornton Creek.

Beckley—Within a few weeks the Piney Fire Creek Coal Co. expects to be shipping coal from mines it is just opening near here.

Charleston—The newly organized Boone County Coal Corporation has purchased the holdings of the Coal Valley Mining Co., on Coal River. The deal was consummated by Col. Quinn Morton, president of the latter company, and W. J. Clothier, of Philadelphia, representing the Boone County Coal Corporation. The sale includes the Sylvia mine in Logan County, which is a drift mine with a 5 ft. seam, employing 70 men. The price paid is said to be $250,000.

Welch—The Earlston Coal Co., with principal office and chief works at Kermit, Mingo County, has been organized by D. W. Farquharson and others of McDowell County. The company has a large acreage of coal on the Kentucky side of Tug River which it proposes to develop, but the chief works of the company, including tipple, power house and other buildings, will be on the West Virginia side of the river. The company has been capitalized at $200,000.

The Venture Coal Company, recently incorporated with a capital of $50,000, will develop coal lands in Upshur County. Those chiefly interested in the company are A. J. McDaniel, Oscar Cochran, Henry King, Charles R. Atha and J. D. Victor, of Worthington.

Bluefield—At a meeting of the directors of the Bradshaw Coal Co., held here last week, it was decided to enlarge the facilities of the plant located on the Dry Fork line near English and to operate the company's mines on a larger scale, officers being authorized to proceed with improvements necessary to bring the output of the operation up to capacity.

Clarksburg—A syndicate of Johnstown (Penn.) coal men has purchased the plant and coal lands of the Trainor Coal Co. of Salem, located near Monongah, the price being about $80,000. J. W. Preston acted as trustee for the syndicate.

Fairmont—Fairmont men are interested in a new company—the Dawson Connellsville Fuel Co.—recently incorporated in this state with a capital stock of $120,000 to operate mines on the West Fork River opposite White Day on the Baltimore & Ohio, where the company owns 100 acres of Sewickley coal. The mine will be equipped with electrically driven machinery. A conveyor will also be erected.

OHIO

Shawnee—The Buckeye Coal and Railway Co., of Columbus, started loading July 1 from the old Buckingham mine, located on the Zanesville & Western about midway between Shawnee and Corning. The mine was one of the large operations of the Sunday Creek Coal Co. 23 years ago, when it was abandoned because of much acreage on which a minimum royalty was required. Several weeks ago it was decided to reopen the operation and the water, which has filled the mine for 23 years, was pumped out. It was found that the ties were in excellent shape but the steel rails were mostly rotted. The mine has now been electrically equipped and has been put in first-class condition. The seam is 10 ft. thick, of which 6 ft. is the ordinary No. 7 vein and the remainder a sort of splint which was not mined up to the time of the abandonment of the mine.

KENTUCKY

Madisonville—The Hopkins County Realty Co. has leased to the Sunset Coal Co. the mining rights to the McPherson tract, containing about 125 acres of coal land, and also the coal under two tracts of land at Elk Creek.

It is understood that W. D. Coil, of the Coil Coal Co., has leased from the Hopkins County Realty Co. the No. 9 seam under 750 acres of land, and that Mr. Coil, who is mayor of the city, will install a shaft mine, loading out on the Louisville & Nashville tracks.

Carrollton—The Beattyville Coal Co., operating mines at Beattyville, and boats and barges on the Kentucky River, has purchased from Oscar Barrett, of Cincinnati, the property of the Frankfort Elevator Coal Co., on the river-front at Frankfort, and plans to handle coal from the Kentucky River mines through this plant.

Hazard—The Blue Diamond Coal Co. recently established a new record for the district when 40 cars of coal were loaded out in one day by its double tipple, which has just been completed at White Oak, on First Creek.

The Montgomery Creek Coal Co., recently capitalized at $100,000, plans installation of plant on Montgomery creek, of Carr's Fork, where a spur track is now being laid. J. W. Reedy and G. W. Smith are the principal backers of the company.

INDIANA

Indianapolis—Production of coal by Indiana mines reached a high figure for the week ended June 15. Reports to the district representative of the Federal Fuel Administration showed that there were hoisted during this period 621,501 tons as against 621,436 during the preceding week. This production was accomplished in spite of a car shortage of 11.16 per cent. as against 7.23 per cent. for the preceding week, the difference in ratio being accomplished through increased efficiency of the mines and through a considerable decrease in the amount of labor trouble which caused a loss of only 1.76 per cent. of time as against 2.93 per cent. for the preceding week. With a 100 per cent. car supply the Indiana production would have been more than 700,000 tons. The greater part of last week's production was mine-run coal, with which the domestic demand is being supplied to a considerable extent. Production of lump coal is being delayed by the sluggishness of the market for screenings.

ILLINOIS

Moro—George Prescott, of Centralia, has organized and incorporated the Moro Coal and Mining Co. to revive the coal-mining industry in the Moro district. Prescott is president of the company and the other officers are Stanley Kolwolkowski, vice president; Thomas M. Kekich, secretary, and Fred F. Reinhardt, treasurer. All except Reinhardt are practical coal men. Reinhardt is a banker at Sandoval, Ill. The company has taken over the George Kabel mine and will install modern equipment, including power machines, steam hoisting engines and an 8-ft. power exhaust fan. About 400 acres of additional coal land adjacent to the shaft has been acquired, and more is being negotiated for. A 6-ft. vein underlies the district, with a percentage of 64 per cent. fixed carbon. Business men will erect homes for the miners and sell them on easy payments. The company will have its headquarters at Alton.

Galesburg—The Cripple Creek Mining Co. has opened a new coal mine at Bryant, Ill., and represents that the vein is No. 5, of the Illinois series, which is extensively mined over the coal section of the state and is counted as a good coal. The company has had some tests made which are satisfactory. The coal is clean and burns well. The prospect now is that the plant will be ready to ship coal by July 15. The name given to the new coal is Carbon Lump.

KANSAS

Baxter Springs—The O. B. Ross Mining Co. has been organized to mine coal in the newly discovered coal field near here, and Superintendent O. B. Rose is now putting down a shaft on the J. McSherry farm, which is west of Baxter Springs. The coal, which is 5 ft. thick, is found at a depth of 52 ft. In one borehole coal was struck at a depth of 180 ft., mixed with zinc. Baxter Springs is in the heart of the Oklahoma-Kansas zinc mining field.

Personals

Ernest Hutton, well known in the mining circles of Fairmont, W. Va., has recently become identified with the Jeffrey Manufacturing Co. of Columbus, Ohio, manufacturer of coal-mining machinery equipment, and will represent it in the Fairmont territory.

A. Niedermeyer, for many years connected with the Worthington Pump and Machinery Corporation, most recently as works manager of the Snow-Holly Works of that corporation, at Buffalo, N. Y., resigned on May 31 to devote his entire time to enterprises of his own.

A. B. Cole has been appointed assistant to the manager, Department of Publicity, of the Westinghouse Electric and Manufacturing Co., East Pittsburgh, Penn., to succeed M. C. Turpin, who has accepted a position in the Ordnance Department at Washington, D. C. Mr. Cole will have charge of the editorial work, including the preparation of literature, and supplying information to the press.

Recent Coal and Coke Patents

Coal Grate. J. W. Tatum, Durham, N. C. 1,261,068. Apr. 2, 1918. Filed May 24 1917. Serial No. 170,686.

Stoker. W. A. Casler, Louisville, Ky., 1,263,035. Apr. 16, 1918. Filed Mar. 23, 1915. Serial No. 166,454.

Furnace Structure. C. D. Mosher, New York, 1,260,789. Mar. 26, 1918. Filed Aug. 30, 1917. Serial No. 188,916.

Smoke Purifier. W. L. Boyd, Hayden, Ariz., 1,263,197. Apr. 16, 1918. Filed May 12, 1917. Serial No. 168,182.

Mine Car Construction. E. E. Slick, Westmont, Penn., 1,261,308. Apr. 2, 1918. Filed June 9, 1915. Serial No. 32,998.

Coal Car Cover. E. M. Shorter, Birmingham, Ala., 1,260,078. Mar. 19, 1918. Filed Jan. 2, 1918. Serial No. 210,016.

Fuel Saving Device. S. C. Hays, Franklin, Penn., 1,260,378. Mar. 26, 1918. Filed Sept. 29, 1917. Serial No. 194,001.

Bottom Dump Car. O. G. Petersen, Somerset, Ky., 1,263,283. Apr. 16, 1918. Filed July 3, 1916. Serial No. 107,295.

Grate for Furnaces. E. W. F. McMillan, Everett, Wash., 1,262,221. Apr. 9, 1918. Filed Jan. 5, 1916. Serial No. 70,545.

Mine Cage. W. S. Alsman, assignor to Sullivan Manufacturing Co., Sullivan, Ind., 1,260,290. Mar. 26, 1918. Filed Jan. 19, 1918. Serial No. 212,665.

Forced Draft Water Grate. H. F. Morris and R. Shinn, Collingswood, N. J., 1,261,268. Mar. 26, 1918. Filed Sept. 14, 1917. Serial No. 191,361.

Coal Storage Apparatus. H. Adams, assignor to Adams Coal Machinery Co., New London, Conn., 1,259,583. Mar. 19, 1918. Filed Oct. 12, 1916. Serial No. 125,165.

Roller Bearing Mine Car Wheel. J. L. McDowell, assignor to American Car and Foundry Co., New York, 1,256,149. Feb. 12, 1918. Filed Sept. 5, 1917. Serial No. 189,861.

Lifting and Screening Shelf for Coal Breakers. J. L. Hillen, assignor to Pennsylvania Crusher Co., New York, 1,259,983. Mar. 19, 1918. Filed May 1, 1911. Serial No. 624,291.

Apparatus for Localizing Mine Explosions by Rock Dust Barriers. J. S. Grasty and W. S. Rodman, University of Virginia, 1,261,922. Apr. 9, 1918. Filed Oct. 27, 1915. Serial No. 58,293.

Furnace for Burning Pulverized Fuel. J. E. Muhlfeld, assignor to Locomotive Pulverized Fuel Co., a corporation of Delaware, 1,262,546. Apr. 9, 1918. Filed Dec. 2, 1913. Serial No. 804,192.

Chain Grate for Furnace Using Mechanical Stokers. A. L. F. Lefevre, assignor to Societe Anoyme des Hotchkiss & Cie, St. Denis, France, 1,261,564. Apr. 2, 1918. Filed July 8, 1915. Serial No. 38,707.

Publications Received

Chart of Properties of Mine Gases. Compiled by G. A. Burrell. Department of the Interior, Bureau of Mines. Illustrated. Wall Chart, 26 x 36 inches.

Coal Mining Practice in District I (Longwall). By S. O. Andros. Bulletin 5 of Illinois Coal Mining Investigations. Illustrated, 42 pp., 6 x 9 inches.

Soil Survey of Jefferson, Berkeley and Morgan Counties, West Virginia. By W. J. Latimer, U. S. Department of Agriculture, Bureau of Soils. Illustrated, 74 pp., 6 x 9 inches.

Monthly Statement of Coal-Mine Fatalities in the United States, March, 1918. Compiled by Albert H. Fay. Department of the Interior, Bureau of Mines. Unillustrated, 21 pp., 6 x 9 inches.

Bibliography of Petroleum and Allied Substances, 1915. By E. H. Burroughs, Bulletin 149. Department of the Interior, Bureau of Mines. Unillustrated, 147 pp., 6 x 9 inches.

Use of Permissible Explosives in the Coal Mines of Illinois. By James R. Fleming and John W. Koster. Department of the Interior, Bureau of Mines. Bulletin 137. Illustrated, 103 pp., 6 x 9 inches.

Recovery of Gasoline from Natural Gas by Compression and Refrigeration. By W. P. Dykema. Department of the Interior, Bureau of Mines. Bulletin 151, Petroleum Technology 40. Illustrated, 117 pp., 6 x 9 inches

Mine Safety Devices Developed by United States Bureau of Mines. By Van H. Manning, Director. United States Bureau of Mines. From the Smithsonian Report for 1916, pages 533-544, with 7 plates. Publication 2473. Illustrated, 6 x 9¾ inches.

Siliceous Dust in Relation to Pulmonary Disease Among Miners in the Joplin District, Missouri. By Edwin Higgins, A. J. Lanza, F. B. Laney and George S. Rice. Department of the Interior, Bureau of Mines. Bulletin 132. Illustrated, 108 pp., 6 x 9 inches.

Carbonization of Illinois Coals in Inclined Gas Retorts. By F. K. Ovitz, U. S. Bureau of Mines, State of Illinois. Department of Registration and Education; Division of the State Geological Survey. Coöperative Coal Mining Series, Bulletin 20. Unillustrated, 20 pp. 6x9 in.

Trade Catalogs

Spare the Coal Pile. Ingersoll-Rand Co., New York, N. Y. Form 876. Single-page flyer on barometric condensing plants.

"Little David" Caulking Machine. Ingersoll-Rand Co., Easton, Penn. Form 901-1. Single-page flyer describing this caulking machine.

Portable Mine Car Air Compressors. Ingersoll-Rand Co., New York, N. Y. Form 3015-I. Pp. 4; 6 x 9 in.; illustrated. Describes "ER-I" mine compressors.

Sullivan "DR-6" Mounted Water Hammer Drill. Sullivan Machinery Co., Chicago, Ill. Bulletin 70-H. Pp. 16; 6 x 9 in.; illustrated. Describes the Sullivan class "DR-6" hammer drill, with water jet.

Polyphase Induction Motors. General Electric Co., Schenectady, N. Y. Bulletin No. 41302A. Pp. 12; 8 x 10½ in.; illustrated. Gives the construction details of company's 15 to 200-hp., Type KT, Form B, induction motor.

Leyner Shank and Bit Punch—I-R Type. Ingersoll-Rand Co., New York, N. Y Form 4039. Pp. 4; 6 x 9 in.; illustrated. Describes Leyner shank and bit punch for punching out holes in bits and shanks of hollow drill steel.

Form 901. Ingersoll-Rand Co., New York, N. Y. Four-page flyer showing the complete line of "Little David" pneumatic tools. Tables of sizes and capacities are given and illustrations show all the tools and their applications.

Blueprint Machinery and Drafting Room Supplies. C. F. Pease Co., Chicago, Ill. Catalog B. Pp. 272; 6 x 9½ in.; illustrated. This is an exceptionally well-prepared catalog, bound in hard covers, and excellently illustrated. For easy reference the book has been divided into seven classifications, an index affording easy guidance to one seeking details and prices on drafting-room supplies.

Industrial News

Danville, Va.—The Southern Railway Co. is considering the construction of a new coal chute at its local plant to cost about $30,000.

Newark, N. J.—The Edison Storage Battery Co. has established a new sales office in Kansas City, Mo., appointing Benjamin F. Eyer as resident manager.

Chicago, Ill.—W. H. Callan, general manager plants, and W. P. Pressinger, general manager sales, of the Chicago Pneumatic Tool Co., have been elected vice presidents of the company.

Charleston, W. Va.—An operation will be started at Queen Shoals, W. Va., by the Five Block Coal Co., recently incorporated with a capital of $300,000. A. J. Salzer and others are interested.

Kenmore, N. Y.—The Board of Education has taken bids for the construction of a new one-story coal storage building, about 25 x 75 ft. William A. Kidd, 250 Delaware Ave., Buffalo, is architect.

Coal Center, Penn.—The Haney Coal Co. has awarded a contract to the Enterprise Contracting Co., Bessemer Building, Pittsburgh, for the construction of a new coal-loading plant at its works to cost about $6000.

Norton, Mass.—The Defiance Manufacturing Co., located in the Barrowsville section of Norton, has commenced the construction of a new coal plant at its works. George E. Carver, 53 State St., Boston, is engineer for the company.

Baxter Springs, Kan.—The O. B. Ross Mining Co., which is developing a coal tract near here, under the superintendency of O. B. Ross, is in the market for hoisting machinery, belts, steam engines, pumps, boilers, cars, track and lumber.

Pittsburgh, Penn.—The Aspromet Company of Pittsburgh (formerly the Asbestos Protected Metal Co.) announces the removal of its Chicago office on July 1, 1918, to the Railway Exchange Building. J. T. O'Neill will continue in charge as district manager.

Constable Hook, N. J.—The United States Government, Bureau of Yards and Docks, has awarded a contract to the Guarantee Construction Co., 140 Cedar Street, New York, for the construction of the proposed new local coaling plant. The structure is estimated to cost $130,000.

Nelsonville, Ohio—The Hazel Ridge Coal Co., recently incorporated with an authorized capital of $15,000, has taken over the operating mine started by D. M. Poston, who, after getting the mine near Nelsonville in operation, enlisted in the army. George Biermann, of Nelsonville, is the general manager.

St. Louis, Mo.—The St. Louis Fuel Committee has refused the following applications for reclassification: Lumaghi Coal Co., Canteen Mine, Collinsville, Standard to Mt. Olive; Southern Coal, Coke and Mining Co., Shiloh mine, Belleville, Standard to Mt. Olive; Northern Coal Co., Gallatin County, Carterville to Duquoin. The reclassifications were asked mainly on the ground of the superior preparation of the output. Other applications are pending.

Toledo, Ohio—Lake trade is still active, as is shown by the activity at the dock of the Hocking Valley and Toledo & Ohio Central at this port. During the week ending June 28 the Toledo & Ohio Central loaded 63,735 tons as compared with 71,000 tons the previous week, making a total for the season of 638,735 tons. The Hocking Valley Railway Co., during the same week, loaded 140,450 tons as compared with 144,634 tons the previous week. The total for the season is 1,177,377.

Louisville, Ky.—The Gordon & Miller Coal and Coke Co., composed of Ross E. Gordon, J. S. Miller and Boyce Watkins, has recently arranged to take over the improved mine of the Lynndale-Jellico Coal Co., at Lynndale, Ky., near Barbourville, on the main line of the Knoxville division of the Louisville & Nashville. The company has a tipple and trackage into its plant. It is planned to put in additional machinery, a power plant and other equipment to increase the capacity to about 20 cars a day.

Cincinnati, Ohio—Reports from Morgantown, W. Va., indicate that the Morgantown & Kingwood R.-R., operating 48 miles between Morgantown and Rowlesburg, W. Va., and serving a number of coal mines, may suspend operations on account of inadequate revenues, unless some remedial action is taken soon. That date has been fixed by the management as the date of suspension. However, it is understood that if suspension actually takes place the Government will intervene in order to prevent the coal mines on the road being left without railroad facilities.

Huntington, W. Va.—At a recent meeting here of the directors and alternates of the West Virginia Coal Association and secretaries of district associations, resolutions were adopted pledging the coöperation of the association with the United States Fuel Administration, the National Coal Association and the State Council of Defense. The following officers were elected to serve for the ensuing year: J. G. Bradley, chairman, Dundon, W. Va.; G. H. Caperton, vice chairman, Charleston, W. Va.; A. H. Land, treasurer, Logan, W. Va.; W. H. Cunningham, secretary, Huntington, W. Va.

Charleston, W. Va.—The capital stock of the Harvey Coal and Coke Co. has been increased under authority of the Secretary of State from $250,000 to $500,000. The president of this company is R. H. Gross, who is also president of the large New River Co. Other companies of which Mr. Gross is also president have increased their capital stock as follows: Stuart Colliery Co., from $500,000 to $1,100,000; Prudence Coal Co., from $100,000 to $300,000; Mabscott Coal and Coke Co., from $135,000 to $250,000. On the other hand, the Loup Creek Colliery Co. has reduced its stock from $2,000,000 to $800,000.

Columbus, Ohio—The Charleston Coal Mining Co., incorporated by Columbus men several months ago, has been organized to take over the operating property of the Charleston Domestic Coal Co., located on the edge of Charleston, W. Va. The capitalization is $125,000, a greater part of which is being sold to miners. J. S. McVey, of the Central West Coal Co., is president; F. J. Fried, vice president and treasurer, and H. E. Varga, secretary. Additional machinery will be installed to increase the capacity of the plant. The product is to be sold by the Central West Coal Co., of Columbus.

Welch, W. Va.—The Bradshaw Coal Co., which recently purchased all the holdings of the Bradshaw Pocahontas Coal Co. and adjoining land, incorporated under the laws of Virginia, held its first stockholders' meeting at Graham, Va., on Tuesday, June 25. Edward Mann, of Bluefield, was elected president; R. J. Hancock, of Lynchburg, Va., vice president; G. S. Strader, of Bluefield, secretary-treasurer. The following directors were elected: Edward Mann, G. S. Strader and Walter Perkins, of Bluefield; R. J. Hancock and R. C. Scott, of Lynchburg; L. A. Osborn, of Welch, W. Va., and C. L. Biddison, of War Eagle, W. Va. C. L. Biddison will be general manger.

Chicago, Ill.—The Allen & Garcia Co., McCormack Building, Chicago, Ill., have been appointed constructing engineers by the Donk Brothers Coal and Coke Co., St. Louis, Mo., in charge of the design and construction of its new No. 4 mine near Edwardsville, Ill. This will be the fourth new mine in the state of Illinois, designed or constructed within the last year, on the basis of skip hoisting and rotary dump at shaft bottom. Another new feature in connection with this property will be the level surface yard, all railroad cars to be handled by shunter locomotive instead of the uncertain gravity system. The power plant will be constructed with a view of supplying electric energy for the operation of mines Nos. 5 and 6, which will be developed after No. 4 is completed.

MARKET DEPARTMENT

Weekly Review

Production of Bituminous Keeping up Well—Where the Coal Is Going—Some Conservation Plans—Stimulating Labor in Soft-Coal Mines—Anthracite Situation Serious—Demand for Coal Active—Lake Shipments

THOUGH the production of bituminous coal for the week ended June 22 totaled 12,016,000 net tons, a decrease of 610,000 net tons when compared with the output for the week ended June 22, production was at the rate of 643,000,000 net tons a year, or 11,000,000 net tons above the average rate in the record-breaking year 1917.

Even at this rate of production it appears that the mines will be unable to furnish enough coal to meet all needs, which serves to emphasize the fact that the demand for fuel is unprecedented.

Where is all the coal going? It would seem almost needless to answer this question. There's the iron and steel industry, for example. The production of coke is this year larger than ever before, and still the blast furnaces cannot get all the coke they need. Furthermore, it must be remembered that every ton of coal converted into coke has been counted in with the figures of coal production each week. The large tonnage of coking coal consumed by the blast furnaces should therefore be deducted from the amount available for other industries. The steel mills, too, at this time are using a larger proportion of pig iron than in normal years, and a ton of pig iron converted into steel means, in the long run, more coal consumption all along the line than a ton of pig iron used in the iron foundry.

The tinplate mills, which consume more coal per ton of output than any other important branch of the general iron and steel industry, are also running at maximum capacity. Then again, the railroads are consuming more coal than ever before. What is true of the few industries mentioned is equally true of every war plant today.

It can readily be seen, therefore, that the strictest kind of conservation must be practiced in order for the country to pull out on the right side. The Fuel Administration has perfected quite a few plans to cut out the wasting of coal, and not the least ambitious of these is the proposal to save several million tons of coal by effecting economies in power plant consumption. There are 250,000 industrial power plants in the United States. At many of these the amount of coal waste is considerable. Every power plant east of the Mississippi River is to be visited by an inspector and given a rating based on the thoroughness with which the owner carries out the conservation recommendation. The plan is based on the use of the existing equipment without the installation of fuel-saving apparatus. Plants which are prodigal in the use of coal will either have to reform or do without fuel.

Another plan is to save the coal consumed in needless illumination. Failure on the part of nearly every city and town in the country to prevent a waste of electricity has made necessary new action on the part of the Fuel Administration, and before long Dr. Garfield may again invoke his "lightless night" order.

While busily engaged in conservation work, the Fuel Administration has not lost sight of the fact that production must be stimulated to the *n*th power. The mine workers are being exhorted to work full time instead of laying idle whenever the whim seizes them, and the final interment of the assigned car policy assures an equitable supply of empty cars to the mines. If labor in the bituminous coal regions can be induced to work regularly and faithfully, there need be no serious shortage of fuel for all essential industries.

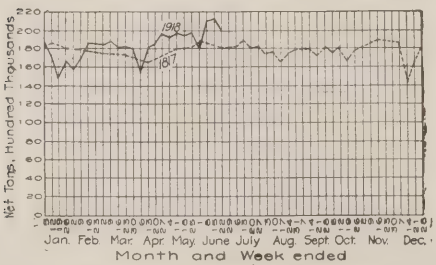
The anthracite mine workers, on the other hand, though not lackadaisical and pleasure-seeking to the same extent as their brethren of the soft-coal regions, are not great enough in number to produce the necessary tonnage of hard coal. Production for the week ended June 22 amounted to 41,170 carloads, which is on a par with the shipments of previous weeks. The continued drafting of employees has placed the hard coal operators in serious straits, and this is forcibly illustrated when it is known that for every man lost to the industry the nation loses 600 tons of coal a year. The magnitude of the loss is further emphasized in the fact that 33,000 mine workers have been withdrawn from the collieries since the war started, which translated into labor power means an annual loss of nearly 20,000,000 anthracite tons of marketable coal.

The market is characterized by a strong demand in nearly every branch. Domestic stocking continues strong, and is taking practically every ton of coal in dealers' yards. With a higher percentage of domestic requirements taken care of by summer storage, it will be possible to concentrate more generally on the industrial supply.

So far shipments to the lakes have not been up to expectations, and a movement of more than 1,000,000 tons is reported from the head of the lakes. Vessel movement is active, and fewer bottoms are going to the upper lake region light. Heavier shipments will be necessary this month to maintain schedules and supply the Northwest before winter sets in.

COAL PRODUCTION

A sharp decline in production of bituminous coal occurred during week ended June 22. The output of soft coal (including lignite and coal made into coke) is estimated at 12,016,000 net tons, a decrease compared with the week of June 15 of 610,000 net tons, or 5 per cent., and an increase over the same week of 1917 of 701,000 net tons, or slightly over 6 per cent. The average production per working day during the current week is estimated at 2,003,000 net tons as against 2,104,000 net tons during the preceding week and 1,888,000 net tons during the week of June 22,



1917. Shipments from all districts decreased during the week of June 22. Shipments from Ohio and Alabama decreased the most, from the former fields the decrease amounted to 7 per cent. and from the latter fields 12 per cent. Central and western Pennsylvania shipments decreased 4 per cent.

Anthracite shipments during the week of June 22 amounted to 41,170 cars, a decrease of 790 cars or 1.9 per cent.

Beehive Coke—A considerable decrease in production of beehive coke in the United States occurred during the week ended June 22. Preliminary estimates place production at 604,000 net tons as against 661,000 net tons during the week of June 15 and the average per working day at 101,000 net tons compared with 110,000 net tons during the preceding week. The principal operators in the Connellsville, Greensburg and Latrobe district of Pennsylvania report production of beehive coke during week ended June 22 at 391,869 net tons, the ovens being operated at 75.5 per cent. of their present capacity, as against 77.2 per cent. during the week preceding. During the week slight improvement occurred in transportation conditions, but such improvement was entirely offset by greater losses due to shortage of yard labor. The same operators produced 143,500 net tons of coal.

Byproduct Coke—Operating conditions in the byproduct industry improved further during the week ended June 22, the plants being operated at 89.5 per cent. of their present capacity as against 88.5 per cent. during the week of June 15. A better supply of byproduct coal and improved labor conditions are reported for the country as a whole, while repairs to plants caused slightly greater losses than during the week preceding. Material improvement was reported by operators in Indiana, Kentucky and Tennessee while operators in Alabama, New York and the western states report the only material decreases.

BUSINESS OPINIONS

Bradstreet's—Industrial movements propelled by Government orders are intensely active, readjustments to a war basis implying regulations of one kind or another loom larger than anything else, and in consequence fresh operations in ordinary business lines proceed at a halting gait. With the Government exercising priorities, regulating prices, and taking such goods as are needed, free trading on civilian account is out of the question. This condition is responsible for the universal cry of a shortage of merchandise and the inability of jobbers to fill orders. In such lines as textiles, trade has almost halted pending definite views as to the Government's final action on prices. Potentially fall business is of large proportions, but the general attitude is to defer placing orders for distant delivery until it can be seen which way and how far the price pendulum is likely to swing.

American Wool and Cotton Reporter—Many are convinced that when wool is apportioned for civilian production that some definite arrangement will be made in regard to prices of woolen goods. It is believed that it is the settlement of this detail more than the raw wool supply which is holding back regulation. Raw cotton remains high even with the visible supply accumulated because the cotton grower or the holders are firmly convinced that the actual amount obtained from the growing crop will not be especially large, even if present indications point to this fact, and also because it is not the basis of domestic supply, but the basis of world supply on which prices must be regulated.

Dry Goods Economist—While the War Industries Board has announced that a large portion of the raw wool stock now in this country, and all of the wool to be produced or imported prior to Jan. 1, 1920, will be required for military uses, the board also declares that the stocks of clothing and cloth on hand will be adequate for essential civilian needs. The board also gives assurance that wool will be equitably distributed to meet both Government and civilian requirements and that prices will be so regulated as to assure a fair and reasonable profit to the industry and at the same time prevent abnormal profits.

Marshall Field & Co.—Current wholesale distribution of dry goods for the week is substantially ahead of shipments for the corresponding period a year ago. Road sales for both immediate and future delivery show a good increase over those of the same week in 1917. Customers have been in the market in slightly smaller numbers than last year. Collections are satisfactory, showing an increase over those for the corresponding week a year ago.

Atlantic Seaboard

BOSTON

First quarter of coal year passed and receipts far short of schedule. Coastwise shipping has caught up with the program and railroads have not been offered the tonnage they could have moved, but the volume of coal has not been forthcoming. Arrears since Apr. 1 amount to 2,000,000 net tons bituminous. The 4500 cars weekly quota from central Pennsylvania all-rail yields less than 70 per cent. and a reduction is probable. Apparent fluctuations in program make it extremely difficult to plan distribution and "protect" preferred requirements. Situation bound to develop fast as season advances. State administrators rule on extra compensation for shippers who distribute over wharves not their own. Anthracite program also falls down. Effort made to restrict domestic sizes from manufacturers and other steam users requiring bituminous to be used as a substitute. Query arises, whence will come the bituminous?

Bituminous—The trade is now able to view the results of fuel regulation so far as concerns the volume of coal received in New England. The situation here seems extremely hard for Washington to grasp, and notwithstanding all the representations made and assurances given, this territory at the end of three months since Apr. 1 is falling steadily behind in receipts, and this during the season of most favorable movement and at a time when stocks must of necessity be accumulated. A program for 30,000,000 net tons for the coal year, two-thirds by water and one-third all-rail, April to October movement to be 3,000,000 tons monthly and October to April to be 2,000,000 tons monthly, was arranged early in March, and it was put up to the Shipping Board and the Railroad Administration to move the coal when the necessary volume was produced. It is now perfectly plain, at the end of three months, where the weakness has been in the March program. At the time everybody was agreed that the greatest bar to a full operation of the program would be the shortage of ships. It meant adding to the available steamers in the coastwise coal trade more than 150,000 tons, and notwithstanding all the difficulties this has been done. Steamer tonnage has been steadily increased until on July 1 the total exceeds the mark set in early March. There are now in service 94 ships against the 40 in the trade as late as in the latter part of April.

The railroads also have moved with dispatch all the coal offered them by the connecting lines. It is recognized now that transportation generally has caught up with coal output, and in New England for the three months the showing is impressive. While the average movement via the five New England gateways was 664 in March and 717 in April, the daily receipts in May dropped to 535. Figures for June are not complete, but for 28 days the average for commercial coal was 527. In other words, the present movement all-rail is still far below what it was in April and is even slightly below what it was in January. A month ago it was clearly stated that the New England roads could handle at least 500 coal cars more a day, but this would of course include anthracite both in steam and domestic sizes. Railroad fuel is still being received in less volume than normal, and certainly we are in for serious times if a greater effort is not made soon to build up stocks for the New England carriers.

The net result of sending coal to points other than New England is a shortage of nearly 2,000,000 net tons for the three months since April 1. This is of course on the basis of 3,000,000 tons monthly, as agreed upon in March, and since this serious deficiency is in volume of coal and not in transportation, it is only natural that the trade here should look to the fuel authorities to see to it that deliveries here are on the proportionate basis outlined early in the year. Much prominence has been given to the 4500-car order, so-called, and even yet there is a great lack of understanding of what the order really meant.

The order went into effect June 10, but so far as returns have come in the order has not yet yielded 70 per cent. When it was issued there was a general understanding this accelerated all-rail movement was in no way to conflict with shipments by rail and water via New York and Philadelphia piers, but except for certain routine shipments for railroad fuel and important industries to which coal continues to run the movement in this direction has fallen off to such extent that emergency shipments for account of the New England Fuel Administrator have disappeared entirely. The scheduled movement via tidewater piers from central Pennsylvania was to be 1125 cars weekly. This added to 4500 cars all-rail would amount to 5625, but again there is a flaw in the program, at least in practical operation. It is now strongly intimated that the total movement via both routes is to be something over 4750 cars weekly, and therefore should the quota be reached by either route the supply in the other channel would most seriously fall off.

Anxiety increases week by week, and a large number of consumers are running on hand-to-mouth deliveries. Only in a few scattered instances has there been any opportunity to get reserves, and the railroads are still the most glaring cases where limited stocks are the rule. They, too, have joined the ranks of those determined to use steam sizes of anthracite in power plants, and the volume of buckwheat and silt bids fair to increase rather than diminish. This will be the case probably up to the time when the shippers will not be able to load fast enough to keep up with the demand. Should car supply in the anthracite region be at all affected, the supply of steam sizes would be the first to be curtailed.

On every side the situation is most complicated and difficult for local fuel authorities to supervise. With the program from Washington changing from time to time, it is impossible here to fix upon an adequate plan for proper distribution. No one is yet able to say what is "protection" for a preferred requirement. For the present, the local mark is three weeks.

As a result of the hearing in Boston on June 18 the Massachusetts Fuel Administration fixed upon 23c. (including purchasing commission) as sufficient compensation for shippers who handle bituminous in their own or chartered transportation and distribute over wharves not their own. This was to carry out the provisions of Rule 23, issued from Washington on or about June 1. Some shippers had asked for 5 per cent. of the delivered price, or 40@45c., while others had asked that no increase be granted. The decision is therefore a very moderate concession to those who thought 15c. not enough.

Anthracite—Shipments of domestic sizes show no substantial increase over recent weeks. June receipts by water were less than in May, although complete figures are not yet in hand. For 28 days in June the average daily receipts of domestic sizes all-rail were 581 cars. Steam sizes averaged 190 cars daily for the same period. One of the larger shippers advanced prices 25c. on these sizes on June 12.

A determined effort is being made to shut off domestic sizes from manufacturers for steam use. The amount of this tonnage, especially that which has replaced coke, is surprising; but if all this is to be replaced in turn by bituminous, the query may well be raised, Whence will come the bituminous?

NEW YORK

Dealers are gloomy over the outlook and hope that receipts will increase shortly. Division of fuel district in New York State opposed. Committee of Bronx taxpayers to see Dr. Garfield. Demand for the steam coals continues heavy. The bituminous situation serious. Free coals are scarce and large consumers become anxious.

Anthracite—The optimism prevailing in Fuel Administration circles as to the outlook is not so much in evidence among the trade. The shortage seems to be as heretofore, and the dumpings at the local piers for the week indicate one more car emptied than was dumped during the previous week. Receipts are not anything like the trade would have them, and complaints are numerous.

The reports emanating from Washington that it is contemplated to appoint a Fuel Administrator for the upper part of the state does not meet with the approval of the trade, and there is said to be much opposition to a divided fuel district in this state. Coal men, however, are solid in the belief that a State Fuel Administrator should be appointed at once, otherwise they are of the opinion this state will face a serious fuel situation next winter.

The situation in Bronx County is so desperate that a committee of taxpayers will shortly visit Dr. Garfield in Washington and present to him the claims of that county. It is the opinion of these taxpayers that the county is being discriminated against and that preference is being shown to New England in the way of shipments. It is claimed that during the year ended Mar. 31, 1918, there were consumed in the county 870,977 tons of coal, while the allotment made by the Fuel Administrator for the current year is but 850,975 tons, although the dealers have applied for 1,344,000 tons. It is proposed to place these and other facts before Dr. Garfield and show him that unless more coal is sent to the dealers there will be many heatless houses in the Bronx next winter.

Unless the order to the Anthracite Committee sending an increased tonnage into New England is renewed, receipts here ought to show a big increase his month.

For the week ended July 1 the dumpings of anthracite recorded at the tidewater docks in this harbor were 7426 cars, or one car more than the previous week. For the month of June there were dumped 30,713 cars. Shipments of anthracite as reported by Government statistics for the week of June 22 showed a falling off of 790 cars as compared with the previous week, 41,170 cars having been sent to market as against 41,960 cars for the week ended June 15.

Operators are anxious about the labor situation at the mines and predict a still greater shortage of coal unless the War Department acts quickly in exempting miners from the draft law provisions.

The activity in steam coals continues, much of the demand being due to the efforts to use barley and culm in place of bituminous or in mixing these sizes with it, owing to its scarcity. Buckwheat No. 1 is nearly as scarce as the domestic coals. Rice and barley are easily moved, some of the railroads storing quantities of the latter size for next winter.

The demand for all sizes among the line trade is heavy. Dealers in some localities say they have delivered as much coal as they usually have placed in bins by Aug. 1.

Current quotations, per gross ton, f. o. b. tidewater at the lower ports, follow:

	Circular	Individual		Circular	Individual
Broken	$6.50	$7.25	Pea	$4.90	$5.65
Egg	6.10	6.85	Buck	4.85	5.60
Stove	6.35	7.10	Rice	4.35	4.80
Chestnut	6.45	7.20	Barley	3.85	4.00

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates. Prices for buckwheat, rice and barley are not fixed by the Government.

Bituminous—There has been no letup in the demand, and dealers see no increase in receipts. There is still much dissatisfaction over the preference order for New England, it being felt in local circles that New York is the loser.

Definite announcement by the railroads fix the freight rates on coal coming to South Amboy from central Pennsylvania and to St. George from certain districts along the Baltimore & Ohio at $2.15 per gross ton, to which the war freight tax of 3 per cent. is to be added, an increase of 50c. per ton. The rate to the upper ports is 5c. per ton higher.

Stocks here show no increase. Free coals are hard to find, while regular customers are getting just about enough to supply their immediate needs. There were 7228 cars of bituminous dumped at the local tidewater docks in the seven days ended July 1, as against 7239 cars the previous week. For the month ended June 30 there were 30,861 cars of bituminous dumped. During the week ended June 22 there were 212,886 cars of bituminous shipped to market, as compared with 222,892 cars shipped the previous week, an increase of 10,006 cars.

Large consumers are becoming alarmed over the situation and are not optimistic of the future. The railroads are preparing to store large quantities for winter, but are not able to obtain anything like the tonnage they would like.

After considerable work on the part of a committee of The Wholesale Coal Trade Association of New York, jobbers are to be allowed a margin not to exceed 35c. per ton on coal physically handled by them. This margin is allowed them as a result of an order issued by Ellery B. Gordon, assistant to state fuel administrator. This margin is to be added to the mine price of the coal plus freight rate to tidewater plus war tax on freight plus demurrage plus actual harbor boat charges.

Current quotations, based on Government prices at the mines, net ton, f. o. b. tidewater, at the lower ports, are as follows:

	Mine Gross	F. o. b. N. Y. Gross
Central Pennsylvania:		
Mine-run, prepared or slack	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of-mine	3.08	5.23
Prepared	3.36	5.51
Slack	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite situation grows serious. Receipts shorter than for two months. Quotas for large buildings cut. Buckwheat to be conserved. Schools to get full tonnage. Rent raisers taken in hand by fuel com-

mittee. Strong hope for improvement in July. Quotas increased 18%. Questions raised by freight increase. New labor problem. Bituminous car supply about 50%. Fair shipments locally. Improved tide movement. Brokers do fair business.

Anthracite—The past week has been one of great publicity to the retail coal trade. The newspapers have printed interviews calling attention to this city's need for anthracite. In an effort to offset another coal shortage next winter, the fuel authorities began reducing the supply to various large buildings. For over a month a large number of inspectors under instructions from the fuel conservation chairman has been visiting apartment houses, stores and manufacturing plants, checking up statements made in answer to a questionnaire concerning their fuel needs, together with the equipment for economical combustion. It is claimed that many faulty statements have been received, and it is probably due to this that drastic cuts will be made. The fuel administration seems determined to conserve fuel for the homes in every possible way and will see to it that only minimum supplies are furnished to large buildings. While it is stated that no war industry has yet been curtailed, it is the intention during the coming winter to care for the homes first, then the war plants and then the non-war concerns last.

In this connection it can be said that the list of plants refused permission to purchase buckwheat grows in number. As a consequence those plants which have been granted exemption have been enabled to increase their storage piles quite considerably. Among this latter class are a number of concerns who are not strictly on war work, and it would be no surprise at all when winter comes to see such stocks commandeered for domestic use.

The number of retail firms refusing to book additional orders until those on hand have been materially reduced is growing almost daily. It was reported this week that the largest concern in the city had now taken this stand. In the meantime those with orders on the books continue to urge the delivery of the coal.

With the month of June now closed it must be said that the coal receipts for the city were most discouraging and are understood to be much below those of April and May. Just how far short of the actual needs of 233,000 tons per month, which is the basis for the yearly estimate as announced by Chairman Lewis, has not yet been ascertained, but the shortage has been estimated by various interests at 75,000 to 80,000 tons; and using the latter figure, this would make the June receipts of domestic coal 153,000 tons, which we feel is about accurate. However, as we start into July at least one of the big operating companies claims it expects to give all its local trade a goodly increase. So far as we can learn this is predicated on the fact that it will this month make shipments with all quotas increased 18 per cent as announced by the fuel authorities some time since. Action on this increase has been postponed from time to time with the hopes that this city would be granted a heavier increase than 18 per cent., but it is stated for the present this will not be done.

Referring to the new freight rates, it is interesting to note that there are now only two rates, that of $1.90 for domestic coal and the other $1.70 for pea and smaller. This latter classification is an innovation, as before the recent 45c. advance pea was $1.25 and the steam sizes $1.20, and for many years there was such a variation. The above rates, of course, are for the most direct routes to the city, the differentials via the other roads still making those rates higher, as usual.

The labor situation among the retailers does not improve, and is really almost as serious a factor as is the slowly diminishing number at the mines. It is next to impossible to get men to make retail deliveries, and when they do work they surround the job with conditions that make their retention almost worthless. In order to help this situation a ruling has now been made that retail dealers will not be required after July 1 to make deliveries in the customer's cellars where the coal cannot be chuted from the wagons. Heretofore an extra charge has been made for carrying the coal, but it has been so difficult to induce men to do this that the fuel authorities have ruled that in such cases the customer must either do this work himself or provide the necessary labor. Of course, all dealers do not expect to apply this rule, except where it is absolutely necessary.

The demand for all steam grades continues unabated, with the usual exception that culm is quite free. Locally the demand for this does not increase, but in the eastern market there has been no diminution, although some whispers of complaint are being heard that the cars used for this coal might be used to better advantage on other sizes.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.25	Buckwheat	$3.40	$4.45
Egg	4.50	5.85	Rice	2.90	3.80
Stove	4.75	6.10	Boiler	2.70	3.70
Nut	4.85	6.20	Barley	2.40	3.30
Pea	3.45	4.70	Culm	1.25	2.15

Bituminous—In the soft-coal trade car supply still dominates the situation, as there has been little or no improvement recently. It seems that the golden days of a few weeks past when an almost 100 per cent supply, based on present production, was to be had, is now but history. There continues to be some chafing over the 900-cars-per-day order to New England, and we really doubt if that many cars are now going forward. The local consumers are receiving a fair tonnage and most of the vital plants continue to be able to store good supplies. This is particularly true of public utilities, where the visible stocks are getting close to normal. It has now been some time since it has been necessary for the fuel administration to divert any tonnage. Of course, this is due to the better production, but much credit also belongs to the bituminous distribution committee of operators who are now handling this work for the administration. Tide shipments are increasing now that the submarine flurry seems to have subsided. In the brokerage trade many of the houses are receiving fair supplies by following the plan of permanently locating representatives in the region and buying stray cars, particularly from wagon-mine operators.

BALTIMORE

Rather remarkable lack of stimulation noted in buying bituminous for future when supplies are fairly easy. More bad coal received. New retail anthracite prices out following freight-rate jump.

Bituminous—Dealers in soft coal here utterly fail to offer any adequate explanation of the lack of active seeking for coal supplies for the future on the part of many consumers. At present there is a fair supply of bituminous here as a result of diversions to the account of the fuel administrator of Maryland, augmenting the regular shipments, and while it is being absorbed there is none of the competitive rush for coal that might be expected after the shortage lessons of last winter and the idea being steadily pushed from Washington that conditions the coming winter are to be even worse.

A number of rejections from Tidewater Pool No. 18 were noted specially the past week. Some of the coal rejected is classed as "very poor." Little complaint, if any, is heard over the advance in freight rates of 45c. on line shipments of soft coal here or on coal for piers and delivery inside the Virginia Capes. Most people take jumps in prices and rates as a matter of course these days. There is a little less understanding of the need of making the outside the Capes increase 50c., however.

Anthracite—Facing necessity of adjustment of a freight-rate increase on prepared sizes of around 60 and 65c. since last April, the Baltimore retail coal men, after several conferences with the fuel administrative force in this city have issued a new retail sale schedule. In this schedule the coal men absorb 15c. of advance on prepared sizes and the public 45c. of the advance of from $2 to the new rate of $2.60. The freight-rate advance of 50c. on pea coal, or from $1.60 to $2.10, is absorbed by the coal trade, as that fuel, known as poor man's coal, remains at the old April schedule price. There are no changes in peck and bushel sale rates either, and this is the more noteworthy as there has been no advance in these small sale lots since last winter. The coal men here are complaining more about lack of ability to get coal than anything else. They admit that many consumers who placed orders last April and May, and whose coal has not been delivered, will be disgruntled over the fact that they will have to pay the new delivery price. The new retail anthracite schedule for Baltimore is as follows:

2240 Lb. to the Ton	Ton	½ Ton
Hard White Ash:		
No. 1 (Broken)	$10.75	$5.55
No. 2 (Egg)	10.45	5.40
No. 3 (stove)	10.70	5.50
No. 4 (chestnut)	10.80	5.55
Pea coal	8.95	4.65
Buckwheat	8.60	4.45
Lykens Valley:		
No. 2 (egg)	11.15	5.75
No. 3 (stove)	11.55	5.95

Prices for half tons are net.

A discount of 25c. per ton for cash.

Bagging, trimming and all labor in putting away coal to be charged at actual cost.

Lake Markets

PITTSBURGH

Heavy production shows magnitude of consumption. Steel industry's requirements heavy. Market narrow.

The record production of bituminous coal in the last three weeks and the fact that coal has not become plentiful, emphasizes the statement that coal requirements are altogether unprecedented.

Lake shipments are not causing any particular trouble, the movement proceeding rather smoothly and with indications that the amount permitted for the lake season, 4,000,000 tons for Canada and 24,000,000 tons for domestic ports, or 28,000,000 tons in all, will be provided without any great difficulty.

There is some stocking of coal, and perhaps a trifle more than a month ago, but all the testimony is that the stocking is proceeding much too slowly to suggest that the prospective difficulties of next winter are being safeguarded against. The by-product coke plants in particular frequently experience difficulty in getting enough coal for current consumption and are accumulating but little of the large reserves they would like to have for winter. The market is narrow, with open transactions representing but a small volume; and most of the transactions are in the form of allocations. The market remains quotable at the set limits: Slack, $2.10; mine-run, $2.35; screened, $2.60, per net ton at mine, Pittsburgh district, with 15c. brokerage allowed to regular brokers.

BUFFALO

Still predicting big winter shortage. Not much change in trade, except that anthracite is hardly so plenty. Some jobbers are doing well. Lake shipments fairly good.

Bituminous—The situation does not change much except that all predictions agree in looking for a shortage next winter quite as large as last, no matter what else happens. Whether the one report is an echo of another is hard to say, but the effect is seen in the increased effort to stock up. If there is a consumer next fall with empty storage capacity he will be reckoned either foolish or unfortunate. As it is now, all but the more isolated districts are able to get more coal than they need, and the rule is that they are making the most of it.

Jobbers as a rule do not find their business improving, but at the same time the more active and reliable are selling a liberal amount of coal. They do not claim to know how they get hold of the coal, but they either manage to stand pretty close to certain operators or they have a large amount of buying territory on their lists. It will not answer to stand still these days and let business come to you, for that will never happen.

Territory dependent on Buffalo for most of its coal is now pretty well taken care of. Canada, as a rule, has enough and New York state is fairly well taken care of; but the gateways to New England are pronounced too small for its needs. North of tidewater they are Poughkeepsie Bridge, Albany and Mechanicville.

The latest fixed prices are not well worked out yet, but at least certain leading jobbers are billing at $4.75 for thin-vein Allegheny Valley, $4.45 for Pittsburgh lump, $4.20 for Pittsburgh mine-run and $3.95 for Pittsburgh slack, all per net ton, f. o. b. Buffalo.

Anthracite—The supply locally continues to run down. Shippers as a rule agree that there is nothing out of the ordinary about that, for they are sending all of their surplus up the lakes, and they will continue to do so all summer if a supply is laid down at upper lake ports sufficient to carry that territory through.

If Buffalo is suffering at all, it is because more anthracite is going east and to the army camps than we can well spare. When the lakes close in early December the amount going into that trade, if diverted entirely to this section, would meet all needs, but it is likely that New England and perhaps some other eastern districts would claim a part of it. The county administrator is warned by the state administrator that too much anthracite is going for steam making.

The amount of coal loaded for lake shipment for the week was below the recent average, being 98,750 net tons, of which 58,500 tons were loaded for Duluth and Superior, 20,200 tons for Chicago, 8000 tons for Sheboygan, 7600 tons for Green Bay, 3000 tons for Houghton and 1450 tons for Portage.

Freight rates remain at 48c. for Duluth, 50c. for Sheboygan, Green Bay, 60@65c. for Chicago and 75c. for the Portage lake ports of Houghton and Portage.

CLEVELAND

Ohio mines close, making further cuts in receipts. Local coal interests predict winter famine, being unable to place contracts. Fuel administration seeks old railroad lumber to aid domestic fuel supply. Lack of cars cuts week's supply 39 per cent.

Bituminous—Turn of the month has not brought any improvement in the coal situation in this market. Car shortage is given as the basis for the absence of normal supply of coal at this time, and although steps toward placing the situation before the Federal Railroad Administration are being considered, it is admitted there is no suggestion to offer, so far, to remedy this deficiency. The extreme car shortage has caused some mines in Ohio to close during the last week or so, and hundreds of miners are actually in danger of starving, the local trade has been informed. This combination presages a coal famine even worse than that of last winter. Already the production, as it will affect Cleveland, is 75 per cent. of normal, because where mines, even though slowing down, still are operating, they have much less labor than in times before the war. The local situation is especially critical, because, unlike other centers, there is practically no contracting ahead. To such concerns here, which have not contracts, mines are refusing to supply coal. With the priority orders now in effect, those consuming firms most essential to Government service are now getting the big supply of bituminous coal. The steel mills here are not able to put out as much product as they might if both car and labor situations were more normal. The latest report from the local offices of the Pittsburgh Vein Operators Association, of which D. F. Hurd is secretary, shows a shortage of coal of 39 per cent., or approximately 100,000 tons, due to the insufficient car supply, which is 2341 cars. More than 17,000 additional tons has been lost due to mine disability, labor shortage and the like.

Anthracite—Because most of the anthracite coal passing through Cleveland is being shipped up the lakes, and practically none consigned to Cleveland, receipts here are almost nil; and there is no indication the situation will be improved this month.

Lake Trade—Manning of 25 vessels for lake coal trade was completed this week, but this is not expected to help much unless receipts are increased. The lake schedule out of this port called for 4,000,000 tons, but only 3,500,000 were shipped, latest figures will show. Many boats have left with light cargoes, for although there were fifty vessels, there was not enough coal to distribute among them. Shipments for the last week were something more than 800,000 tons, but the normal movement for this period should be 1,000,000 tons each week. The amount fixed for July is 4,500,000 tons. It is admitted the lake trade has loosened up considerably in the last few days, so that the Fuel Administration's plan to get coal into the Northwest is working out well.

DETROIT

Inadequacy of supply continues to handicap early buying. Lake shipments make little gain.

Bituminous—Coal is not yet coming into Detroit as freely as jobbers and wholesalers say is necessary to assure a sufficient supply for the city's needs later in the year. The movement in June was disappointing to dealers who had hoped the month would give a strong impetus to the establishing of reserves not only among users of steam coal but in the yards of retail dealers as well.

Shipments received during the month, according to estimates of some of the jobbers, represent an aggregate little if any greater than the amount of supply necessary to fill current requirements. Complaint is heard that the supply of domestic stock is conspicuously deficient in quantity, while mine-run constitutes the larger bulk of the receipts, other sizes, including slack, reaching the city only in moderate amount.

Restoration of amicable relations has taken place between the Michigan fuel administrator, W. K. Prudden, and Detroit business interests represented by the Detroit Board of Commerce.

Anthracite—Detroit is not yet receiving anthracite in any substantial amount. Much of the time during June receipts were under 40 cars a day. Household consumers are unable to get orders filled but are unwilling to stock up with bituminous.

Lake Trade—Movement of coal over the lake routes in June did not equal expectations. Shipments were augmented for a few days early last week, but before the end of the week slumped off again with a light movement from the Pittsburgh district. Heavier shipments will be necessary this month to maintain schedules and supply the Northwest before winter sets in.

COLUMBUS

Strong demand characterizes every branch of the coke trade in Ohio. Mining operations in certain districts have been improved.

The coal trade in Ohio during the past week has been active in every way. Demand for steam, domestic and lake tonnage is still strong, and there is still a scarcity of available stocks. The lake trade is being rushed as rapidly as possible and steam users are increasing their storage. On the whole the tone of the market has been active in every way, and prospects are for a continuation of the strong demand from every locality.

The domestic trade is still one of the important departments of the industry. Dealers are clamoring for stocks and have placed orders both for immediate and deferred delivery. Retail stocks are quite light and most of the dealers are operating from hand to mouth. Retail prices will be changed to take in the new freight rates and also the advances in most Ohio districts which were announced effective June 29. Dealers are busy making deliveries, as users are now anxious to secure their stocks for the coming winter. Pocahontas is quite scarce and only small consignments are arriving in the local trade. Some West Virginia splint is available. Pomeroy Bend and the Hocking Valley are supplying the largest tonnage.

Steam demand is also good and the larger consumers especially are making frantic efforts to increase their surplus stocks. Many of the users have all available storage space occupied. The smaller users are following the example of the larger consumers and are also stocking up to guard against an emergency. Fuel regulation is holding down orders in certain places. Railroads are taking a goodly amount for the operation of trains.

Lake trade is strong, and a priority order is now looked for in order to stimulate lake movement. So far the lake trade has not been up to expectations, and a shortage of more than 1,000,000 tons is reported from the head of the lakes. Vessel movement is active and fewer bottoms are going to the upper lake region light.

Lake prices are firm at the new levels announced by the Federal Fuel Administration several weeks ago.

CINCINNATI

Record-breaking deliveries are under way, facilitated by improved car supply and good weather. Labor conditions present the only probability of trouble at present.

Loadings at West Virginia mines during the past week broke all records, indicating the decided improvement which has taken place in the matter of car supply and the satisfactory condition of the supply of labor for the time being. Some deliveries of new open coal cars are reported to have been made, rather unexpectedly early, considering the fact that the orders for the equipment were placed only a short time ago; and as it is obvious that deliveries will increase as time goes on, it is evident that the shortage of rolling stock, which contributed so largely to the distressing conditions of last winter, will be largely remedied before cold weather again sets in. The movement of coal to the lakes, under the system of distribution now in force under the orders of the Fuel Administration, is very heavy and bids fair to care for all of the requirements of the Northwest without difficulty. In fact, if the threatened shortage of labor does not develop acutely, the effective coöperation of the railroad and fuel branches of the national administration promises to take care of the Nation's extraordinary fuel requirements in an astonishingly efficient manner. With a higher percentage of domestic requirements than ever before taken care of by summer storage, it will be possible to concentrate more generally on the industrial supply. The trade is becoming more and more optimistic over prospects in this respect.

LOUISVILLE

The domestic stocking demand continues strong, and is taking care of practically all of the coal received from both the eastern and western Kentucky fields at this time. Steam demand about normal, with production generally light.

Unless coal production increases in both the east and west Kentucky fields, even Louisville, located between two considerable fields, will have trouble in securing coal supplies this winter. At the present time no surplus stocks are being secured, while increased consumption is shown on every hand. The new Government powder plant at Nashville, Tenn., is expected to take a large percentage of the production of that district and general plants are operating on Government contracts and must be supplied.

During the past week it was announced that the Government would erect a large powder plant at Louisville in addition to the one at Nashville, and it was further announced that a new artillery cantonment with a capacity of 30,000 men would be erected at West Point, Ky. These two new developments alone will take a considerable volume of coal, and increase the necessary tonnage, whereas production in both the east and west Kentucky fields has been steadily decreasing due to the shortage of labor.

BIRMINGHAM

Production being speeded up to some extent. Supply to meet domestic and steam requirements still short. Market very active for all grades.

Alabama mines made some progress in the prime essential of increased production during the past week, according to information gathered from the producers and distributing agencies, and the opinion is held that continued improvement will be shown from now on.

There is still a distinct shortage in receipts of domestic coal by local dealers to care for the orders now in hand, practically no stocking having been accomplished in respect to the higher grades of coal. The Montevalle Mining Co., the largest producer of strictly domestic fuel and the only company which has contracted its output to any extent, is now installing six longwall conveyors in its mines at Aldridge, which is expected to materially increase the output. Much of this coal is being sought in North Georgia points, which formerly depended on Tennessee and Kentucky fields for the better grades of fuel.

The fuel situation with the railroads is somewhat easier than before for some weeks, and some accumulations are reported in storage bins, which will probably enable a reduction in priority requirements and provide a more liberal supply for industrial plants. The Southern Ry.'s advertised requirements for some 1,800,000 tons for the year ending June 30, 1919, are reported to have been about two-thirds provided for in tentative agreements. Other contracts for railroad fuel are being made as the old ones expire.

The sharp increase in coal rates from the fields supplying the local market are being commented upon generally and some adjustments are expected.

Coke

CONNELLSVILLE

Market quiet. More byproduct coke in prospect. Connellsville production steady.

There has been no further contracting for furnace coke, following the few contracts hitherto reported. The great majority of the furnace-coke contracts are for the whole year, requiring no mid-year negotiations. In the case of foundry coke quite a number of contracts expired June 30, and many of these have not been renewed, so that there will be more prompt business done than formerly. Foundry coke is in only moderate supply, but on the whole it is easier to buy foundry coke than furnace, as operations are proceeding in such a way that a rather high proportion of 72-hour coke is made; and the operators prefer to make foundry coke, as there is no difficulty in securing the full $7 price, as compared with $6 for furnace.

There is considerable speculation as to what will occur in beehive-coke production in the Connellsville region as the new byproduct ovens in the Central West get into operation, using Connellsville coal quite largely, although not exclusively by any means. That there will be some reduction in Connellsville coke output seems probable. Thus far, however, there has been no material change, although the American Steel and Wire Co.'s new plant of 180 ovens at Cleveland is now in nearly full operation, having made its first coke early in May, while last week the first battery, 128 ovens, of the Carnegie Steel Co.'s Clairton plant was put in operation. Four more batteries will follow in the next two or three months, while six more will come some time next year. At the first of this year the existing byproduct coking capacity was approximately 500,000 tons a week, according to the individual works rating, but experience has shown that from a combination of causes the actual production runs 88 to 90 per cent. of capacity, this having been the testimony of the Geological Survey's weekly reports for more than two months past. Capacity by some time in September should have risen to about 640,000 tons weekly, promising an actual output of about 575,000 tons a week.

Furnaces have been endeavoring to accumulate some surpluses of coke to carry them over the curtailment in coke movement that invariably occurs at Independence Day, and have been fairly successful. The market remains quotable at $6 for furnace, $7 for foundry, 72-hour selected, and $7.30 for crushed, over 1 in., per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended June 22 at 344,950 tons, an increase of 1980 tons. For about 10 weeks past production has averaged 341,000 tons a week.

Buffalo—The trade drags a good deal, for though it is not so difficult to buy coke it is a hard matter to get it delivered. The late advance of freights from the Connellsville district from $2 to $2.60 would not be a hindrance if the cars could be had, for any rate would fail in that respect. The furnaces are kept going somehow. What they pay for coke is not known to the jobbing trade, for it gets none of that business; but the regulation of $7 and $6 for the best grades is still in force, to which must be added the $2.60 freight and no middleman's profit. Considerable breeze coke is selling for steam making at about $2.75 net, oven price. Iron ore receipts are large, being 308,813 gross tons for the week. Cars for shipping out ore are so scarce that it piles up badly at the docks.

Middle Western

GENERAL REVIEW

Demand in excess of supply. Will be shortage in anthracite. Production hampered by car shortage.

The demand at the present time for both steam and domestic coals from the producing districts of Indiana and Illinois is greatly in excess of the supply. Screenings and mine-run coal from the Springfield and Standard districts of Illinois are selling strong. This is a decided change from a week back, when these coals were to be had at a substantial decrease from the Government price. This condition is brought about as much as anything by the recent ruling of the Fuel Administration, which allows both Illinois and Indiana screenings to go into the southern part of Michigan. In addition, a number of factories in the Chicago district have become alarmed over their supply and have endeavored to place orders for extra coal so that they will go into the winter months with a supply on hand sufficient to run them from one to two months at least. The difficulty they are encountering is that they can find but few operators to book their orders. The producers who have their regular business are only able to give them enough coal to keep them going from week to week. High-grade screenings and steam coals from the southern part of the state are hard to get. This is equally true of the Springfield and Standard districts. It is rumored that one of the large western railroads having mines in the central part of Illinois is about to close its mines for a short period and purchase its coal on the open market. This rumor has given a decidedly bullish tinge to a market already strong.

The retail dealer is now fairly awake to the problems to be faced next winter, and in a number of cases dealers have hired vacant lots or available property near them and on this property are piling up mine-run, screenings and 2-in. lump. They have come to the conclusion not only will there be a shortage of anthracite, but in addition there will not be enough high-grade southern Illinois domestic coal to go around. The demand for domestic coals is keeping up as strong as ever. Retail dealers are trying to place orders with their various sources of supply, and in case orders have been placed they are trying to have these orders increased. The buying public is wakening up to the situation and trying to get under cover.

The tonnage in the states of Indiana and Illinois will not be up to its maximum for this period, as production has been hampered by car shortage and lack of miners to produce the coal. The car situation is just about the same, but the labor situation is getting worse from week to week.

CHICAGO

A slight fall in the volume of retail orders was noticeable toward the end of the week.

The disposition on the part of domestic coal users to order their winter supply now continues, but with a marked decrease the last three days, to be attributed, perhaps, to warmer weather. Retailers are loaded up with orders for some time to come, so that this condition gives no cause for alarm.

There is practically no anthracite in the Chicago market, certainly none which is not covered by long standing orders.

The new ruling of the Railroad Administration to the effect that freight bills must be met on a cash basis has caused dealers with limited capital to insist on cash on delivery. This, also, has probably been one cause of the let-up in orders from domestic consumers.

All grades of coal continue to be taken by large consumers, as rapidly as they are received, with the exception of certain grades of screenings, but stocks of those are not accumulating to any great extent.

Quotations in the Chicago market are as follows, per net ton f.o.b. cars at mines:

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La-Salle, Bureau and Will.
Steam lump	$2.55@2.70	$2.55@2.70	$2.95@3.10	$2.55@2.70	$2.55@2.70	$3.25@3.40
Domestic lump	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Egg or furnace	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Small egg or nut	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Stove	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Chestnut	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Pea	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Washed egg	2.75@2.90	.....	.....	2.75@2.90	2.75@2.90	3.45@3.60
Washed stove	2.75@2.90	.....	.....	2.75@2.90	2.75@2.90	3.45@3.60
Washed nut	2.75@2.90	.....	.....	2.75@2.90	2.75@2.90	3.45@3.60
Mine-run	2.35@2.50	2.35@2.50	2.75@2.90	2.35@2.50	2.35@2.50	3.00@3.15
Screenings	2.05@2.20	2.05@2.20	2.35@2.50	2.05@2.20	2.05@2.20	2.75@2.90
Washed slack	2.05@2.20	2.05@2.20	.....	2.05@2.20	2.05@2.20	2.75@2.90

MILWAUKEE

Official anthracite price schedule received from Washington. A busy week in coal circles. Coal administration force increased.

Milwaukee has experienced what may properly be termed a coal week, because of a bunching of notable events in connection with the trade; namely, the announcement from Washington of the new local price schedule for anthracite coal; the return of State Fuel Administrator W. N. Fitzgerald from the national capital; the naming of Prof. Stephen W. Gilman, of the University of Wisconsin, as his special assistant; the appointment of C. A. Cahill, of Milwaukee, as state administrative engineer, and a two-day session of the Illinois and Wisconsin Coal Dealers' Convention.

Anthracite prices are considerably higher than the prevailing rates at this time last year. Egg is rated at $10.60, stove at $10.82 and nut at $10.91. No prices have been named on buckwheat, pea and broken coal. During 1917 anthracite prices increased 10c. per ton for three months. This year the entire increase for three months will become effective Sept. 1 and remain in force indefinitely. This ruling is applied to encourage summer buying. The prices named apply to coal delivered at the curb. The cost of carrying in is placed at 50c. per ton and 25c. for less than ton lots.

Wisconsin has also been accorded more coal from southern Illinois and an increase of 8 per cent. in the previous allotment of buckwheat and pea anthracite. It developed that the schedule 86 per cent. anthracite supply covered the larger sizes only. Surplus buckwheat and pea will be sent to the state during the course of the season.

A vigorous campaign in the interest of increased consumption of bituminous coal is to be prosecuted from now on. Mr. Cahill, the new administrative engineer, will devote his attention to devising ways and means for saving fuel in manufacturing plants throughout the state. Counties in the extreme northern and northwestern parts of the state, where wood is abundant, will receive little or no coal.

Stephen D. Balliet, of Appleton, Wis., was chosen president of the Illinois and Wisconsin Retail Dealers' Association; E. C. Streeter, of Grand Fork, Ill., vice-president; O. S. Dodge, of Monroe, Wis., treasurer, and Peter Beck, of Harvey, Ill., and C. H. Hill, of Beloit, Wis., directors. I. L. Runyan, of Chicago, is secretary.

Chippewa Falls, Wis., is now purchasing soft coal for $4.95 per ton delivered in bins. The city contracted for 475 tons at $2.85 at the mines, but this price was reduced on order of the Government.

Coal receipts by lake at Milwaukee continue slow. Since the last report 7500 tons of hard and 62,858 tons of soft coal have reached the docks, making the record since the opening of navigation up to the present time 152,235 tons of hard and 799,541 tons of bituminous.

ST. LOUIS

An unusually good market, contrary to expectations. Carterville coal hard to secure. Other coals somewhat easier and Standard inclined to be weak. Steam sizes not moving free. Transportation better. Car supply poor.

The local situation is encouraging from the fact that the demoralization that was expected to follow the higher rates in view of the large amount of coal put in storage under the low rate did not materialize. Locally the domestic demand has fallen off some, but the orders on the books of the retailers is sufficient to last them for two or three months. The principal trouble locally is the fact that users of high-grade fuels are unable to secure them and are undecided what to take as substitutes. Up to the 27th of May the retailers of St. Louis had booked about 40,000 tons of anthracite coal, none of which will be delivered. To replace this will require about between 90,000 to 100,000 tons of soft coal. These orders have not yet been placed.

It is expected that about 25,000 to 30,000 tons of coke will be available from the local plants in the next eight months, which will take the place to some extent of hard coal, but this demand upon Government instructions for coke distribution. If there are manufacturing plants and public utilities that must have this coke then the domestic consumer will not get it.

Indications are now that there is going to be unusual activity in the retail market in the next three months, and to such an extent that the retailers will not be able to handle the situation with the volume of orders now on hand.

The Carterville situation this week shows a somewhat disappointing tonnage. The car supply has been exceptionally poor, and in a general way there seems to be a decrease in the tonnage available for domestic shipment. It is expected, however, after July 1 there will be a better supply for domestic shipment on account of rumors that the Government has an order prohibiting the railroads from taking this coal for railroad purposes.

In the Mt. Olive field the car supply has been poor the past week, but the tonnage of coal produced is about equal to the demand.

In the Standard field the car supply has been unusually bad and there have been idle days this past week caused by the men laying off to celebrate the departure of the men in the draft. Other mines have been idle on account of no orders.

There is not a good market for Standard coal.

The steam market is unusually weak in places. There is, however, a feeling that this market will improve in the next ten days or two weeks.

There are no Eastern or Arkansas coals moving in.

The St. Louis Fuel Committee established new prices for retail as follows, effective July 1:

Carterville, $6.20; Duquoin, $5.95; Mt. Olive, $5.70, and Standard, $5.45. This is sidewalk delivery, two tons or more.

The price on domestic coke was fixed for June deliveries at $12.50; July, $12.75; August, $13. This on both gashouse and by-product.

There has been no change in the mine price from last week other than that Standard screenings are worth from $1.30 to $1.50 on account of restrictions and Standard 2 in. lump is quoted at from $2.25 to $2.40, with egg and nut at the same figure. Other coals are bringing the Government maximum.

The prevailing market is, per net ton, f.o.b. mines:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.55@2.70	$2.55@2.70	$2.40@2.70
3x6-in. egg	2.55@2.70	2.55@2.70	2.35@2.55
2x3-in. nut	2.55@2.70	2.55@2.70	2.35@2.55
No. 2 nut	2.55@2.70	2.55@2.70	.....
No. 3 nut	2.55@2.70	2.55@2.70	.....
No. 4 nut	2.55@2.70	2.55@2.70	.....
No. 5 nut	2.05@2.20	2.05@2.20	.....
2-in. scrgs	2.05@2.20	2.05@2.20	1.25@1.50
2-in. lump	.....	.....	2.25@2.40
3-in. lump	.....	.....	2.25@2.40
Steam egg	.....	.....	2.25@2.40
Mine run	2.35@2.50	2.35@2.50	1.85@2.00
Washed:			
No. 1	2.75@2.90	2.75@2.90	.....
No. 2	2.75@2.90	2.75@2.90	.....
No. 3	2.55@2.75	2.55@2.75	.....
No. 4	2.55@2.75	2.55@2.75	.....
No. 5	2.05@2.20	2.05@2.20	.....

Williamson and Franklin County rate is $1.10; Duquoin field, $1; Standard and Mt. Olive fields, 95c.

CURRENT PRICES—MATERIALS & SUPPLIES

IRON AND STEEL

STEEL SHEET PILING—The following price is base per 100 lb. f.o.b. Pittsburgh, with a comparison of a month and a year ago:

Current	One Month Ago	One Year Ago
$4–5	$4–5	$3.60

PIG IRON—Below are the present quotations, with a comparison of a month and a year ago:

	Current	One Month Ago	One Year Ago
CINCINNATI			
No. 2 Southern foundry	$30.90	$35.90	$47.90
No. 2 Northern foundry	....	36.26	.....
NEW YORK †			
No. 2 X Northern foundry	34.40	34.25	50.25
No. 2 plain Northern foundry	33.90	33.75	49.25
No. 2 Southern foundry	39.00	39.00	49.25
BIRMINGHAM			
No. 2 Southern foundry	33.00	33.00	45.00
CHICAGO			
No. 2 Northern foundry	33.00	33.00	55.00
No. 2 Southern foundry	38.00	37.00	....
PITTSBURGH			
Bessemer iron *	36.60	36.15	55.95
Basic iron *	32.00	32.00	50.00

* These prices include the freight charge from the valley to the Pittsburgh district. † Delivered Tidewater, New York.

STRUCTURAL MATERIAL—The following are the base prices, f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

	Mill, Pittsburgh	New York—Current	New York—1 Year Ago	St. Louis	Chicago
Beams, 3 to 15 in.	$3.00	$4.245	$5.25	$4.27	$4.27
Channels, 3 to 15 in.	3.00	4.245	5.25	4.27	4.27
Angles, 3 to 6 in., ¼ in. thick	3.00	4.245	5.25	4.27	4.27
Tees, 3 in. and larger	3.05	4.245	5.25	4.27	4.27
Plates	3.225	4.745	9.00	4.52	4.52

BAR IRON—Prices in cents per pound at cities named are as follows:

Pittsburgh	St. Louis	Denver	Birmingham
3.50	4.17	4.05	4.38

NAILS—Prices per keg from warehouse in cities named:

	Mill Pittsburgh	St. Louis	Denver	Chicago	Birmingham	San Francisco	Dallas
Wire	$3.50	$4.50	$4.85	$4.32	$4.25	$5.95	$4.75
Cut	4.00	5.40	.....	4.47	....	6.40	.....

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh Current	Cincinnati	Chicago	St. Louis	San Francisco	Birmingham	Denver
Standard railroad spikes ⅝-in. and larger	$3.90	$6.00	$4.50	$5.30	$6.70	$5.30	$5.00
Track bolts	4.90	8.90	5.50	Prem.	8.00	8.00	6.00
Standard section angle bars	3.25	....	4.45	Prem.	5.15	....	4.30

COLD DRAWN STEEL SHAFTING—From warehouse to consumers requiring fair-sized lots, the following discounts hold:

Cincinnati	Cleveland	Chicago	St. Louis	Denver	Birmingham
17½%	List	+10%	+10%	+35%	+30%

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill Pittsburgh	Cincinnati	Chicago	St. Louis	Denver	Birmingham
Straight	$5.25	$7.50	$6.50	$6.25	$8.00	$7.50
Assorted	5.40	7.50	6.50–7.00	6.40	8.25	7.75

Cincinnati—Horseshoe nails sell for $4.50 to $5 per 25-lb. box

CAST-IRON PIPE—The following are prices per net ton for carload lots:

	New York—Current	New York—1-Month Ago	New York—One Year Ago	Chicago	St. Louis	San Francisco
4 in.	$64.35	$64.35	$68.50	$64.80	$63.00	$76.00
6 in. and over	61.35	61.35	65.50	61.80	60.00	73.00

Gas pipe and 16-ft. lengths are $1 per ton extra.

STEEL RAILS—The following quotations are per ton f.o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

	Pittsburgh—Current	Pittsburgh—One Year Ago	Chicago—Current	Chicago—One Year Ago
Standard Bessemer rails	$57.00	$38.00	$67.00	$38.00
Standard openhearth rails	55.00	40.00	65.00	40.00
Light rails, 8 to 10 lb.	*3.135 (100 lb.)	58.00	*3.135 (100 lb.)	53.00
Light rails, 12 to 14 lb.	*3.09 (100 lb.)	57.00	*3.09 (100 lb.)	54.00
Light rails, 25 to 45 lb.	*3.00 (100 lb.)	53.00	*3.00 (100 lb.)	52.00

* Government price per 100 lb.

OLD MATERIAL—The prices following are per gross ton paid to dealers and producers in New York. In Chicago and St. Louis the quotations are per net ton and cover delivery at the buyer's works, including freight transfer charges:

	New York	Chicago	St. Louis
No. 1 railroad wrought	$30.80	$33.00	$34.00
Stove plate	22.50	25.00	19.00
No. 1 machinery cast	34.00	29.00	21.50–22
Machine shop turnings	15.30	17.50	19.00
Cast borings	15.30	17.50	18.50
Railroad malleable cast	30.30	29.00	25.50–26

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Cincinnati	Birmingham	St. Louis	Denver
$0.12	$0.16½	$0.18	$0.18	$0.17

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis	Birmingham
Solid	15c.	14c.	15c.
Hollow	24c.	25c.	..

PIPE—The following discounts are for carload lots f.o.b. Pittsburgh; basing card of Nov. 6, 1917, for steel pipe and for iron pipe:

BUTT WELD

Steel Inches	Black	Galvanized	Iron Inches	Black	Galvanized
⅛, ¼ and ⅜	44%	17%	¾ to 1½	33%	17%
½	48%	33⅓%			
¾ to 3	51%	37½%			

LAP WELD

2	44%	31⅓%	2	26%	12%
2½ to 6	47%	34⅓%	2½ to 4	28%	15%
			4½ to 6	28%	15%

BUTT WELD. EXTRA STRONG PLAIN ENDS

⅛, ¼ and ⅜	40%	22½%	¾ to 1½	33%	18%
½	45%	36½%			
¾ to 1½	49%	36½%			

LAP WELD. EXTRA STRONG PLAIN ENDS

2	42%	30½%	2	27%	14%
2½ to 4	45%	33⅓%	2½ to 4	29%	17%
4½ to 6	44%	32½%	4½ to 6	28%	16%

From warehouses at the places named the following discounts hold for steel pipe:

	Black—New York	Black—Chicago	Black—St. Louis
⅜ to 3 in. butt welded	33%	39%	40.1%
3½ to 6 in. lap welded	15%	43%	36.1%

	Galvanized—New York	Galvanized—Chicago	Galvanized—St. Louis
¾ to 3 in. butt welded	16%	28%	25.1%
3½ to 6 in. butt welded	+3	25%	22.1%

Malleable fittings. Class B and C, from New York stock sell at list price. Cast iron, standard sizes, 5%.

SHOP SUPPLIES

NUTS—From warehouse at the places named, on fair sized orders, the following amount is deducted from list:

	New York—Current	New York—One Year Ago	Cleveland—Current	Cleveland—One Year Ago	Chicago—Current	Chicago—One Year Ago
Hot pressed square	$2.50*	List	$1.40	$1.65	$1.05	$3.00
Hot pressed hexagon	2.50*	List	1.20	1.50	.85	3.00
Cold punched square	2.50*	List	.75	1.40	1.00	1.75
Cold punched hexagon	2.50*	List	.75	1.40	1.00	2.25

* List plus.

Semifinished nuts sell at the following discounts from list price:

	Current	One Year Ago
New York	40%	50%
Chicago	50%	50%
Cleveland	60%	50%

MACHINE BOLTS—Warehouse discounts in the following cities:

	New York	Cleveland	Chicago
⅜ by 4 in. and smaller	30%	46%	37%
Larger and longer up to 1 in. by 30 in.	15%	40%	25—5%

WASHERS—From warehouses at the places named the following amount is deducted from list price:

For wrought-iron washers:

New York..... $2.50 Cleveland..... $3.00 Chicago..... $2.50

For cast-iron washers the base price per 100 lb. is as follows:

New York..... $3.50 Cleveland..... $4.00 Chicago..... $3.50

RIVETS—The following quotations are allowed for fair-sized orders from warehouse:

	New York	Cleveland	Chicago
Steel ⅛ and smaller	30%	45—5%	45%*
Tinned	30%	45—5%	45%*

Button heads, ¾, ⅞, 1 in. diameter by 2 in. to 5 in. sell as follows per 100 lb.:

New York..$6 14½ Cleveland...$5 15 Chicago ...$5 50 Pittsburgh...$4 65

Coneheads, same sizes:

New York. $6 24½ Cleveland...$5.25 Chicago ...$5 60 Pittsburgh..$4 75

MISCELLANEOUS

GREASES—Prices are as follows in the following cities in cents per pound for barrel lots:

	Cincinnati	St. Louis	Birmingham	Denver	Pittsburgh
Cup	7	13.0	7½	12	7½
Fiber or sponge	8	13.0	7½	20	7½
Transmission	7	13.0	7½	20	7½
Axle	4½	3.8	3¼	5¼	4
Gear	4½	7.0	4½	9	4
Car journal	22 (gal.)	4.3	7½	8	4

BABBITT METAL—Warehouse prices in cents per pound:

	New York		Cleveland		Chicago	
	Current	One Year Ago	Current	One Year Ago	Current	One Year Ago
Best grade	125.00	70.00	113.00	70.00	100.00	70.00
Commercial	70.00	70.00	23.00	24.00	24.00	30.00

HOSE—Following are prices of various classes of hose:

Fire

	50-Ft. Lengths
Underwriters' 2½-in	75c. per ft.
Common, 2½-in	40%

Air

	First Grade	Second Grade	Third Grade
¾-in. per ft	$0.55	$0.30	$0.25

Steam—Discounts from list

First grade 30% Second grade 30–5% Third grade 40–10%

LEATHER BELTING—Present discounts from list in cities named:

	Medium Grade	Heavy Grade
St. Louis	40+5%	35%
Denver	35%	30%
Birmingham	30%	35%
Chicago	45%	40%
Cincinnati	40—10%	40%

RAWHIDE LACING—40—5% off list.

PACKING—Prices per pound:

Rubber and duck for low-pressure steam	$0.99
Asbestos for high-pressure steam	1.76
Duck and rubber for piston packing	1.10
Flax, regular	.99
Flax, waterproofed	1.21
Compressed asbestos sheet	1.10
Wire insertion asbestos sheet	1.30
Rubber sheet	.66
Rubber sheet, wire insertion	.99
Rubber sheet, duck insertion	.55
Rubber sheet, cloth insertion	.25
Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes	1.21
Asbestos wick, ½- and 1-lb. balls	.75

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York and St. Louis
Galvanized iron rigging	+20%
Galvanized cast steel rigging	List
Bright plain rigging	30%
Bright cast steel	17½%
Bright iron and iron tiller	5%

MANILA ROPE—For rope smaller than ⅝-in. the price is ½ to 2c. extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: ⅝-in., 8 ft.; ¾-in., 6; ⅞-in., 4½; 1 in., 3½; 1⅛-in., 2 ft. 10 in.; 1¼-in., 2 ft. 4 in. Following is price per pound for ⅝-in. and larger, in 1200-ft. coils:

Boston	$0.34	Birmingham	$0.38
New York	.30	Denver	.35½
Cincinnati	.33¼	Kansas City	.34
Chicago	.34	Seattle	.34
St. Paul	.34	St. Louis	.34
San Francisco	.32	Los Angeles	.35

PIPE AND BOILER COVERING—Below are discounts and part of standard lists:

PIPE COVERING

Pipe Size	Standard List Per Lin. Ft.	Price Per Lin. Ft. One Year Ago
1-in.	$0.27	
2-in.	.36	
6-in.	.80	
4-in.	.60	
3-in.	.45	
8-in.	1.10	
10-in.	1.30	

BLOCKS AND SHEETS

Thickness	Price per Sq.Ft.
½-in.	$0.27
1-in.	.30
1½-in.	.45
2-in.	.60
2½-in.	.75
3-in.	.90
3½-in.	1.05

85% magnesia high pressure 15% off

For low-pressure heating and return lines { 4-ply 58% off; 3-ply 60% off; 2-ply 62% off

LINSEED OIL—These prices are per gallon:

	New York		Cleveland		Chicago	
	Current	One Year Ago	Current	One Year Ago	Current	One Year Ago
Raw in barrel	$1.65	$1.31	$1.75	$1.32	$1.70	$1.32
5-gal. cans	1.75	1.41	1.90	1.42	1.80	1.37

* Nominal.

WHITE AND RED LEAD in 500-lb. lots sell as follows in cents per pound:

	Red				White			
	Current		1 Year Ago		Current		1 Year Ago	
	Dry	In Oil	Dry	In Oil	Dry and In Oil		Dry and In Oil	
25 and 50-lb. kegs	12.38	12.83	13.25	13.50	12.38		13.00	
12½-lb. keg	12.60	13.05	13.50	13.50	12.60		13.25	
100-lb. keg	12.15	12.29	13.75	14.00	12.15		13.00	
5-lb. cans	13.95	.....	15.25	15.50	13.95		15.00	
1-lb. cans	14.85	.....	.....	.....	14.85		.....	

COMMON BRICK—The prices per 1000 in cargo or carload lots are as follows:

Cincinnati	$12-15.50	Birmingham	$13.75
St. Louis	12.00	Denver	9.50

WIRING SUPPLIES—New York prices for tape and solder are as follows:

Friction tape, ⅙ lb. rolls	38c. per lb.
Rubber tape, ½-lb. rolls	45c. per lb.
Wire solder, 50-lb. pools	46c. per lb.
Soldering paste, 2-oz. cans	$1.20 per doz.

PREPARED ROOFINGS—Standard grade rubbered surface, complete with nails and cement, costs per square as follows in New York, St. Louis, Chicago and San Francisco.

	1-Ply		2-Ply		3-Ply	
	C.l.	L.C.l.	C.l.	L.C.l.	C.l.	L.Cl.
No. 1 grade	$1.30	$1.55	$1.60	$1.75	$1.90	$2.05
No. 2 grade	1.15	1.30	1.45	1.60	1.75	1.90

Asbestos asphalt saturated felt (14 lb. per square) costs $5.35 per 100 lb.

Slate-surfaced roofing (red and green) in rolls of 108 sq.ft. costs $1.95 per roll in carload lots and $2.20 for smaller quantities.

Shingles, red and green slate finish cost $5.25 per square in carloads, $5.50 in smaller quantities, in Philadelphia.

ROOFING MATERIALS—Prices per ton f.o.b. New York or Chicago:

	Carload Lots	Less than Carload Lots
Tarfelt (14 lb. per square of 100 sq. ft.)	64	65
Tar pitch (in 400-lb. bbl.)	21	22
Asphalt pitch (in barrels)	37	42
Asphalt felt	72.50	77.50

HOLLOW TILE—The price per 1000 in carload lots f.o.b. mine is as follows:

	4 x 12 x 12	8 x 12 x 12
St. Louis	$60.80	$114.00
Chicago	79.00	137.00
Denver, per ton	None	None
Kansas City	75.00	140.00
St. Paul	56.00	110.00
Boston	80.00	150.00
Birmingham	70.00	131.75
Cincinnati	69.00	129.00
Pittsburgh	86.50	147.10

LUMBER—Price of yellow pine per M in carload lots:

	1-in. Rough 10 In. x 16 Ft.	2-In. T. and G. 10 In. x 16 Ft.	8 x 8 In. x 20 Ft.
St. Louis	$40.00	$31.00	$38.00
Birmingham	30.00	34.00	33.00
Denver	40.00	42.00	42.50
Cincinnati	45.00	44.00	39.00

STEEL SHEETS—The following are the prices in cents per pound from jobbers' warehouse at the cities named:

	Pittsburgh, Mill, in Carloads	New York Current	New York One Month Ago	New York One Year Ago	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago
*No. 28 black	5.00	6.495	6.445	10.00	6.42	9.50	6.52	9.50
*No. 26 black	4.90	6.395	6.345	9.90	6.32	9.40	6.42	9.40
*Nos. 22 and 24 black	4.85	6.345	6.295	9.85	6.27	9.35	6.37	9.35
Nos. 18 and 20 black	4.80	6.295	6.245	9.80	6.22	9.30	6.32	9.30
No. 16 blue annealed	4.45	5.695	5.645	9.70	5.62	9.70	5.72	9.70
No. 14 blue annealed	4.35	5.595	5.545	9.60	5.52	9.60	5.62	9.60
No. 10 blue annealed	4.25	5.495	5.445	9.50	5.42	9.50	5.52	9.50
*No. 28 galvanized	6.25	7.745	7.695	13.00	7.67	11.00	7.77	11.00
*No. 26 galvanized	5.95	7.445	7.395	12.70	7.37	10.70	7.32	10.70
No. 24 galvanized	5.80	7.295	7.245	12.55	7.22	10.55	7.47	10.55

* For painted corrugated sheets add 30c. per 100 lb. for 25 to 28 gage; 25c. for 19 to 24 gages; for galvanized corrugated sheets add 5c., all gages

COPPER WIRE—Prices per 1000 ft. for rubber-covered wire in following cities:

	Denver			St. Louis			Birmingham		
No.	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex
14	$11.40	$13.40	$31.00	$11.00	$20.00	$31.50	$11.00	$17.90	$36.60
10	22.15	25.25	50.05	25.40	29.00	59.00	30.30	34.30	48.80
8	31.40	24.25	69.50	30.45	35.00	72.50	42.35	46.85	67.60
6	49.40	53.30	.....	.....	61.00	120.00	64.60	74.10	.....
4	71.30	76.15	.....	.....	86.00	.....	101.75	106.55	.....
2	108.00	113.65	.....	.....	130.00	.....	151.50	163.00	.....
1	140.40	147.85	.....	.....	176.00	.....	201.00	209.50	.....
0	176.85	176.85	.....	.....	222.00	.....	276.00	285.00	.....
00	.....	239.45	.....	.....	270.00	.....	317.00	330.00	67.60
000	.....	298.15	.....	.....	330.00	.....	417.00	428.00	.....
0000	.....	357.00	.....	.....	400.00	.....	508.00	516.00	.....

EXPLOSIVES—Price per pound of dynamite in small lots and price per 25-lb keg for black powder:

	Low Freezing 20%	Gelatin 40%	Gelatin 60%	Gelatin 80%	Black Powder
New York	.....	$0.27½	$0.34½	.....	$2.40
Boston	$0.24½	.27½	.34½	$0.41½	2.40
Cincinnati	.18¾	.22½	.27½	.....	2.25
Kansas City	.20	.26½	.33¼	.43¼	2.45
Seattle	.17½	.29¾	.31¾	.41¾	.....
Chicago	.18¾	.22¾	.33	.43	2.35
St. Paul	.19	.23	.28	.43½	2.75
St. Louis	.19	.26½	.33½	.43½	2.35
Denver	.18	.25½	.32½	.42½	2.45
Dallas	.23	.30¼	.37¼	.47¼	.....
Los Angeles	.22	.28	.36	.....	.....
San Francisco	.17½*	.23½*	.30½*	.40½*	.....

* Carload lots.

FREIGHT RATES—On finished steel products in the Pittsburgh district including plates, structural shapes, merchant steel, bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished), chains, etc., the following freight rates per 100 lb. are effective:

Boston	$0.27	New Orleans	$0.385
Buffalo	.17	New York	.245
Chicago	.27	Philadelphia	.23
Cincinnati	.23	St. Louis	.34
Cleveland	.17	St. Paul	.495
Denver	.99	Pacific Coast (all rail)	1.25
Kansas City	.59		

Note—Add 3% transportation tax.

COAL AGE

Volume 14 New York, July 13, 1918 Number 2

Traveling Toward Daylight

By FLOYD W. PARSONS

THE coal industry is rapidly progressing toward a solution of many of its difficulties. It is unwise, however, to assume that a few weeks of record coal shipments indicate that we are finally out of the woods. After all is said and done, the fact remains that we are a volatile people, too prone to have thumbs up today when only yesterday we were demanding a sacrifice.

About the only constant thing in the world is inconstancy. Our appetite calls for steak, and when we find we can't have it, we conclude the restaurant man is a robber and is trying to make us eat fish because his profit on this food is greater. When the shoe that pinches is on our own foot, we yell like "blue blazes"; but when some other poor devil comes hobbling along, we contend he is either a darned fool for wearing such a shoe, or a blamed traitor for whimpering.

When the house or the office is cold in January, we are sure Dr. Garfield is an incompetent, and wonder how under heaven the President could have selected him to administer the coal business; but when the warm winds of July fan us into forgetfulness, we are astonished that anyone should consider coal a prime necessity of life.

Let us try and remember that the guns on the battlefront in France are belching forth their missiles of death right now, and consuming thousands of tons of American coal. Let us rejoice that our splendid shipbuilding forces were able to launch so many ships on the Fourth of July; but we must not forget that when those ships slid into the water they represented the potential power and the actual consumption of 1,035,000 tons of coal.

We are building some new style tanks, and we hope to send them across "No Man's Land" in such numbers that the Hun defences will crumble before the onslaught; but let us remember that each big tank we build will consume 190 tons of coal. Every Liberty motor that goes into an airplane has used up in excess of a ton of coal, and we propose to manufacture these engines in thousand lots.

Never before have the shipments of coal been so large as in recent weeks, and the comment on every side is—"At last we have struck our gait." We should smile and be happy over the fact that we are breaking records, but let us not foolishly assume that our troubles are at an end. The railroads have hardly started to move crops, and they are not combating the floods, snow and ice of winter. If we cannot make headway now, we will present a sorry spectacle six months hence.

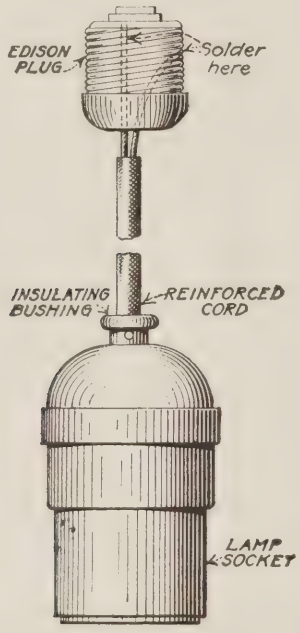
The coal situation is serious. We have fewer miners than a year ago, not many more cars and very little coal in storage. However, there is no reason to feel despondent or to slow up in our fight. No way is impassable to courage. The Fuel Administration is composed of capable, patriotic men, who are giving unselfishly the best that is in them. Great progress has been made toward the orderly and effective control of an immense industry of vital importance. Let us stand shoulder to shoulder, not a few of us, but everyone, and let us have faith one in another and see if thus united we cannot give the Huns such a licking that succeeding generations of Germans will curse the infamy of the Hohenzollerns.

IDEAS AND SUGGESTIONS

Makeshift Extension Cord

By L. M. Beck

When an extension cord must be assembled and no extension plug is available, the cord can easily be arranged as suggested in the accompanying illustration. The length of reinforced lamp cord is first made up into a lamp socket which is provided with an insulating



SHOWING ARRANGEMENT OF EXTENSION CORD

bushing, following the usual practice. Then, instead of using an attachment plug, an old Edison fuse plug can be made to serve, as suggested in the drawing.

The mica window should be taken out of the old fuse plug; then one of the conductors of the cord is soldered to the screw shell and the other to the button contact at the end. Where refillable fuse plugs are used, screw binding posts are provided in them whereby the lamp cord conductors can be electrically connected to the screw shell and to the contact button without the use of solder.

Firing Wet Holes

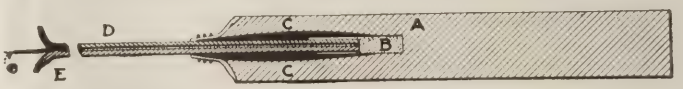
By T. F. Price

San Antonio, Texas

The accompanying illustration shows a method that I have used quite successfully in firing wet holes. I trust this method may be of service to others. Referring to the illustration, *A* is a stick of dynamite, *B* is the detonator and *C* is a paraffine seal. In preparing this cartridge the covering on the end of the stick of dynamite is first opened carefully. Next, with a stick of suitable size, a hole is made in the explosive to a depth equal to at least twice the length of the detonator.

The fuse should now be trimmed in order to be sure that the end entering the cap is perfectly dry. This end is next inserted and the detonator carefully crimped. The paraffine is now applied, being carefully pressed firmly around the cap and fuse. For this purpose, the paraffine may be brought to the proper consistency by kneading and working in the hand.

The detonator may now be inserted in the cartridge, the wrapping being securely tied around the fuse. The



METHOD OF FIRING WET HOLES

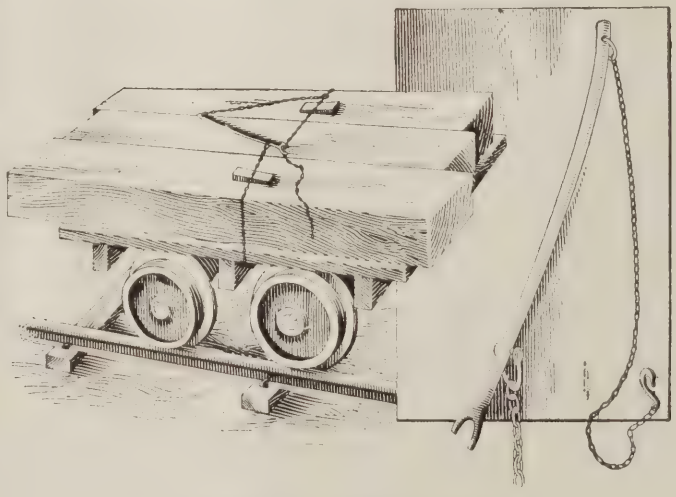
other end of the fuse, as shown at *E*, should now be split, exposing the core *e*. When the charge of explosive is properly put in place and tamped, all that now remains to be done is to light this core *e* and retire to a safe distance.

I have repeatedly used this method when firing charges submerged under 15 ft. of water and had uniformly good success.

Device for Binding Timbers on a Truck

By C. T. Rice

In the accompanying sketch are shown the details of a useful device for binding round or square timber and lagging securely on a timber truck. It consists of a lever made of a slightly bent piece of 1-in. steel, through which two holes are punched, one about a fifth



DETAILS OF TIMBER BINDER

of the length of the rod from one end, which end is fashioned into a claw. The other hole is punched at the other end of the rod.

A clevis is attached to the hole near the claw, as shown. To this is connected a ⅜-in. binding chain, long enough to go around the load of timber and back

up under the truck. The other hole is used as a point of attachment for a small chain the same length as the binding lever. On the end of this short chain is a hook which can be made to engage some link in the binding chain.

In using the device, the binding chain is passed around the load and the timber truck and then brought back on top, so that it can be gripped by the claw in the end of the lever. The free end of the lever is then pulled back as tightly as possible, and the fastening chain hooked to a link in the binding chain, holding everything tight. When the truck is being used to haul plank lagging which is covered with ice, as is often the case in winter, it is well to drive a wedge between the chain and the top planks of the outer rows in the load, for in that way the chain can be more snugly gripped to the slippery planks.—*Engineering and Mining Journal.*

Apply Your Thought

By Leigh Mitchell Hodges

To a man marooned on a desert island, a safety pin might mean more than a million dollars.

Money is useless if it can't be exchanged for something you need or want.

Thought is more powerful than money, because it not only mothers the making thereof, but determines the spending.

Yet unapplied thoughts are as worthless as dollars that cannot be used.

On the walls of one of the world's biggest factories are scores of placards bearing in giant letters the word "THINK." The founder and owner of this business says it is the one form of service he has had the hardest time getting, though willing to pay more for it than for any other.

Even those who think often waste thoughts through not applying them. Others never try cross-application—testing in some new field thoughts which already have proved profitable.

In a great industrial plant a certain man directs the manufacture of a standard product. Lately, new uses were sought for this. At one suggestion this man suddenly remembered he long ago had tried that same plan and found it practical.

Failure to apply his thought in the larger field had cost him self-advancement and sales profits.

"If twenty pairs of men's trousers can be cut out at one operation, why not apply the same cost-reducing plan to automobile parts?" was the thought-urge back of the biggest motor car business on earth.

It was simply cross-fertilization of brain power!

"If steam lifts a kettle lid, why won't it push a piston head?" was the mothering thought-force of every engine and dynamo today doing the world's work.

THINK—but don't stop there!

Don't rest with one successful application of your thought.

There may be two or ten Cinderellas whose feet will fit your glass slipper!

THINK—for thought is the ancestor of every action. But one thought may have many children of achievement.

Apply your thought in varying fields, and thus multiply your own profits and those of others.

And never let any thought pass untried—for this is one sure road to the sea of remorse, where dreams and hopes are drowned in the black waters of "It might have been!"—*Du Pont Magazine.*

Spending and Helping the Enemy

UNCLE SAM needs twenty billions of dollars or so this year for the war. What does Uncle Sam do with this money? He spends it just as you and I spend our money.

What does he spend the money for? For ships, guns, shells, clothes and food for the soldiers and sailors, and for many other things needed to carry on war.

What do you and I spend our money for? For houses to live in, food to eat, clothes to wear, and for many other things of greater or less use to us.

But some of the things we want are exactly the same things Uncle Sam wants, and some of the other things we want, while not exactly the same as the other things Uncle Sam wants, require, in order to be made, the raw material, labor and transportation facilities that are also required for making the further things that Uncle Sam must have.

Uncle Sam could not perhaps use your new suit. But he could have used the wool that is in it, the labor that fashioned it and brought it to market, and the transportation agencies that were necessary to carry it.

Hence, every time you buy something that you do not positively need you are selfishly withdrawing from service to Uncle Sam raw material and supplies, labor and transportation.

There is available only a certain amount of raw material of all kinds; labor can be pushed only to a certain limit, and beyond maximum capacity nothing further can be expected from the railroads.

Before the war, we used everything to cater to our own private needs. Now, about one-half of all that we can produce must be put aside for war purposes. If that is to be done—and it must be done if we are going to win—everybody must do his "bit."

We cannot eat our cake and have it too! We cannot insist upon eating and dressing and having a good time as before, and expect our Government to put up a winning fight. When we save, we stop competing with Uncle Sam—and with the boys in the trenches.

Better still, when we save and put our savings in Thrift and War Savings Stamps, we are saying to our boys in the trenches: "Here, boys, count on me. Here is food and clothing and medicine. If this is not enough, I'll do even better."

The best way to do "even better" is by joining a War Savings Society. Then in "our crowd," in "our shop," in "our office," we will learn to do without by all agreeing to do without the same things.

Motor-Driven Shaft-Hoist Installation

By R. P. HINES
Fairmont, W. Va.

THE purpose of this article is to give a somewhat detailed description of a comparatively large electrically operated shaft-hoist installation in the bituminous coal fields of West Virginia. Two sets of equipment are being installed, one at each of two separate mines, the shafts of which are about two miles apart. Although there is a slight difference in the depth of the two shafts, the two equipments are practically duplicates, so it will only be necessary to consider one of them in detail.

The depth of the shaft, from top of casing to bottom of coal, at which the equipment described operates, is 506.8 ft., while the travel from the sump rail to dump is 550.1 feet.

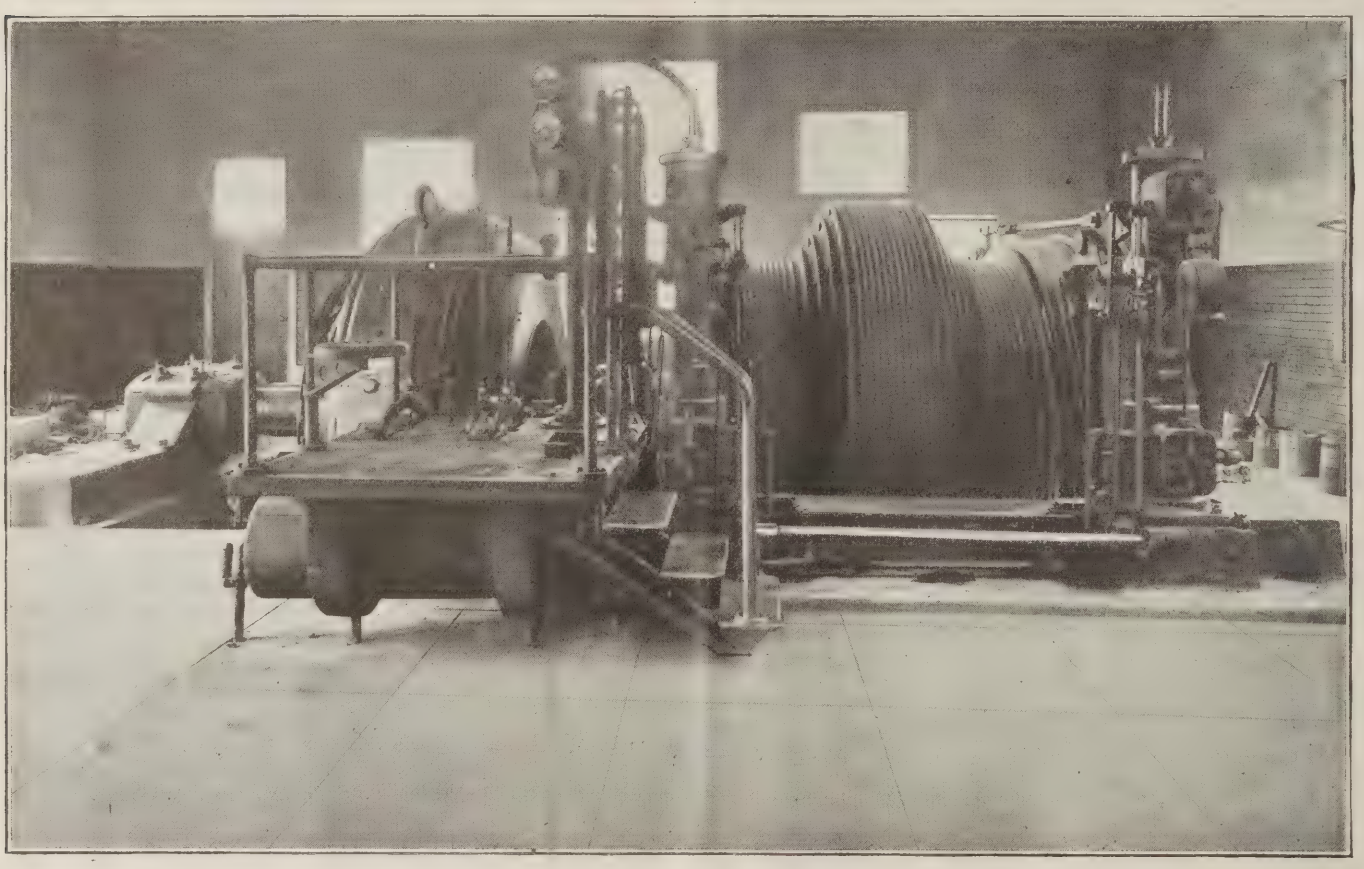


FIG. 1. GENERAL VIEW OF THE DIRECT-CONNECTED, ELECTRICALLY DRIVEN HOIST

The motor is direct-connected to the hoist, and the control and arrangement of the equipment is such that a practically constant input is taken from the transmission line, although the actual peaks on the hoist motor vary from a maximum of 1800 hp. to a minimum of 400 hp. negative. The hoist is fitted with one cast-iron, double cylindro-conical, tight-grooved drum, 8 ft. in diameter at the small ends, 11 ft. in diameter in the center and of sufficient face to coil 563 ft. of 1½-in. wire rope, allowing three full extra turns at each end of the drum for fastening. There are five active turns on each of the 8-ft. diameter cylindrical portions, five active turns on each of the conical portions, and 8.04 active turns on the 11-ft. diameter cylindrical portion. The shaft is of the double-compartment type, the loaded car and cage being hoisted in one compartment, while the empty car and cage are being lowered in the other. Two separate ropes are used on the single drum, being fastened at opposite ends, the one winding onto the drum at the top while the other is winding off the drum at the bottom, and vice versa.

The system is operated with the cages and the cars in balance, and on the slack-rope plan so arranged that the descending cage lands at the bottom as the ascending cage is coming into the dumping horns. The last 2.88 ft. of the hoist and dump is thus made "out of balance." The equipment is designed to hoist 3¼ short tons of coal per trip and to make 2½ trips per minute, operating on the following calculated cycle:

	Seconds
To strain down rope	2
Accelerating	6
Full speed running	5.82
Retarding	5
Dumping	5
Rest	0.18
Total time of trip	24.00

Fig. 4 gives the calculated duty curve based on this cycle of operation. The average hoisting speed is approximately 2500 ft. per minute, and the maximum hoisting speed is 3100 ft. per minute.

The hoist is driven by a 1400-hp., 550-volt, 90-r.p.m., direct-current, compound-wound, commutating-pole motor, the armature of which is pressed onto the same

shaft that carries the hoist drum. Two post brakes, either of suitable capacity for holding the load, are provided. These are of the air-actuated, dead-weight type. They are equipped with electrical solenoids for emergency application, and after being set may be released by levers on the operator's platform.

The electrical end of the equipment is operated on the Ward Leonard method of control combined with the Ilgner flywheel method of load equalization. By this system a flywheel motor-generator set is used for converting the incoming alternating-current power to direct current for operating the hoist motor. This unit consists of an eight-pole, 1000-kw., 720-r.p.m., 550-volt, separately excited, shunt-wound, commutating-pole, direct-current generator driven by a ten-pole, 600-hp., 720-r.p.m. (synchronous speed), 2200-volt, three-phase, 60-cycle, slip-ring, wound-rotor induction motor. A large steel-plate flywheel 8.75 ft. in diameter and weighing 30,000 lb. is connected to the motor shaft by a flexible coupling, while a 17-kw., 250-volt, compound-wound exciter is mounted on the same shaft. Fig. 3 shows this flywheel set and indicates clearly the relative positions of the different units.

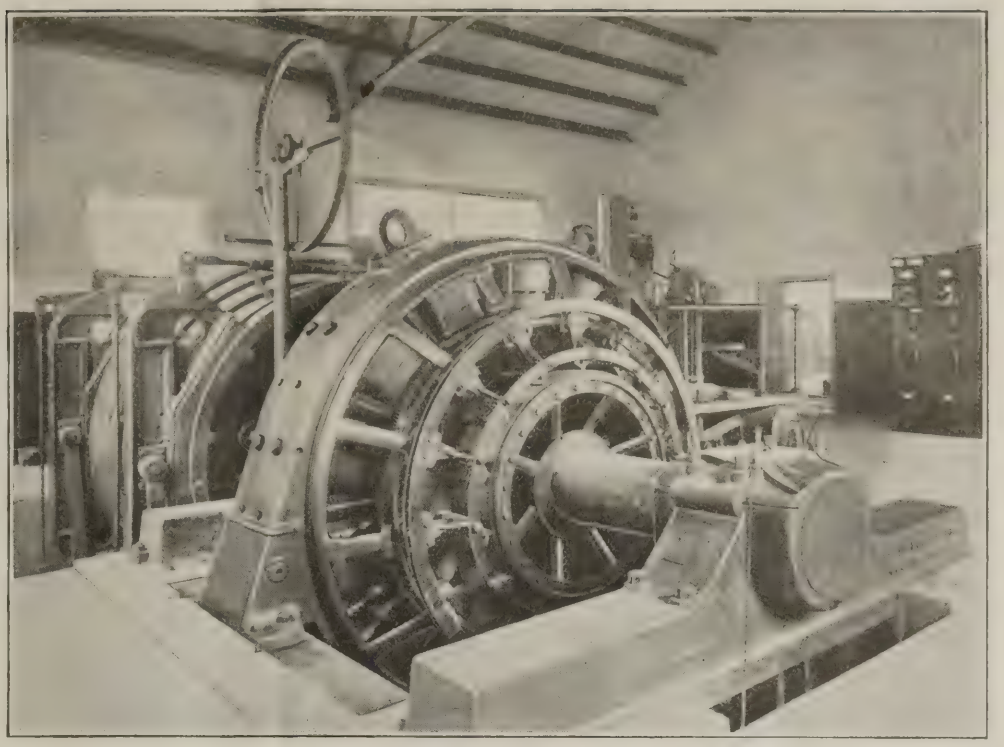


FIG. 2. MOTOR END OF HOIST

As the speed of the flywheel motor-generator set in the normal operation of the system must vary through a comparatively wide range, the direct-current exciter is designed for operation between 470 and 720 r.p.m.; and in order to maintain a constant voltage from this exciter within this speed range, a Tirrill voltage regulator is provided. This is mounted on the exciter panel, and in this way forms part of the switchboard equipment. The switchboard equipment provided for the installation comprises seven panels, as indicated by Fig. 6. These include an alternating-current incoming line panel; an alternating-current motor panel for the flywheel set; a direct-current motor panel and a direct-current exciter panel. The other panels are included for controlling a small bank of transformers for reducing the 2200 to 220 volts for the tipple motors; together with the required 220-volt feeder circuits, which also furnish power to the motor-driven air compressors used for obtaining the compressed air required for operating the air brakes of the hoist.

Power to operate the flywheel set is transmitted at 23,000 volts from the central generating station over a line approximately three miles long. The conductors of the line are carried on triangular laced steel poles, with some rectangular four-leg towers, on the long spans. A Siemens-Martin galvanized-steel strand ground wire is used.

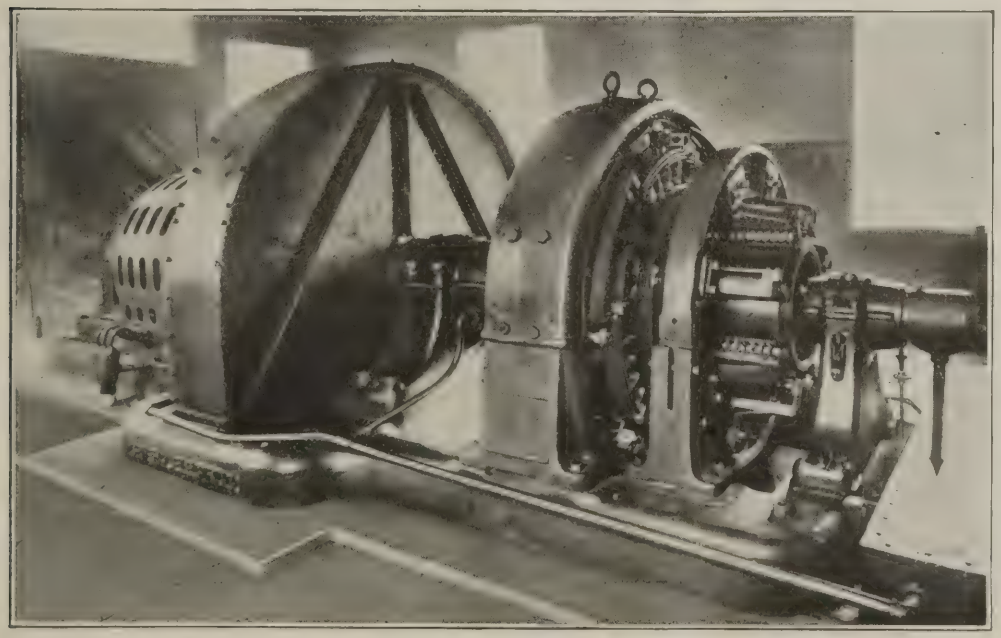


FIG 3. MOTOR GENERATOR SET FROM DIRECT CURRENT END

Outside the hoist house there are installed three 250-kv.-a., single-phase, 60-cycle, oil-insulated, self-cooled, outdoor-type transformers, which reduce the line potential from 23,000 to 2300 volts, at which voltage the power is delivered to the alternating-current motor of the flywheel set.

The speed and direction of rotation of the motor driving the hoist are controlled by varying the strength and

polarity of the generator field by means of a controller mechanically operated from a lever under the control of the hoist operator. This lever is moved forward or backward from a central or neutral position, depending upon the direction in which the operator desires the hoist to run. This actuates the controller, which is arranged to reverse the field connections and thereby the polarity of the direct-current generator. This reversal of the generator polarity also reverses the direction of rotation of the hoist motor.

A variable resistance in the field of the direct-current generator is also actuated from the controller, so that continued movement of the operating lever in either direction from the central or neutral position reduces this resistance by steps. This increases the field strength of the direct-current generator and its voltage and consequently the speed of the hoist motor.

The speed of the induction motor connected to and driving the direct-current generator and the flywheel is automatically varied in such a manner that the flywheel is caused to give up or to absorb energy as the occasion demands, and it is of such capacity that practically constant input will be taken from the transmission line when the hoist motor is operating in accordance with the required duty cycle.

The automatic variation in the speed of the induction motor is accomplished through varying its slip, by means of a water rheostat inserted in the rotor circuit of the induction motor, the resistance being altered by raising or lowering the electrodes. This is accomplished by a small induction motor (called the torque motor), which is arranged with its stator winding in series with the main incoming alternating-current supply circuit to the induction motor of the flywheel set. To the shaft of the torque motor there is rigidly attached a long arm from one end of which the movable electrodes of the water rheostat are suspended, while

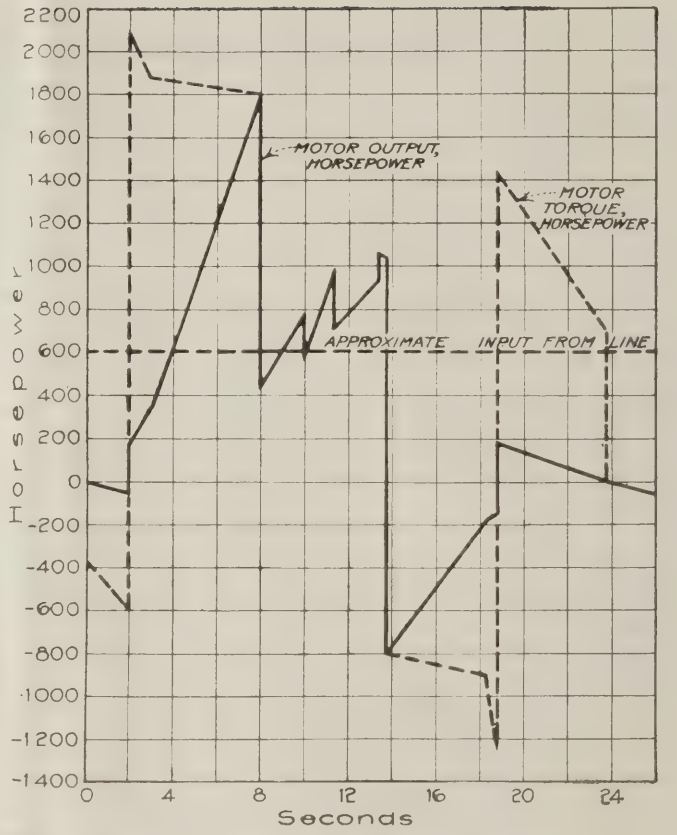


FIG. 4. DUTY CYCLE OF THE HOIST

at the other end weights are attached, thus permitting the adjustment of the balance of the moving parts.

The torque of the motor at the predetermined line current value and the weight of the moving parts are balanced against each other. When the current input to the alternating-current motor tends to increase above the constant value for which the equipment is adjusted,

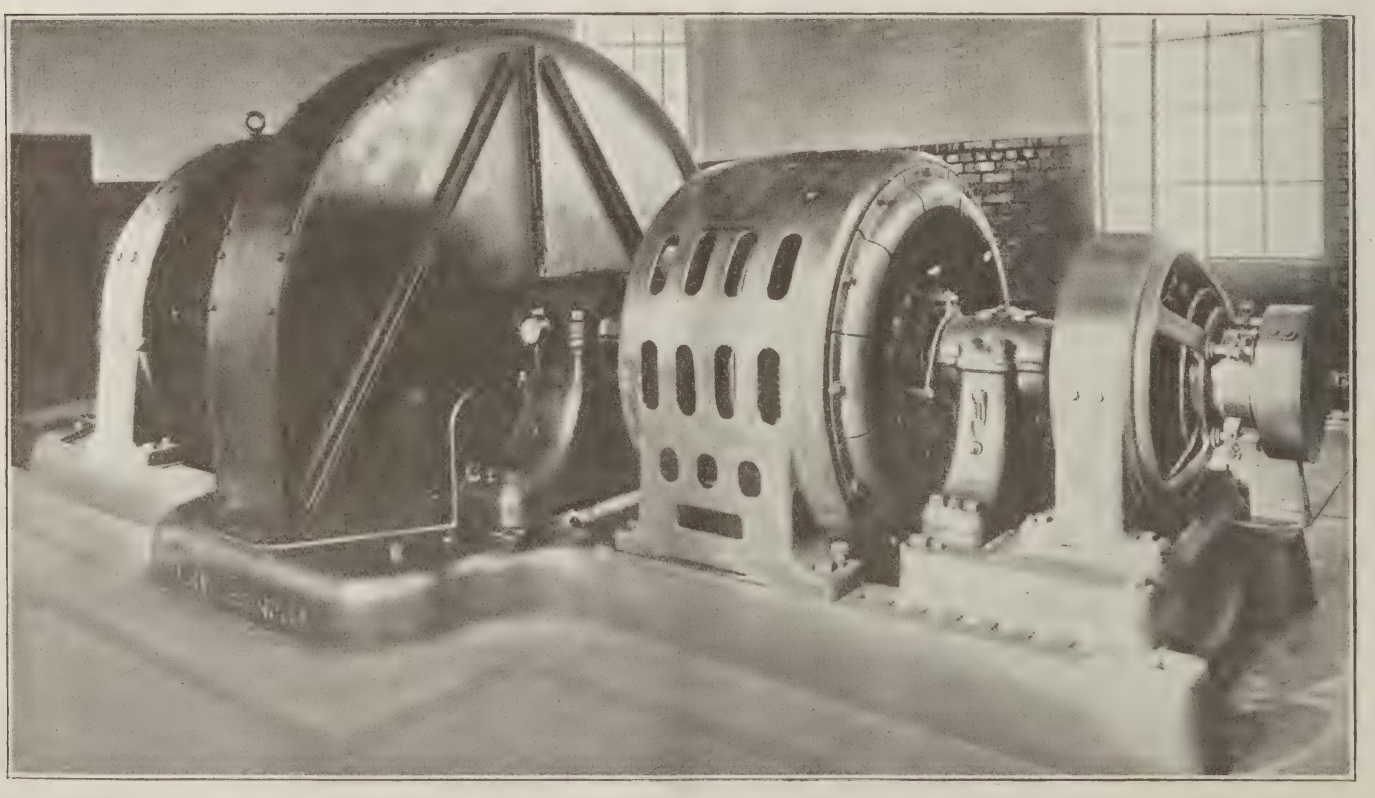


FIG. 5. THE MOTOR GENERATOR SET FROM THE ALTERNATING-CURRENT END

the added torque of the slip motor, caused by this increased current passing through its stator windings, overcomes the weight of the movable parts, raises the electrodes and thereby increases the resistance of the water rheostat in the rotor circuit of the alternating-current flywheel motor, and consequently its slip—or tends to slow it down. Thus the energy stored in the massive flywheel is given out to supply the extra demand of the hoist motor. Inversely, when the alternating-current input to the motor of the flywheel set tends to fall below the constant value, the torque of the slip regulator motor decreases, the weight of the moving parts lowers the electrodes of the water rheostat. This decreases the resistance in the circuit of the rotor of the induction motor, the set is speeded up, and the excess energy taken from the line (over that required at this time by the hoist motor) is stored up in the flywheel.

This equipment is so designed that in case of a failure of the alternating-current power supply to the motor of the flywheel set, after a trip had been started, there is sufficient energy stored up in the flywheel to completely finish the hoisting cycle and land the loaded trip at the top. Under normal operating conditions the flywheel merely gives up the necessary amount of energy required by the hoist motor during that part of the cycle in which the demand exceeds the constant amount to be drawn from the alternating-current line, having stored this up during that part of the cycle when the hoist motor demand was less than the constant amount of power to be drawn from this line. The flywheel has a normal rim speed of 3.74 miles per minute, and in dropping its speed 10 per cent. below normal will give out approximately 7000 horsepower-seconds.

For a shaft of the depth given, there is a great advantage in using a drum of the cylindro-conical form, because in this type, when properly designed, the load is accelerated and brought up to full speed on the small cylindrical part. The starting peaks are thus greatly reduced and a considerable saving in power consumed also is effected. Furthermore, there is a decided increase in the overall efficiency.

These gains, attributable to the cylindro-conical drum, are usually more marked in cases of comparatively short lifts and high rope speeds. Of course, in some cases where the starting peaks are the dominant feature in determining the size of the hoist motor required, through a reduction in these starting peaks, the size of the hoist motor is correspondingly reduced.

The use of the Ward Leonard system of control with Ilgner flywheel load equalization results, in the case under discussion, in a great saving in actual power consumed from the alternating-current line; also the peaks of the hoisting cycle are smoothed out, thus relieving the central generating station of the sudden and widely fluctuating demands that the hoist motor would otherwise make on it. All losses in gear reductions and most of those occurring in rheostats are obviated; but against these is balanced the normal flywheel rotation and other losses in the motor-generator set. However, it is estimated that by adopting the foregoing system of control and load equalization as against the regular alternating-current motor driving the hoist through a gear reduction, the actual saving in power for each trip is from 80 to 100 per cent. and the peak demand from the line of approximately 2600 hp., which would be expected with the alternating-current, geared hoist motor, has been converted into a practically constant demand of about 600 hp., or less than 24 per cent. of the peak that would occur with the alternating-current geared motor.

Of course, the comparative merits of the Ilgner-Ward

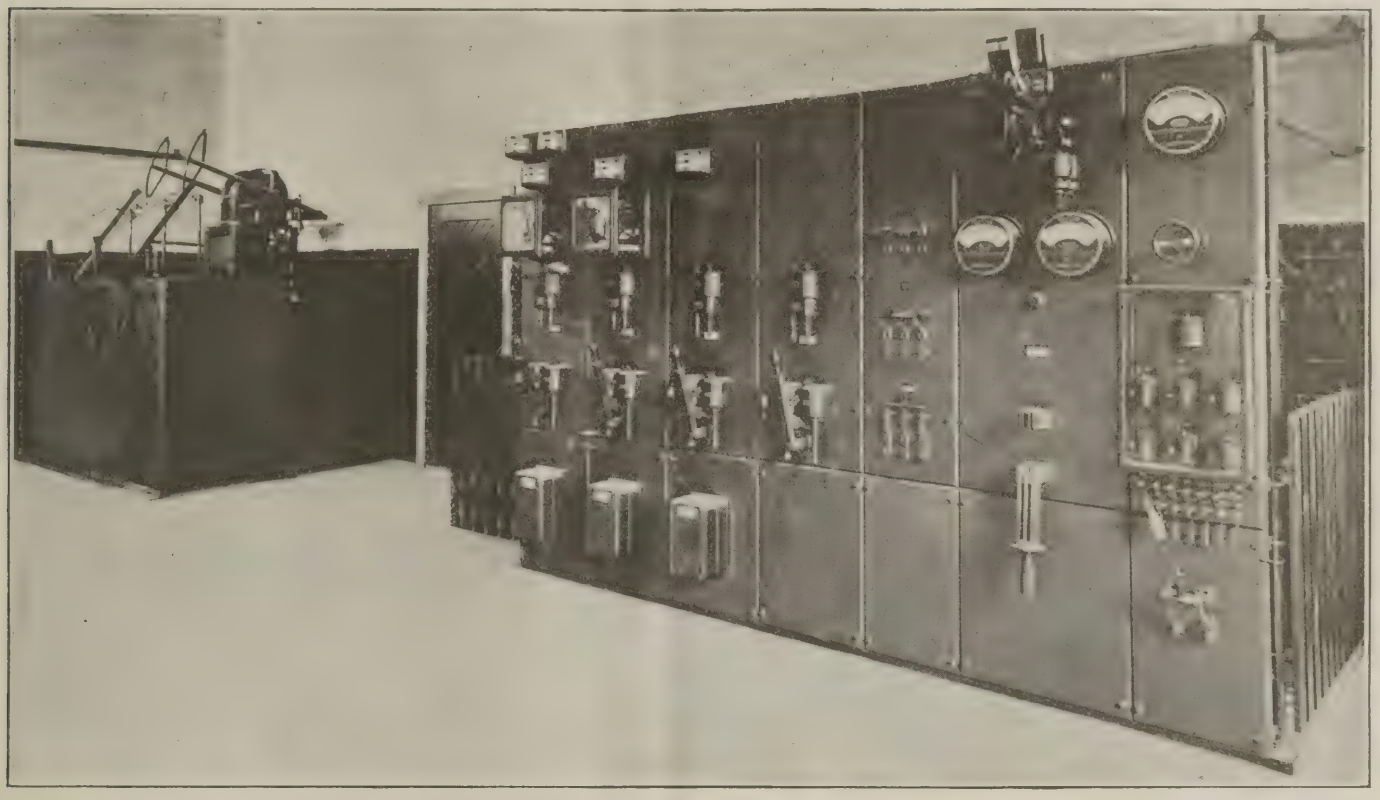


FIG. 6. THE SWITCHBOARD, SHOWING CONTROL DEVICES THEREON

Leonard system and the alternating-current geared motor should be determined for each case, because the former system will not show such marked advantages in every instance. There are cases where the power consumed might be more than that of an alternating-current geared motor, but there is in its favor in every case the practically constant demand from the line. In purchasing power where the price is based on a maximum-demand or peak-load charge in addition to the usual charge for the actual energy consumed, also even when generating one's own power, if the capacity of the generating station is not large compared to the load carried this point of constant and even demand is of great importance.

Generally speaking, the most marked advantages may be expected from the Ilgner-Ward Leonard system where the lift is moderate, the load comparatively heavy and the rope speed high. As the control equipment has to handle only the comparatively small field current of the direct-current generator, the parts are small. When in motion the hoist motor has its fields excited with but little resistance in circuit, but in order to reduce the losses when the motor is standing still the control is designed so that at this period an additional resistance (called an "economy resistance") is inserted in circuit, where the controller is brought to the neutral position. This reduces the standby field losses in the motor and also the field heating,

Comprehensive protection is secured through the use of devices which accomplish the following:

1. Automatic devices are provided which prevent retardation being accomplished in less than a predetermined rope travel. This limits the load which can be placed on the hoist motor and also the generator of the flywheel motor-generator set during this period. However, the operator is free to retard at a slower rate than fixed by the automatic devices and to run at intermediate speeds.

2. The hoist is automatically retarded at the proper rate, independent of the operator, when either cage approaches the dump.

3. In case the operator allows either cage to go past the landing by a predetermined amount, the power will be automatically cut off entirely from the hoist motor, and a relay will be operated which automatically applies the emergency brakes. This automatic device will, however, allow the operator to start the hoist in either direction from any point in the cage travel.

4. Additional overwind protection is provided by separate switches, actuated by the cages themselves, which may be placed so they will cut off power from the hoist motors and automatically apply the emergency brakes at any desired point of travel beyond the landing.

5. In case the exciter voltage or the motor field current fails, the direct-current circuit breaker will be automatically opened, thus cutting off power from the hoist motor and automatically applying the emergency brakes.

6. A hand-operated emergency switch is provided within easy reach of the hoist operator, by means of which he can automatically cut off power from the hoist motor and apply the emergency brakes.

7. When hoisting men limit switches are provided, which prevent the operator from allowing the cage to go past the main landing.

8. Additional generator field resistance is provided and so arranged that when hoisting men the hoisting speed is further limited.

9. The special safety devices employed when hoisting men have their control circuits so interconnected with a signal system that a visible signal is given to the men to be hoisted, showing that such safety devices have been put into operation.



FIG. 7. GENERAL VIEW OF THE SURFACE EQUIPMENT

Serve abroad or serve at home. Buy War Savings Stamps.

Hartley Withers, the editor of the Economist, of London, says: "Money spent in war time on things not needed is money given to the enemy."

Labor and material are essential to victory; use both sparingly.

Save for the country's sake.

Coal Mining in British Columbia

By R. DUNN
Victoria, B. C.

SYNOPSIS—*British Columbia, as well as other portions of the Canadian Northwest, is anticipating a coal famine next winter. The demand for and output of coal is now stronger than ever before. Men are scarce, the cost of supplies high and still rising, equipment is difficult to secure, and new development is thus strongly retarded.*

THE vital importance of coal to the industrial and domestic life of the country is being brought home more forcefully every day to the people of Canada. In British Columbia, a coal-mining center, this is specially noticeable because in the past, with producing mines a few miles away, coal had come to be taken somewhat as a matter of course; something which, everybody agreed, cost far too much but which could, at any time, be secured in any quantity provided the price was forthcoming.

Circumstances are changing. The collieries are working at a high pitch. They are turning out as much coal as the men and equipment available can produce. New mines are being opened, and yet the prospects are that the demands on British Columbia coal this year will far exceed the supply. It may well be asked: "Why is this so? In what way have conditions so materially changed in the last few months as to warrant the assertion that this province, at present producing coal at a greater rate than for many years, despite the handicaps of labor shortage and high prices of mine equipment, is unlikely to be able to fill all orders?"

In answering these questions the position, not only in British Columbia, but throughout the Pacific Coast states and the Western Canadian provinces, has to be considered. First let us glance at the records with respect to the sale of coal by British Columbia in the years 1916 and 1917. These are as follows:

SALES IN 1916

Coal:	Tons
Home consumption	858,052
Export to United States	837,879
Export to other countries	6,166
Total	1,702,097
Coke:	**Tons**
Home consumption	233,456
Export to United States	34,377
Total	267,833

SALES IN 1917

Coal:	Tons
Home consumption	935,469
Export to United States	754,568
Export to other countries	38,211
Total	1,728,248
Coke:	**Tons**
Home consumption	147,811
Export to United States	12,711
Total	165,022

It is important, in order to properly grasp the story told by the foregoing figures that it should be understood that "home consumption" means, in the strictest sense, just what the words convey provincially; that is to say, none of the coal so classified goes outside the province. Therefore, it will be seen that almost half of British Columbia's production has gone and continues to go to the adjacent states—the greater part to California. To the coal miners and operators this is an important market, developed to its present state in the course of 50 years of trade.

It is not saying too much for the coal of Vancouver Island, from which section the coal for export chiefly comes, that the consumers of the State of California would not relish the idea of being forced to make a change. It follows that everything possible will be done, as far as the operators are concerned, to maintain their obligations both in respect of home consumption, which is a first consideration and has been always so considered, and in regard to the needs of the people of the southern Pacific state.

But on top of these considerations come two new developments. One is the demand that the coal fields of British Columbia and Alberta[1] supply, if not fully, to a much larger extent than heretofore, the requirements of the Canadian prairie sections as far east as the Great Lakes. This includes the large market of the Province of Manitoba which, in the past, has depended on the anthracite of the States. Another is the possibility of the local British Columbia market being indefinitely expanded through the cutting off by the United States Government, as a war measure, of the fuel-oil supply to the Northwest from California.

In regard to the former its seriousness to the prairie provinces and the necessity for concerted action of some sort were the subject of addresses by C. A. McGrath, fuel controller for the Dominion of Canada, and C. W. Peterson, deputy fuel controller, at a public meeting held in Winnipeg on the evening of Tuesday, May 14. On or about that date Mr. Peterson gave a statement to the daily press as follows:

> In regard to the coal situation as it affects the prairie provinces, I may say that the only positive statement we have from the United States authorities at the present time is that anthracite shipments to Western Canada will be materially restricted. As a matter of fact we have no positive assurance that any anthracite at all will be shipped to the head of the lakes. It should not be forgotten that the coal situation changes almost from day to day in sympathy with the variations of output and the demands from every source. As an illustration I may mention that events have transpired recently that will probably render it necessary for the continent of America to find additional coal supplies for one of the Allies. This may easily prove an important factor in the coal situation during the coming winter.

A few days later Mr. Peterson held a conference

[1]What is said herein applies, generally speaking, with equal force to Alberta and Saskatchewan, although references to local conditions mean conditions in the Province of British Columbia. That the operators of Alberta are doing their utmost to meet the situation is shown by the remarkable jump in their output for the year 1916, although the figures available indicate that difficulties, which may be classified as national and provincial, brought down the production of the year 1917. The totals, as far as available here, are: Alberta, 1915—3,434,891 tons; 1916—4,648,604 tons; and for the first three quarters of the year 1917—2,213,501 tons. In Saskatchewan the output for 1915 was 237,249 tons and for 1916, 267,234 tons.

with the coal operators at Calgary, Alberta, the object being to discuss and decide upon measures for the speeding up of production.

It is not necessary to devote more than a few words to the other development referred to, namely, the necessity of replacing fuel oil with coal should the California oil be withdrawn from the Northwest, because this, although predicted, has not yet transpired. If it does, however, the result will be a further draft on the coal supply of the province of considerable proportions, as the liquid fuel is used largely by the Esquimalt & Nanaimo Ry., the only important railway of Vancouver Island, and by all passenger train locomotives operating on the mainland of British Columbia. It is true, in connection with the latter, that coal gradually is replacing oil, but the sudden cessation of importations will unquestionably materially strengthen the home coal market not only in respect to the transportation companies, rail and water, but with regard to industrial plants, business blocks, etc.

As a further illustration of what this means to the province it may be said that conservative estimates place the quantity of oil used in British Columbia at approximately 8,000,000 barrels per year, or the equivalent of about 2,500,000 tons of coal.

And now the other phase of the situation may be given brief scrutiny. What is the condition in the province and how are the operators of the collieries that are expected to meet this increased demand placed? Generally speaking, the condition cannot be said to be a happy one. Operators have problems of a character that have never in the past been faced. To begin with, there is the labor question. While in some districts there is no appreciable lack of men to handle the present output of the mines of these particular localities, in other sections, where the mines possibly are not as modernly equipped and the conditions under which the workers are toiling are perhaps more onerous, there is a distinct and unfortunate shortage.

Wages Have Gone Up Considerably

It goes almost without saying that wages have increased to a large extent, but the mine managers have met the demands in this respect in almost every instance, and it is gratifying to be able to report that the relations between employee and employer are amicable and satisfactory. The operators have recognized that the general increase in the cost of living entitles the men to more wages, while the fuel controller, of whom more anon, when appealed to by the employers has consented to an increase in the selling price of coal. Thus the burden, as is always the case, has been shifted to the broad but, in recent years, somewhat staggered shoulders of the body politic.

But the point that I want to bring out here is that, with this position as to men, the collieries are at a decided disadvantage in their efforts to further develop the coal fields by the opening of mines and thus increase their production. It is to their credit, therefore, that despite difficulty they are going ahead, crossing no bridges before they are reached, and so far under the circumstances they have been able to accomplish wonders.

It will be interesting here, perhaps, to review a little history—not ancient history, for the events in question happened only last year and have a bearing on future prospects. In the fall of 1917 there developed considerable agitation among the municipal officials of the cities of Vancouver and Victoria, it being the contention that the coal dealers were charging outrageous prices. About that time the fuel controller for the Dominion appointed a British Columbia representative in the person of Nichol Thompson, a citizen of high standing and a business man with long experience in connection with eastern Canadian collieries. Through Mr. Thompson and the Hon. William Sloan, minister of mines, an investigation was instituted into the cost of the production of coal and of the handling charges from the mine to the consumer. As a result it was made fairly clear that the profits of the middleman were not exorbitant, certainly not as exorbitant as newspaper articles, based on ex parte statements, had indicated.

Would Not Buy Coal in Summer

It served the purpose, however, of bringing out the fact that residents of these municipalities, and of New Westminster, B. C., as well as other parts of the province, were in the habit of postponing their coal purchases until the winter and that through the summer the collieries often found no market for their output. The result was that orders were crowded into six months, demand exceeded production, and coal famine threatened. Fortunately the winter of 1917-18 in the Pacific Northwest was unusually mild and the condition feared did not develop.

However, it is hardly to be expected that the same conditions will prevail in the winter of 1918-19. Profiting by the experience of the past, and realizing the imperative need of being in a position in the months to come, to supply, not only British Columbia, but the established market of California and the prospective market of the Canadian prairie provinces, the colliery managers and the dealers of this province are inaugurating a campaign with a view to having local residents lay in their winter's supplies this summer, thus assisting in the even distribution of the demand.

To this end, and with the object of establishing the machinery through which the people may be impressed with the need of conserving coal and of the various methods of doing so, the Dominion Government recently passed an order-in-council authorizing the provinces to appoint fuel administrators within their several jurisdictions and giving each municipality power to appoint a fuel commissioner. It is felt that this will have the effect of bringing into operation an immense organization throughout Canada by means of which an effective educational campaign may be waged.

One of the pleasant features of the present position in the Northwest is the good feeling between the men and the managers, to which I have referred. This has been brought about by a disposition on both sides to recognize each other's difficulties and to make concessions. An instance of this was brought to my attention the other day. The employees of a certain Island company wanted an increase in pay. They took the position that the rise in the cost of living had so diminished the value of the dollar that more money was essential. A committee was appointed to wait on

the management, by whom it was received courteously and its representations listened to sympathetically.

The case for the men had been thoroughly prepared. Statistics were submitted showing the augmented cost of various articles of food and clothing and proving, beyond a question, that what might have been considered a fair scale some months ago was not so now. The management replied, in effect: "We recognize the force of your argument, but we cannot, without losing money, pay you more. To demonstrate our good faith you are welcome to review our books. They are open to any auditor in whom you have confidence, and the examination can start now if you so desire."

The men accepted this invitation and the report substantiated the company's position. "Very well," said the men, "we recognize that your shareholders are entitled to a reasonable return on their investment. We still think we are justly entitled to a living wage. Therefore we will gladly join you in demanding of the fuel controller authority to increase the selling price of coal at the mine." This course was adopted, with the desired effect, and peace and good feeling was maintained.

Shortly after the war began the miners of Vancouver Island, and this applies in general to those of all British Columbia, were given a 5 per cent. war bonus which was followed by a 5 per cent. time bonus, its purpose being to encourage continuous work. On Jan. 1, 1917, there was a 10 per cent. straight bonus, and in December of the same year another bonus of the same magnitude and character. On Apr. 15, 1918, the latest increase was agreed upon, namely, 50c. a day straight bonus. In other words, the wages of the miner in British Columbia have risen 30 per cent., together with a straight 50c. per diem, since the outbreak of the war. When this is taken into account in conjunction with the fact that supplies have soared, broadly speaking, 80 per cent. (some of the high-grade steel material having climbed as much as 160 per cent. over the prewar prices), some conception of the problems with which the operators are dealing may be obtained.

Circumstances would not be so difficult if the prices of coal had risen in the same ratio or if, even at the prices quoted, equipment was readily obtainable. As to the former, in January, 1917, there was an increase of 10c. a ton; in July of the same year another of 65c. a ton; and in February, 1918, another of 30c. a ton. With respect to the latter, the demands being made upon all the large industrial plants of the United States and Great Britain, the restrictions imposed on exportations, and the transportation difficulties have made the obtaining and delivery of equipment so uncertain and the delays so extended even when all arrangements have been perfected, as to seriously hamper the new development of coal fields.

The selling price of coal at the mine is now $5.80 per gross ton as compared with $4.25 and $4.50 in 1914. This will give some idea of the enormous advance in costs throughout the Northwest. It almost goes without saying that, in the face of these figures, a further increase in the selling price of coal by the dealers will be necessary.

Whether British Columbia will be able to accomplish everything that seems to be expected of her in meeting the demands of the home, the prairie and the southern markets remains to be seen. It must be apparent that the coal-mine managements have a stony path to tread but, if they fall short, it will not be their fault as far as can be judged at the time of writing. The miners, too, are coöperating. But lack of mechanical facilities and shortage of labor in some districts are difficult hindrances to overcome, and it will be imperative, if serious emergencies are to be avoided during the winter of 1918-19, that the public be fully apprised of the facts and instructed as to how it can best buy and save in order that, while having sufficient fuel for ordinary needs, the heavy demands may be so evenly distributed as to enable the producers to deal with the extraordinary situation which the exigencies of the war have developed.

Views of Anthracite Stripping

The accompanying illustrations show two views of the Delaware & Hudson strippings at the Plymouth No. 4 Colliery in the Borough of Larksville, near Kingston, Penn. The photograph on the left shows the Cooper and Bennett coal beds at the point where the entry is made to the underground workings. The photograph on the right shows a shovel making the second cut in the removal of overburden. The Larksville Mountains are seen in the distance.





DELAWARE & HUDSON STRIPPINGS AT THE PLYMOUTH NO. 4 COLLIERY NEAR KINGSTON, PENNSYLVANIA

The Snow-Bird Mine

By S. C. REYNOLDS
Houston, Penn.

SYNOPSIS—*The total number of wagon mines in operation in this country is somewhat over 2000. Although the operation of such mines has been criticized, frowned upon and discouraged in every way, they often reclaim coal considered as worthless by the big producers. During the past two years they have placed upon the open market several million tons of coal at a time when it was sorely needed.*

DURING the last two years a good deal has been said of, and more or less interest taken in, the small mines eligible to the "snow-bird" classification. While at first thought it would seem that the "pesky wagon mine"—as it was referred to in an editorial comment in *Coal Age* some months ago—could hardly warrant much interest, yet, when it is realized that during the past two years considerably over 2000 wagon mines have been opened up in the coal fields of this country, it will readily be seen that this is a matter of some importance to those in charge of the fuel problem of the nation. This problem is now more vexing than ever before.

Many reasons have been advanced—principally, however, by those who were hardly in a position to speak in an impartial manner—as to why the "wagon mine should be weeded out." It has been charged that the small mine is wasteful of labor; that the miners could be used to better advantage in the larger and better equipped mines; that these operations are wasteful of the teamster's time who hauls the coal from them, and that railroad cars are kept idle which otherwise might be in use. After all, I wonder if the last reason given why the "pesky wagon mine" should be weeded out isn't really the only reason that would stand a fair analysis. While any business that in any way hampers the already overtaxed railroad equipment should be eliminated, if possible, it is also true that any harm done in this respect by the small mines has been counteracted a hundredfold by the thousands of tons of coal produced by them and thrown into the open market at a time when it was sorely needed.

Aside from being personally interested in a mine of this sort—which I confess at the start—I have had an unusual opportunity to watch the development and the work carried on by at least 200 mines of this class in Pennsylvania alone during the past two years; and while my business with them pertains only to workmen's compensation, I have naturally absorbed a good deal of first-hand information about these small mines which are scattered throughout the coal fields.



THE DUMP OF A SNOW-BIRD MINE

One of the principal assertions advanced by those who desire the elimination of the wagon mines (that they are wasteful of labor) can readily be disproved, because, as a matter of fact, while these numerous mines as a whole have produced several millions of tons of coal during the last two years, the labor used could probably not have been employed to better advantage. I have invariably found that the majority of miners digging coal in these small mines are men who for various reasons do not care to work in the bigger railroad operations.

The miners who as a rule dig coal in these small developments are frequently local characters who prefer



MOTOR TRUCK RECEIVING ITS LOAD

to work only in such mines, where they can be, in most instances, within a few hundred feet of daylight, unhampered by union regulations, or the necessity of waiting on the "machine man" to cut their place; where they can go to work early or late as the humor strikes them, and "knock off" when they choose. I know of dozens of instances where their tonnage loaded over a period of a month compares favorably with that of the miner in the big mine. The fact that there is seldom a strike or a general lay-off on account of a "hunky" wedding or christening helps to equalize any difference in efficiency in favor of the miner in the larger mine by reason of machine mining.

Hundreds of these small mines that are operating today in spite of what seem unjust conditions are supplying coal to the consumer direct from the mine, also to local industries by wagon and automobile trucks, which otherwise would have to draw upon the railroad mines for their supply. Furthermore, I happen to know that a great many industrial plants that are



GENERAL VIEW OF SNOW-BIRD TIPPLE

now getting their coal supply in railroad cars from the larger mines could have secured their fuel requirements direct from small operations adjacent to the plants had provision been made by our Fuel Administration to allow the small mine operator to charge a price for his coal that would make it possible for him to operate.

A year ago scores of these small mines were hauling coal in wagons and trucks over distances up to four or five miles. I have in mind now two different snow-bird mines that were opened up near Pittsburgh with conditions much alike. The coal was the thin vein. About $15,000 was invested in automobile trucks and the necessary equipment. Coal was loaded in cars at a railroad siding two miles distant. It was loaded principally into cars that had been emptied of their freight and were not moved until loaded with coal. Everything went beautifully as long as the price of coal was above the $3 mark, but anything below that figure defined the difference between a working profit and a loss. Consequently, after Government restriction they shut up shop and the tonnage available from the two was lost from the market.

The small mine operator has been hampered and discouraged at every turn. For many weeks the railroad companies refused him cars in which to ship coal. Later it was decided to permit him to load only box-cars and allow 75c. per ton above Government price, which with present labor conditions about pays for shoveling the coal from the wagon or truck into the car, to say nothing of the cost of the haulage from mine to railroad siding. And the 75c. allowed above the mine price for loading box-cars is the price regardless of whether the distance from the mine to the loading point is 500 ft. or five miles.

Acres of crop coal that otherwise would have been left in the hillsides have been mined during the last two years by the wagon miner, and from a conservation standpoint that fact alone is surely commendable. Within sight of where I write a couple of men leased the crop line from the owner of a farm from which a big operator had taken all the coal he thought worth while and drew the stumps and abandoned the property as being worked out. Since the first of June, 1917, however, that crop line has produced over 20,000 tons of coal. And the lessees are still producing.

The wagon-mine operator has come in for a good deal of criticism from the big mine operator whenever the opportunity arose. This is natural. There is the same reason for affection on the part of the big mine operator for the wagon-mine operator as there is for evidence of a warm feeling by the street car company for the "jitney bus," or the big department store for the small corner grocer.

However, as remarked by an editor of national repute a few days ago, "If you know of any way to increase the fuel supply of the country at this time, it is your clear duty." But, making conditions such that it is impossible for the small mine operator to produce coal, or discouraging the mining of coal in any way, regardless of the size of the operation, is not, in my opinion, the best thing to do.

The New Harewood Mine

Harewood mine is one of many recently opened on Vancouver Island. It is situated about four miles southwest of Nanaimo, which is the central city of this famous coal field.

This mine is owned and operated by the Western Fuel Co., of Nanaimo, with offices in San Francisco. This company was recently reorganized. G. W. Bowers has been appointed general manager, and John Hunt, superintendent, was promoted to general superintendent. The search for new mines has gone steadily forward.

The Old Harewood mine was visited and explored and there was found enough coal in the old pillars to warrant reopening the mine. This is the third time this mine has been opened. It was first opened about 40 years ago, when the coal near the outcrop was worked for a short period.

In 1902 the mine was again reopened and was more extensively worked, a shaft being sunk on the east side of the ridge, where the seam was cut at a depth of 150 ft. and the coal worked from this point to the raise joining with the former workings through two levels. The operation was closed down again in 1904 and reopened in August of last year.

Since that time the old mine has been developed fairly rapidly and is now producing 750 to 800 tons of coal daily with about 200 underground employees. It is now the second largest producer on the island, the No. 1 shaft at Nanaimo holding premier place.

The power for the working of the mine is electric and is supplied from generators situated at the old shaft, which is now used as the upcast. A Murphy fan supplies about 30,000 cu.ft. of air per minute to the mine and runs at half capacity. The haulage is performed by two Jeffrey locomotives in the main levels, while electric winches are used in hauling coal up the dips.

The coal varies greatly in height, increasing in places to 20 ft. in thickness, while the greater portion of the bed will average between 4 and 5 ft. Numerous rolls and faults are found on the dip side of the main level, while to the raise the coal thins down to about 2 feet.

The Western Fuel Co. has accomplished much in the operation of this mine which helps considerably to maintain this firm's daily output of nearly 3000 tons derived from three mines. Hopes are entertained of a still further increase which will augment the production to the coveted 1,000,000 tons for the year's operations.

Recovery of Byproducts in Coke Manufacture

By M. MEREDITH
Liverpool, England

SYNOPSIS — *The employment of byproduct ovens in preference to those of the beehive type has greatly increased in Britain in recent years. The present war has stimulated byproduct coking largely on account of the demand for high explosives made from certain of the byproducts. Future practice will doubtless demand the mixing of coals before carbonization is begun.*

THE erection of modern coke ovens with the necessary appliances for the saving of the byproducts in coal, and the extraction and working up of the various products, must ultimately come into use everywhere and is a matter which requires serious consideration on the part of all coke manufacturers.

With the gradual disappearance of the old prejudices against coke made in the byproduct ovens, the modern process has now come into use and begun to assert itself. In 1898, in England, 1¼ million tons of coal were carbonized in byproduct coking ovens; in 1905, the quantity of coal so treated reached roughly 3½ millions, and in 1909, 7½ millions of tons. Evidence given before the royal commission on coal supply in England shows that the value of the byproducts will not only pay for the working of such coke plants and provide a profit, but will also pay for the capital outlay within 10 years.

In the United States modern coking and byproduct plants have been erected in many districts and are extensively operated. In Canada, in 1915, there were only two byproduct coke-oven plants, yet these two were responsible for two-thirds of the total coke production of the Dominion.

Modern byproduct recovery coke plants have recently been installed in certain places as a means of supplying city gas, but such installations are at present only possible where there is a good demand for metallurgical coke. It is not improbable that, in years to come, this matter will receive serious consideration and coke plants will be fitted with modern appliances for the saving of the byproducts. With the rapid depletion of coal supplies this will be rendered highly necessary.

The wasteful loss of valuable material by the beehive process of carbonizing coal must sooner or later be considered, and the modern process introduced in the manufacture of coke, the whole question being a national and economic one. There has been a decided prejudice against the use of retort-oven coke, the fuel from the beehive ovens being more in demand for use in blast furnaces. This preference is now disappearing, and it is generally recognized that retort ovens make as good a coke as beehive ovens, and give a high yield in coke when operated on ordinary coking coals. Beehive ovens are stated to burn about 10 per cent. of the coal itself —that is, if a coal will yield 75 per cent. of coke in a retort oven, probably only 65 per cent. would be obtained from a beehive oven.

Germany owes largely to her modern methods of treatment of coal and coke the large amount of high explosives she has been able to use against the Allies in this war. The byproduct coking plants which are favored in England are the Otto-Helgenstock, Simon-Carves, Koppers, Somet-Solvay, Simplex, Coppée and Hussener. According to A. W. Belden (United States Bureau of Mines): "The yield of byproducts is dependent on the working of the ovens and can be regulated within certain limits at the option of the operator. The manipulation of the ovens depends in large degree upon which product is more desired. Ideal conditions are reached when a coke possessing the chemical and physical properties necessary for the purpose for which it is intended is produced, together with a maximum yield and quality of byproducts."

True Distillate from Byproduct Oven

In a byproduct oven a true distillate of coal is obtained, the process being under control so that it can be regulated. From the ovens the volatile matter passes through the uptake pipes and is driven along the ovens by means of exhausters. En route to the exhausters it passes along a hydraulic main laid along the top of the ovens to a chamber where it deposits tar and a small portion of ammonia. The gas having deposited the greater part of its tar is then passed through air coolers, water coolers, scrubbers, exhausters, tar extractors and ammonia washers, to a gas holder. After the gas has been deprived of its tar and ammonia it is then treated by certain heavy creosote oils, which absorb from it the benzol contained therein, and benzols of various degrees of strength are manufactured therefrom. The following is a typical analysis of the gas produced:

	Per Cent.
Hydrogen	50.0
Saturated hydrocarbons	34.0
Unsaturated hydrocarbons	4.0
Carbon monoxide	8.0
Carbon dioxide	2.0
Oxygen	..
Nitrogen	2.0
	100.0

Inflammable constituents of this gas amount to 96 per cent.

To the ammoniacal liquor from the ammonia washers lime is added, and the mixture then distilled, the ammonia (NH_3) being passed into sulphuric acid to form ammonium sulphate; or it is pumped into a condenser and saturated to form stronger liquor, varying in NH_3 contents, but usually containing between 15 and 20 per cent. The quantity obtained depends on the nitrogen content of the coal, but other factors, such as the shape of the retort ovens, temperature, etc., have an influence on the fraction of nitrogen which is given off as ammonia.

Nitrogen may be present in coals to the extent of 1 to 2 per cent., but in gas works probably only about

14 per cent. of this is saved as ammonia in the gas, although the percentage may be increased by the addition of lime to the coal, or by passing steam through the retort during distillation. In the dry distillation of coal about 2 per cent. of the nitrogen of the coal is evolved in the form of cyanide and recovered.

NH_3 yields per ton carbonized at gas works from different coals:

	Lb.
Pelaw Main, Maitland	91
Newcastle	7½
Western district	4
Southern district	2½

The ammoniacal liquor, after concentration, is bought on the NH_3 content basis by the manufacturers of ammonia, by whom it is largely made into anhydrous ammonia (used for refrigerating purposes), or into sulphate of ammonia.

Tar and Other Products

The composition of the tars varies with the apparatus employed, method of working and class of coal coked. The following is a typical analysis of gas works tar:

On Distillation Yields	Per Cent.
Water	2.20
Light oil	5.90
Middle oil	12.30
Heavy oil	12.00
Anthracite oil	16.00
Pitch	49.70

Specific gravity, about 1.10.

The following amounts are stated to be obtained from the distillation of tar at ordinary gas works:

From One Ton of Tar Distilled:		
Ammoniacal liquor	3	gal.
Crude naphtha	10	gal.
Light oils	4	gal.
Carbolic acid	1	gal.
Creosote	56	gal.
Anthracine cake	3	lb.
Pitch	13	cwt.

The light oils, which are from 3 to 6 per cent. of the original tar, contain:

	Per Cent.
Phenols	5.0
Pyridines	1.0
Sulphur compounds	0.1
Neutral substances	1.0
Hydrocarbons	80.0

The middle oil, which constitutes 8 to 12 per cent. of the tar, contains:

	Per Cent.
Phenols	10.0
Cresols	20.0
Naphthalene	30.0
Residue, heavy oil	4.0

In addition, the oil contains considerable amounts of pyridine and other bases. The heavy oil, 10 to 12 per cent. of the tar, a semi-liquid product, contains:

	Per Cent.
Naphthalene	30.0
Cresols and homologues	10.0
Pyridine bases	6.0
Hydrocarbons (?)	40.0

Crude naphtha is usually worked up into a standard strength, which yields 20 per cent. of benzol when distilled up to a temperature of 120 deg. C. This is sold to the dye makers, who break it up into benzol, toluol, solvent naphtha, burning naphtha and creosote. The dyes are made from benzol and toluol. Solvent naphtha is used by mackintosh makers and others for dissolving india rubber; burning naphtha is employed for consumption in lamps, etc.; creosote for the preservation of timber, etc.

About a 20 per cent. quality of light oil distills over at 160 deg. C. This is sold to the refiners, who convert it into toluol, solvent and burning naphtha and creosote, for all of which products there is a growing demand.

Carbolic acid is made by washing the crude naphtha and light oils with a 10 per cent. caustic soda solution. The aqueous alkaline liquid is drawn off from the oil, and steam blown through, in order to volatilize any trace of the naphthalene or other hydrocarbon that it still contains. The alkaline liquid is then neutralized by sulphuric or carbonic acid, and the precipitated oily layer or phenol drawn off and fractionally distilled in stills provided with zinc or silver condensing coils. The distillate is crystallized out by cold and separated from the still fluid cresols by a centrifugal machine. Phenol is thus obtained, almost chemically pure, as a white solid. It is used principally for making picric and salicylic acids. The cresols separated from the phenol occur as a fluid mixture of these isomers. They are much used for disinfecting purposes.

Pitch readily commands a sale for asphalting and for many other purposes. Large quantities of pitch were formerly shipped to the collieries of Belgium and the north of France and used for the manufacture of briquettes, the pitch acting as a binding material.

If cheap tar or pitch is produced in sufficient quantity as one of the byproducts in coke manufacture, it could be utilized largely for briqueting the fine dust and coal which accumulates in large quantities in a colliery which yields a coal unsuitable for coking. In certain centers there is a large amount of fine coke or breeze obtained from the coke ovens, which if briquetted would make an excellent fuel. To briquet the fine coal it is washed in the ordinary way and dried, then mixed with 7 or 8 per cent. of tar and molded into bricks by machinery.

The briquettes possess the following advantages: They are less friable, when properly made, than coal lumps, and being of regular shape they are more readily stored. For domestic use they have the advantage of not soiling the hands, and they can be purchased by count, so that a check is kept on the weight supplied. The briquetting of the fine coal dust will become an important industry, as the supplies of the better class of coals become reduced.

Many Valuable Byproducts Recovered

Trinitrophenol is used extensively for filling shells, and its salts have formed constituents of priming compositions and of powders used as propellants. The honey-yellow color of the molten acids suggested the name of "melinite," which it received in France, while in other countries it is designated as "liddite," "pertite," "ecrasite," or "schimose," in Japan. Trinitrotoluene is manufactured from pure toluene. It has sprung into prominence as a substitute for picric acid, chiefly owing to its freedom from acid properties, its low melting point and great stability. Trinitrotoluene has been introduced in the French service under the name of "tolite." The Spanish Government calls it "trilit," and it is also known as "trolyl," "trinol," etc.

The first Australian plant for the making of coke and saving of byproducts was erected in Newcastle (the Australian Coking and Byproduct Co.), but is not now working. The Broken Hill Proprietary Co.'s works, erected at Newcastle, may be said to be the successful pioneer of the byproduct industry in New South Wales. This company makes metallurgical coke, ammonia, gas, tar, etc. The tar, for treatment and extraction of the

byproducts contained therein, is taken over by De Meric, Ltd., tar distillers. This firm has works at Hamilton and has lately erected an up-to-date plant adjoining the Broken Hill Proprietary steel works. The chemist, John Paton, has supplied the following information in regard to the work taken in hand at these works.

The tar is distilled and fractionated into light, middle and heavy oils, distilling at temperatures of 100, 120 and 170 deg. C. respectively. From the light oil benzol, toluol and solvent naphtha are made. It is further treated, and pyridine, xylol, benzol and toluol obtained, the benzol and toluol being brought up to 90 per cent. strength. From the middle oil carbolic-acid crystals, neutral oil, cresylic acid and naphthalene are made; also it is proposed to manufacture disinfectants later on. The heavy oil by fractionation yields creosote, anthracene and dead oil for lubrication. The tar will be carried into pitch, and from the pitch lampblack will be made.

Coke Making and Byproducts Saving

For the making of good metallurgical coke with the byproduct ovens, and to obtain a maximum result from the byproducts, it probably will be found necessary to blend certain coals with others giving higher percentages of volatile matter. The high-class coking coals in some districts are gradually being depleted and experiments will be necessary to blend them and so obtain the maximum coke and byproducts contained in other coals. According to A. W. Belden (United States Bureau of Mines), "the best results seem to be obtained when coals are mixed in proportions that give about 25 per cent. of volatile matter in the mixture, and this practice is generally followed throughout the country where mixed coals are used."

The great waste of gas and loss of all byproducts by the use of the beehive ovens in the coking of fine coal to produce a metallurgical coke only will have to be seriously considered in the erection of future plants, and the question of costs thoroughly gone into; also the suitability of coals, separately or blended, for the making of metallurgical coke, byproduct extraction and the utilization of the gas for power, or heat generation.

Legal Department

Iowa Mine Safety Law—Under the Iowa statutes, a miner need not notify his employer that a mine roadway needs timbering in order to render the latter liable for injury resulting from negligent failure to timber. (Iowa Supreme Court, Erickson vs. Maple Block Coal Co., 167 Northwestern Reporter, 105.)

Refuge Holes in West Virginia Mines—The duty to see that refuge holes along motor roads in West Virginia coal mines are maintained, as required by the statutes of the state, rests on the mine foreman, not on the mine owner, and for injury to a miner resulting from defects therein the mine owner is not liable. (West Virginia Supreme Court of Appeals, Kinder vs. Boomer Coal and Coke Co., 95 Southeastern Reporter, 580.)

Negligent Operation of Mine Motor—Although it was not negligent for a mine motorman to back his motor a short distance without reversing the trolley, it was negligent to move the motor so carelessly as to permit the trolley to leave the wire, causing injury to a boy employed to attend the trolley, and the employer is liable for such injury. (Kentucky Court of Appeals, Borderland Coal Co. vs. Miller, 201 Southwestern Reporter, 299.)

Effect of Indiana Employers' Liability Act—Under the Indiana Employers' Liability Act, a coal operator is liable for death of an employee while assisting in undercutting a vein of coal and due to negligent failure of other employees to remove coal loosened from the vein; the injured employee being himself free from contributory negligence. (Indiana Supreme Court, J. Wooley Coal Co. vs. Tevault, 118 Northeastern Reporter, 921.)

Cancellation of Federal Coal Land Patents—Under the Federal statutes which forbid more than one entry upon public coal lands by the same person or association of persons, entries cannot lawfully be made in the interest of persons or associations who have exercised their own right of entry. Patents based on entries pursuant to a scheme to enable a person or association to obtain lands in excess of the area allowed by such statutes are fraudulent and subject to cancellation. (United States Circuit Court of Appeals, Eighth Circuit; United States vs. Kirk; 248 Federal Reporter, 30.)

Liability of Corporate Promoters—Promoters of a corporation are legally obligated to use the utmost good faith toward the company and the subscribers to its stock. If the promoters undertake to sell their own property to the corporation they are bound to disclose the whole truth respecting it. If they fail to do this, or if they receive secret profits out of the transaction, either in cash or stock, the corporation may elect to rescind the purchase or to hold the promoters accountable for the secret profits. (West Virginia Supreme Court of Appeals, North American Coal and Coke Co. vs. O'Neal, 95 Southeastern Reporter, 822.)

Injury to Inexperienced Miners—When an older and experienced miner is delegated by his employer to instruct and qualify an inexperienced employee for service the employer becomes liable for injury to the latter directly due to negligence upon the part of the instructing employee. Hence, if plaintiff, a miner, was ignorant of dangers arising from the presence of unexploded charges left in coal where he was directed to work, failure to fully instruct him as to the danger and how he might avoid injury was actionable negligence, rendering the operator liable for injuries sustained by plaintiff in exploding such a charge when he struck his pick into the coal. (Pennsylvania Supreme Court, Jelic vs. Jamison Coal and Coke Co., 103 Atlantic Reporter, 300.)

Well Settled Principles Applied to an Unusual Accident—Plaintiff was employed to assist a mine engineer in making certain measurements on an inclined entry. Near the top of the entry was a loaded coal car, held in position by a piece of an old tie set between the end of the car and a tie in the track. The engineer told plaintiff to wait where he was, near the car, until the engineer should make some measurements nearby. Plaintiff sat down in the middle of the track, with his back against the bumpers of the car, and conversed with the mine boss concerning what work plaintiff should do when through assisting the engineer. As the engineer returned, he brushed or stumbled against the prop that was holding the car, resulting in the prop and car being released, and in plaintiff being seriously injured through being dragged in front of the car until it was stopped after moving about 45 ft. Plaintiff sued for damages and recovered verdict for $1200. Setting aside the recovery and ordering a new trial, on the ground that the jury was not properly instructed as to the law of the case, the Kentucky Court of Appeals holds that it was for the jury to determine whether plaintiff was guilty of contributory negligence in sitting in front of the car; that plaintiff was injured while in the line of his duty; but that defendant employer could not be held liable on account of any negligence on the part of the engineer unless that negligence should be found to be gross, because plaintiff and the engineer must be regarded as fellow servants within the meaning of the established rule of law in Kentucky that an employer is not liable for injury to an employee caused by negligence of a fellow servant unless the negligence was gross. (Edwards vs. Borderland Coal Co., 199 Southwestern Reporter, 792.)

Tabulation of Entry Progress

By O. H. Hampsch
Washington, D. C.

The tabulation of the progress of entries in a mine will often prove of much value to the average mine foreman, superintendent or operator. The data in most cases are generally obtained from yardage measurements which the mine foreman or engineer makes at regular intervals.

In the table given below, which may be used as a standard, or a similar table devised to meet any special case, the total entry progress for each semi-month the advance for any particular entry for each month or year, and the total entry progress for the year can be found in a few moments' time.

NAME OF MINE.....

ENTRY PROGRESS FOR PERIOD JAN. 1, 1918, TO JAN. 1, 1919

Name of Entry	Jan.		Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Main entry (St. N.)	32	37	41											
Main air course	26	33	27											
First east	15	17	16											
Second east	14	20	23											
First west	26	32	37											
Second west	35	22	39											
Third east	20	19	21											
Fourth east	28	25	27											
First right	16	14	5											
Second right	11	20												
Main entry (St. S)	42	47	43											
Main (air course)	49	51	52											
First east	29	31	26											
Second east	34	37	31											
First left	5	11	16											
Second left	21	19	17											
Total														
Total for year														

The arrangement of the table shows an easy method of tabulation which, however, may be adapted or changed to conform to any size of lettering that may be used. The table may be made upon tracing cloth or printed upon ordinary drawing detail paper and mounted upon a cardboard back.

Uses of Peat in Agriculture

The increased use of peat and its products in compounding fertilizers may also afford relief from the present shortage of fertilizing minerals in the United States. Peat has long been used in agriculture in this country, having been either applied directly to the land or used as a filler for commercial fertilizers. In view of the curtailment of the imports of potash and nitrates since the war began and the consequent shortage of fertilizers the time has come when the producers of peat might make better known its value in agriculture.

Analyses of the peats of the United States show that they are very rich in combined nitrogen, from 70 to 85 per cent. of which, a proportion that in some peats amounts to more than 2 per cent. of their dry weight, may be recovered in the form of ammonium sulphate, one of the costly ingredients of modern commercial fertilizers. Peat may also be a source of nitrates. A culture bed of peat, if treated with a dilute solution of ammonium sulphate and then inoculated with nitrifying organisms, is said to yield 0.82 per cent. of nitrates, and with repeated treatment about 4 per cent. It has not yet been shown that this process will produce nitrates on a large scale, but in view of the rare occurrence and present shortage of these salts, which are so essential to agriculture and to the explosives industry, the process strongly invites further and larger experiments.

Peat mull may be profitably employed as an absorbent of the valuable nitrogenous liquids of stables, which are ordinarily wasted. When so used it not only absorbs liquids but checks decomposition and absorbs gases, so that it should be an effective deodorizer and disinfectant. For this use it is superior to lime, ashes, and some of the more expensive disinfectants, and it is a nearly ideal material for use in earth closets and other receptacles for moist waste organic matter.

Peat has also been used successfully in this country as bedding for stock and in compounding stock feed.

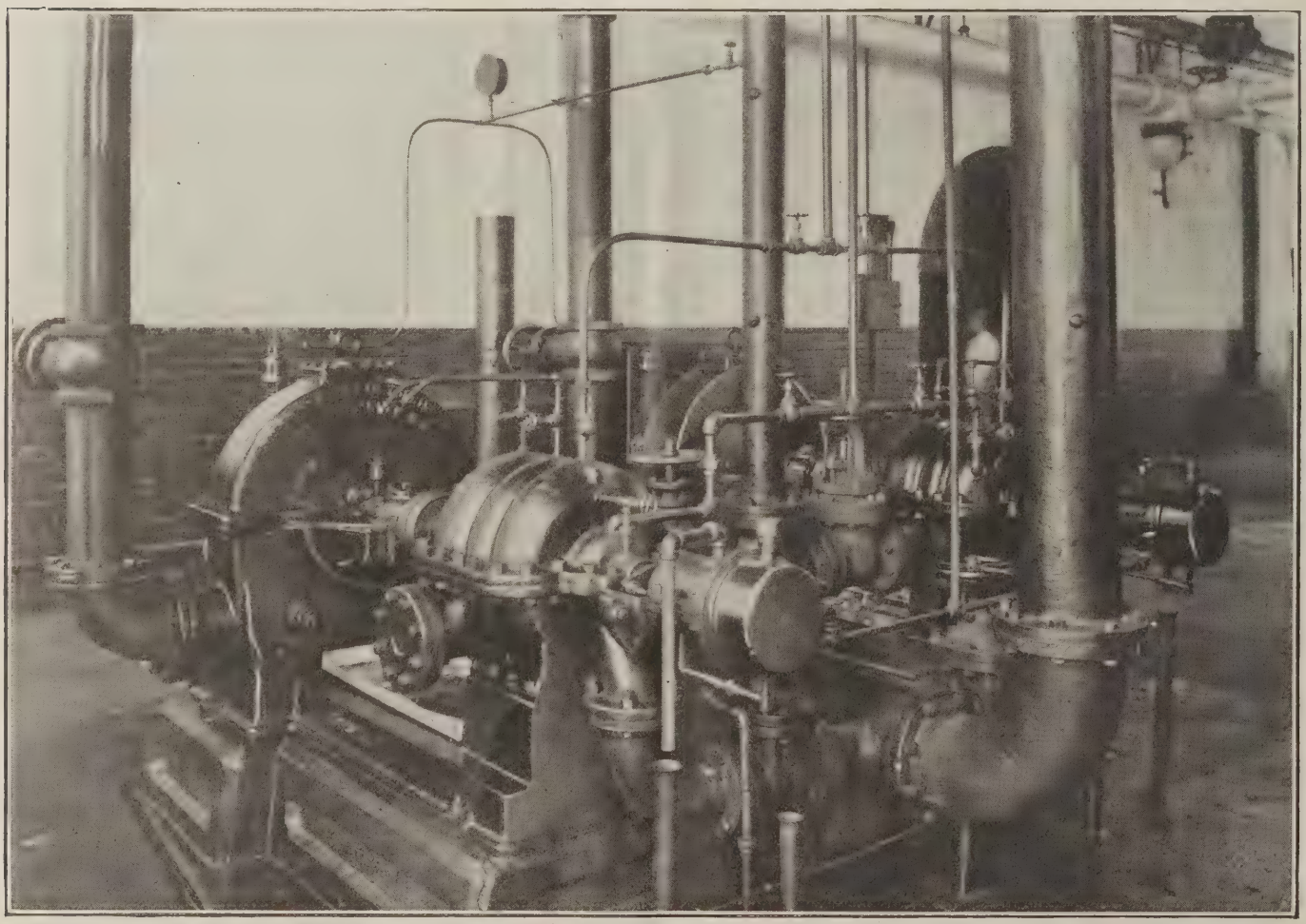
Peat has frequently been used as a source of charcoal and coke, of various byproducts from coke retorts, such as those obtained from the distillation of wood and of fuel and illuminating gas, as well as in making paper, substitutes for wood, and packing material. The prospective value of the peat deposits of the country as a source of these products is much larger than their value as a source of fuel.

Information with regard to the occurrence, distribution, and production of peat in the United States will be furnished on application to the United States Geological Survey, Interior Department, Washington, D. C., and information on the use of peat for fuel and other purposes may be procured from the Bureau of Mines, Interior Department, Washington, D. C.

SNAPSHOTS IN COAL MINING



VIEW OF THE UNDERWOOD COLLIERY OF THE PENNSYLVANIA COAL CO., THROOP, PENNSYLVANIA



TERRY STEAM TURBINE UNITS AT UNDERWOOD COLLIERY OF THE PENNSYLVANIA COAL CO., THROOP, PENNSYLVANIA



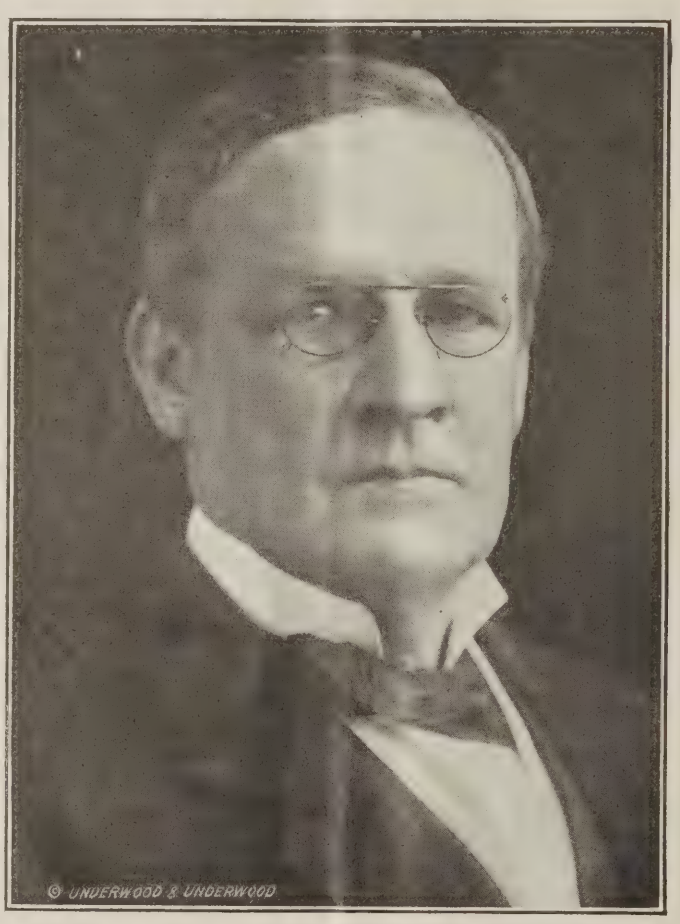
VIEW OF TIPPLE AND WORKS AT THE MINES OF THE VICTOR-AMERICAN FUEL CO., DELAGUA, COLO.; TOWN OF DELAGUA IN BACKGROUND



MINERS PICKING AND LOADING COAL AFTER SHOT HAS BEEN FIRED AT FACE OF CHAMBER, CONSOLIDATION COAL CO., FAIRMONT, WEST VIRGINIA

Death of Viscount Rhondda

IT IS hard to know whether Viscount Rhondda was best known here as David Alfred Thomas, leading Welsh coal operator, or as Baron or later Viscount Rhondda, the Food Controller of Great Britain. D. A. Thomas entered closely into our national life, when in 1913 he made two trips to America purposing to secure large holdings in West Virginia. It was confidently prophesied at that time that a large area of coal land in the "Mountain State" would shortly pass into his hands and that, as a result, the United States would enter under every favorable condition into the export business. But the scheme, for some unknown reason, fell through. Mr. Thomas was here again in March, 1914, this time on his way to Canada to provide for the building of a line 1500 miles long, to be known as the Pacific, Peace River & Athabasca R.R., the purpose being to tap the Ground Hog coal fields. Even at that time it does not appear that the proposed West Virginia venture had been definitely given up. The coal properties of that state were not at that time doing so profitable a business as in times past, and the hour was propitious for purchase. Mr. Thomas was much surprised at the low cost of extraction and at the even more remarkable low selling cost. In fact, he had something of much interest to say when in Great Britain as to the great differences existing between mine operating costs in America and abroad.



OPERATOR WHO CONTROLLED THE BRITISH FOOD

D. A. Thomas was born Mar. 26, 1856, at Adare, in Monmouthshire. While this county is Welsh in all its history and characteristics it lies immediately adjacent to the line between England and Wales, and is actually on the English side of the border as England is now delimited. Thomas graduated from Caius College, Cambridge, in 1880, and three years later got his master's degree. He was the son of a colliery owner, but he did not find in that fact a reason for taking charge of the business without first obtaining a practical and underground knowledge of every method of operation.

In 1888 he entered the firm of Thomas & Davey, coal sales agents, and at the same time became member of Parliament for Cardiff, which constituency he served till 1910. In that year he became senior member of his firm as well as managing director of the Cambrian combine and other colliery interests in South Wales. His trips to investigate the advisability of taking an interest in American enterprises followed three years later, but the war prevented his plans from being consummated, and in 1915 he came to America as business agent of the British Government. On this occasion he reorganized the munition industry of Canada, bringing the Shell Committee of the Dominion under direct control of Lloyd George, then the minister of munitions.

David Thomas was on the "Lusitania" when it was sunk, and the exposure is said to have shortened his life. But in the few years yet remaining he had a chance to perform a large service for his country. He was appointed Food Controller and immediately set himself to stop speculation and profiteering in food. He took over all the crops in 1917. Later he announced the formation of an Inter-Allied Food Council to purchase in the United States food supplies for Great Britain, France and Italy in connection with Herbert Hoover, our own great mining celebrity, who, like the mining man of England, had been placed in charge of the Food Administration. Strange to say, Lord Rhondda's thankless job met with generous approval in Great Britain. The more stringent the control the greater the satisfaction. The loose regulation of earlier days was of such a character that long queues of persons assembled at the stores, but after Lord Rhondda regulated matters the ration, while painfully slim, was certain and not so hard to obtain. The situation was indeed quite desperate. The United States had largely suspended shipments of food in order to provide shipping for soldiers, and there was nothing for Lord Rhondda to do but to slip the belt on the portly person of John Bull not one, but several notches. That the latter forgot to grumble and protest is a tribute to the Welsh coal master. Lord Rhondda boasted that he allowed himself less food than he apportioned to the public he regulated.

In fact, there are not a few who believe that his disease resulted from the weakened vitality that was the outcome of his asceticism and devotion to duty. Thus passed away, on July 3, the "British Coal King," to the great regret of his fellow countrymen—an extremely democratic man, and not greedy for honors.



New Classification for Ohio

In order to eliminate the intricacies of the thin and thick vein method of basing prices in Ohio, a new classification for that state has been adopted as follows:

	Run-of-Mine	Prepared Sizes	Slack or Screenings
District No. 1—County of Meigs and Townships of Cheshire and Addison in County of Gallia	$2.35	$2.60	$2.10
District No. 2—Counties of Vinton, Jackson, Lawrence, Sciota, Pike, and County of Gallia except Townships of Cheshire and Addison	3.00	3.25	2.85
District No. 3—Counties of Hocking and Athens, and Townships of Coal and Monroe in the County of Perry and Township of Homer in the County of Morgan	2.10	2.35	1.85
The Bailey Run. or No. 7 Seam	2.50	2.75	2.25
District No. 4—Counties of Washington and Noble, County of Morgan except Township of Homer, and County of Perry except Townships of Coal and Monroe	2.50	2.75	2.25
District No. 5—Counties of Guernsey and Muskingum and Township of Warren in Belmont County	2.25	2.50	2.00
District No. 6—Counties of Holmes, Tuscarawas, Carroll, Coshocton, and Townships of Monroe, Franklin, Washington and Freeport in County of Harrison, and Townships of Washington and Yellow Creek in County of Columbiana, and Townships of Brush Creek, Saline, Springfield, Ross and Knox in County of Jefferson	2.50	2.75	2.25
District No. 7—Counties of Trumbull, Portage, Summit, Mahoning, Medina, Wayne and Stark, and County of Columbiana except Townships of Washington and Yellow Creek	3.00	3.25	2.85
District No. 8—County of Monroe, County of Belmont except Township of Warren, County of Harrison except Townships of Monroe, Franklin, Washington and Freeport, and County of Jefferson except Townships of Brush Creek, Saline, Ross, Knox and Springfield	1.90	2.15	1.90

To the above prices there may be added the 45c. allowance for wage increase if the producing companies are entitled to add such allowance under the President's Order of Oct. 27, 1917.

Lightless Nights Expected to Save Much Coal

The new "lightless" night order is expected to save much more coal than did the one of last year. In fact, all lighting and heating are to be reduced to a war basis. Every effort is to be made to reduce the fuel consumption in office buildings and apartment houses. Eugene C. Eppley, of Sioux City, Iowa, the president of the Hotel Men's Mutual Benefit Association, has been put in charge of the hotel section of the Conservation Bureau of the Fuel Administration. It is expected that a considerable saving of fuel will be effected in hotels by reducing the amount of heat and light used.

Curtails Coal Supply to Breweries

Only 50 per cent. of the average annual requirements of coal is to be furnished to breweries during the twelve months beginning July 1. The average is to be based on the consumption during 1915, 1916 and 1917. The restriction applies to the brewers of non-alcoholic cereal beverages as well as to those which contain alcohol. The regulation allows the operators of breweries to concentrate their brewing at one plant with the right to the same quantity of fuel they would have used had their plants been operated individually.

Margins Set for Run-of-Mine Coal

A separate classification for run-of-mine coal, from which a certain portion of lump has been screened, has been added to the price schedule by the Fuel Administrator. The price of this modified mine-run is not to exceed the Government price applicable for screens plus the following percentages of the margin between the price for mine-run and screening: Run-of-mine passed through 2-in. openings, 40 per cent. of such margin. Run-of-mine passed through 3-in. openings, 75 per cent. of such margin. Run-of-mine passed through 4-in. openings, 90 per cent. of such margin. Run-of-mine passed through 5-in. openings, 95 per cent. of such margin. Run-of-mine passed through 6-in. or larger openings shall take the applicable Government price for run-of-mine.

Dr. Garfield Would Tax Excess Coal Profits

Without expressing any belief as to the accuracy of the Federal Trade Commission's findings in regard to profits in the operation of coal mines, Dr. H. A. Garfield points out that most of the 1916 output was under contract at high prices before the putting into effect of the President's schedule. He admitted, of course, that the price had to be made high enough to meet the necessities of the high-cost mines in the immediate section of low-cost mines. The emergency, he said, made it necessary to stimulate production even if large profits were made by some operators.

Dr. Garfield said the plan of buying the Nation's entire output and selling it at a fixed price to the consumer would not be conducive to maximum production. He suggested that excessive profits could be reached by excess profits taxation, or the Government could buy all the coal, paying each mine a fair profit over its costs of production.

Weekly Production Statistics

Production figures for the week ended June 29 are as follows: Bituminous coal, 12,458,000 tons; anthracite forwardings, 41,641 cars; beehive coke, 604,000 tons; byproduct coke, 496,396 tons. With the exception of beehive coke, production in each case was greater than that of the week preceding.

Bituminous production shot up markedly during the week under review, being an increase of 3.8 per cent. over that of the week preceding, and 7.5 per cent. over that of the corresponding week of last year. In fact, the week's showing is second only to that of the week ended June 15, which surpassed all previous performances in the history of the coal industry in the United States.

The anthracite forwardings were 471 cars in excess of those for the week ended June 22, but still is less than the best performance made in recent weeks.

Shortage of yard labor continues to be by far the serious factor limiting beehive-coke production. For this reason, production during the week ended June 29 was 57,000 tons under that of the week ended June 15. Little difficulty would be experienced, it is believed, in maintaining production above 700,000 tons if the labor could be secured. The byproduct ovens are now operating at better than 90 per cent. of full-time capacity. Car shortage no longer is a factor, and fewer ovens were shut down for repair work. The principal gains were made at Pennsylvania and Alabama ovens.

The figures referred to in the foregoing are estimates made by C. E. Lesher, the geologist in charge of coal statistics for the United States Geological Survey.

New Prices on Coke and Breeze

New prices on coke and breeze have been announced as follows:

Gas coke, in districts where anthracite coal is not obtainable: Run-of-retorts, $5.50; run-of-retorts screened above ¾ in., $6; screened and sized about ¾ in., $6.50; screened and sized, between ½ and ¾ in., $4.50. The lowest published coke freight rates may be added to the foregoing prices.

Gas coke, in districts where anthracite coal is obtainable: Screened and sized above ¾ in., same price as established for stove anthracite in the same locality; run-of-retorts, screened about ¾ in., 25c. less than the price of stove anthracite; run-of-retorts not screened, 75c. less than the price of stove anthracite. The prices are to apply on less-than-carload shipments and on those delivered direct to consumers for household purposes. Coke sold for other purposes is to take the same price as gas coke in the localities where anthracite is not obtainable.

The maximum price for breeze is one-half that established for run-of-retort coke unscreened, made in gas retorts where such breeze is produced.

Coke made in beehive ovens, crushed, over ¾ in., 30c. may be added to the price for 72-hour selected foundry; prepared sizes, clean, dried, screened, under ¾ in., $1 less than blast-furnace coke made at beehive ovens where such coke is produced; breeze, one-half the price of blast-furnace coke.

Byproduct coke f.o.b. cars, over ¾ in., 50c. may be added to run-of-oven price. This is to include all prepared sizes of clean, hard coke over ¾ in. whether crushed or screened by hand or mechanically. Prepared sizes under ¾ in. $1 less than the price for run-of-oven. Breeze, one-half the price of run-of-oven.

Coke produced in Utah, smelting or furnace, $8.50; 72-hour selected foundry, $9.50.

Retailers Must File Coal Reports

Each retailer of coal in the United States must report to the Fuel Administration the amount of his coal receipts, his deliveries and his stock on hand. This plan has been in operation for some time in New England, and now it is to be extended throughout the country. For failure to comply with regulations in this regard, 750 retailers in New England recently were given five days in which to file their reports or have their supply cut off.

Railroad Administration Denies Liability for Coal Lost in Transit

The National Coal Association has taken issue with the stand taken by the Railroad Administration that it is not to be liable for losses of coal by theft when it is loaded in an open-top car or by falling off when it is loaded above the sides of the car. The Railroad Administration takes the position that open-top cars are furnished for the convenience of the shipper and the consignee, and that it should not be held responsible for the many claims which are made for losses in transit from such cars.

The National Coal Association takes the stand, in its representations to the authorities, that it is a dangerous precedent to establish in the minds of people that property being transported by the Government is unprotected by a Government agency. The ruling also is held to influence adversely the loading of cars as heavily as is possible. The association also takes issue with the contention that the open-top car is operated primarily for the convenience of the consignor and the consignees. Numerous examples are cited showing that the volume of coal carried would be reduced enormously if it had to be loaded in closed cars.

Prices Fixed for Charcoal

Prices have been fixed for charcoal by the Fuel Administration as follows: Lump in bulk, 20c. per bushel; lump in bags, 22c. per bushel; screenings in bags, 20c. per bushel. The prices apply on car lots sold to consumer or dealers for wagon delivery. Any commissions are to be paid to the vendors and shall not be added to the price. The bags are to be returnable.

Domestic Consumers to Be Rationed

So rapidly is the demand for coal increasing for war work, that it may be necessary to ration the domestic consumer this winter. Public announcement to this effect has been made by the Fuel Administrator. If it is necessary to apply a rationing system, the amount allowed will be as much as is found sufficient, after scientific investigation, to provide a temperature of 68 deg. This is to be based not on the consumption of last winter, but on the amount which will be required with every possible conservation.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The railroads are supplying the coal mines with more cars. But, given a little imagination, one does not need to be directly informed that coal cars are being more regularly delivered, for it could be deduced readily from the fact that the Fuel Administration has at last appointed a Production Division. So long as the railroads were wholly at fault, such a division was entirely unnecessary and would have been merely provocative of ill feeling. Distribution, therefore, received the undivided attention of Dr. Garfield. Now the burden shifts, and the Fuel Administration is found resting, at least partly, on the other foot. In fact there is a possibility that Dr. Garfield may after a while find himself wholly poised on that little used member.

That this is the case is attested also by the hullabaloo rising from all, or at least most, of the field. One wonders why there is such a loud recrimination, but we have heard the like before. When production is demanded there is sure to be altercation, every one making excuse and no one able to give a reason.

No Reasons Exist for Short-Time Service

The miner is trying to explain that the reason he does not stay underground eight hours is because of this and that. But really the only real reason why he leaves the mine early is because he is unwilling to stay there for the specified eight hours. There is nothing to compel him to come out sooner, except his wish to do so. He should stay underground till the mine closes down. He has no right to say that he will go home because his place is not in shape or the turn is slow. He should persevere the full eight hours. The soldier does not leave the trench because no Germans are stirring and because there is nothing for him to do. He waits till there is something to be done and is there to do it. If he isn't there, he is a deserter and in great need of executive clemency.

Last week we recorded the Alabama comments on the attempts to make the slacker work eight hours. This week the same word comes from Illinois, and the anthracite mine workers are in like manner trying to place the blame on the operators. Of course, the operator is partly to blame, but the miner cannot defend himself by blackening the operator. The miner should stay in his full eight hours, slow or fast turn, whether the undercut is delayed or completed; whether there are road wrecks or the cars come regularly; whether there is water or the road is dry. The mine worker has his duty to perform, and only when he has done it can he begin to load blame on his employer.

Operator Needs Advice as Much as Consumer

But the operator needs quite a little advice, counsel and condemnation. We have seen how in Missouri he has been getting those necessary admonitions from the Fuel Administrator. Between ourselves it seems that the operator who produces the coal needs instruction and pressure just as much as the consumer who burns it. And he is going to get it. He cannot go on inefficiently operating with inadequate equipment and ill-handled plant. If he does not amend he will be shut down by the Administration. At least the action in Pennsylvania in regard to high-cost mines seems to foreshadow that. He is even more likely to be penalized for bad management and consequent inefficient operation than for difficult conditions and consequent high wage rates, for the condition of the coal seam is beyond his control whereas good management really is not.

The disputes now raging are natural, and they will do some good if both parties remember, as Kennamer, Farrington and the presidents in the anthracite region appear to do, that the other fellow's failings don't excuse yours. A man must stand or fall on his own comings or shortcomings and not on the performances of others.

The operators' shortcomings are mostly hard to cure. The miner on rising in the morning may say with full intention, "I will stay in the mine till the last trip tonight," but the operator who on rising says, "I will put 100 more mine cars and two more locomotives on the tracks today, for my men need them," is a fit candidate for a lunatic asylum unless he placed his orders for this equipment some months earlier. The operator's shortcomings, it will be seen, take time, money and the coöperation of other parties as well as mere volition.

Day Laborers More Wanting Than Equipment

Nor is it otherwise with the supply of labor needed to comply with Farrington's demand that every working place be in standard condition. In fact the equipment supply is in some ways in better shape than labor supply. An old mine that is shorthanded, unless repairs have not been kept up and headings have not been extended, is equipped for the tonnage it had before it became shorthanded and therefore should not be in a bad case.

The new mines, especially those run by newly arrived operators without much capital, are the chief offenders in the matter of short equipment. Without capital, without experience and without any claim on the manufacturer such as is derived from past purchases, the new operators are unable to equip their mines properly. Theirs is a nightmare of makeshifts from morn to dewy eve.

While some mines suffer but little for lack of equipment, all mines suffer severely from the lack of labor. If repairmen, water bailers, tracklayers, roadmen, timbermen and rockmen are to be kept available for every job, to be done the moment the work is called for, the roustabout labor supply around the mines must be immensely increased. It will probably pay to supply that labor if the miner will work whenever he has a chance. If he will pitch in as soon as the repairs are made, it will be an economy to accommodate him, if indeed, with our environing labor conditions, that accommodation be possible. But if an omission of the operator that will delay the miner an hour is going to send the miner home for all eight hours, it will not pay the operator or the nation to keep a repair force of this kind in comparative idleness ready to be called into action like the bellboy at the hotel when the clerk cries "Front."

Mine Often Suffers from Under-Supervision

All this argument does not grant the operator a right to deny that the mine is too often a place where under-supervision and under-provision run riot. Too often the foreman waits for complaints when the thing complained of should have had the benefit of his early investigation, knowledge and action. If the miner will work his derndest, there will be profit to the operator and advantage to the nation in providing the miner with the opportunity to put out maximum production, this opportunity being given by a more adequate repair force and a minute and provisional supervision. However, the operator is justified in saying, Where are these additional men to be secured? Mine management, like management in other business, usually retrenches first on repairs, supervision and maintenance. No greater folly can be committed. A bad accident that one man's work might have averted may lay off a hundred men and damage equipment so that the next day's run will be below normal. An hour or two of bailing or ditching, or a day of tracklaying done in time, may give every dayman 25 to 100 tons more output to handle. As the operator has learned in his long idleness, transportation for the material

produced is as important, or more important, than production itself if the tonnage sought is to be obtained.

In the anthracite region, where the hounding of the slacker has been hottest, the defense has developed new forms of recrimination. One notes how wholly different they are to those in the bituminous region. Little talk of slow turn, or flooded places, or time wasted on labor disputes, or loss of time from lack of timber—none of these stock grievances are presented. Probably the anthracite region is better equipped and more effectively supervised than the bituminous region. The anthracite region has almost no new mines and relatively few old mines reopened. It has less miners to tax and test what equipment has been provided. The slacker, therefore, has less to say as to the assistance afforded him, but nevertheless he is busy saying something.

Unsubstantiated Charges in Anthracite Region

Note that the recrimination does not come from the union, but from other less well-informed or less responsible sources. Kennamer and Farrington, in Alabama and Illinois respectively, are meeting criticism with criticism because they have a case. But in the anthracite region the union issues nothing under its name, probably because the criticisms against the operator are less generally justified. The anthracite operator has the equipment, except perhaps miners' dwellings, and he is giving his men favorable conditions for output.

Now what are the criticisms of the mineworkers? In the Shamokin district they say the operators are keeping the flat workings idle because they will not give the men the rate of wages they demand for working in the flat coal. If that action did not lay off any men the charge would be negligible, but the declaration is that there are scores of anthracite men idle in the lower anthracite fields. It is also said that the Delaware & Hudson Co. has laid off 500 men.

These broad statements of a deliberate intention to create an appearance of labor shortage could be quite easily investigated by any of the parties interested, Major-General E. H. Crowder, Dr. H. A. Garfield or William B. Wilson. Doubtless the charge would be completely disproved as soon as inquiry was set on foot by competent authority. So far no responsible organization has given the charge currency. The mine workers also make the claim that the companies want to keep all the men at home who have small families, so that in case of an accident large compensation will not have to be paid to a numerous progeny.

Miners Who Are Only Two-Thirds Citizens

But all these stories of corporational depravity of which we are now hearing on little or no authority are balanced by reports said to be made by inspectors of the Department of Labor, now making a labor survey of eastern Pennsylvania, the region in which the anthracite fields are located. The Labor Department inspectors are said to have discovered that many of the employees work only two-thirds of full time.

Supervising Inspector Walter McNichols is reported to have said that the time lost by miners is one reason why production has decreased. "Flimsy excuses are being offered for laying off," according to McNichols. "I believe that there is enough available labor in the district to get out the coal if it is properly distributed and if every man will do his share and work every day he is able to."

While men are working short time because they do not have to work full time every day or six days a week to provide for a living, the mine workers are asking for a wage scale providing higher wages. At the meeting of the Tridistrict board held July 7 and composed of officials of districts Nos. 1, 7 and 9, comprising the whole anthracite region, the board recommended that the matter of an increased wage be taken up with the coal operators and the Fuel Administration.

Almost everywhere the mines were idle for Independence Day, but on July 5 the men almost without exception returned promptly to work. The two mines of the United Coal Corporation, located at Jerome, Penn., and the mine of the same company at Naomi, Penn., worked on July 4 and produced from two-thirds to three-quarters of a full day's output. The mines of this company had on July 5 a larger turnout and output than is customary on the day following Independence Day.

Give the Front Seat to Men of Jewell Ridge

These men did so well it seems almost unkind to cap their patriotism with an even better performance. The mine workers of the Jewell Ridge Coal Corporation, of Jewell Ridge, Va., near Tazewell, worked on July 4, giving their output to the American Red Cross. The company will give its gross profits and overhead expense for that day to the same end. The owners of the mine proposed a Big Fourth of July celebration with a brass band, but the mine workers opposed the waste of time and money and declared for the operation of the mines. There is a purpose and a vision in the mine workers of Jewell Ridge. The country may well be proud that it has men who will make such sacrifices even without the excitement of a "Drive."

In the Fairmont region of West Virginia the progress of unionism still continues. W. M. Rogers, the president of the West Virginia Labor Federation, claims that 15,000 mine workers have been organized and that by Christmas there will be 27,000 in the union. In West Virginia there will then be a total membership of 44,000 out of a possible 78,000; thus roughly 56 per cent. of all workers in the coal mines of the state will be affiliated with the union. As the Pocahontas region is still nonunion, the organization in the parts of West Virginia that are unionized will then be quite dense, more so than in many states which West Virginia used to regard as in bondage to the union. But then perhaps W. M. Rogers is an optimist and has no sure basis for his prognostications.

All companies in West Virginia employing 20 men or more are required under penalties set forth in Section 6, Chap. 4, of the acts of the Special Extraordinary Session of 1917, West Virginia State Legislature, to report at the end of each week to the Secretary of the State Council of Defense the names of all those persons carried on their rolls who have not been actively engaged at some useful occupation for as many as 36 hours during the preceding week, as provided by the Vagrancy Act. The corporations thus instructed are requested to furnish the Council with the names and addresses of any other "violators of the Vagrancy Law who habitually and without reason work less than full time at their respective employments."

In St. Louis County, Missouri, Fuel Administrator Hodgson says that despite large wages drivers of coal wagons cannot be secured. Half the teams are idle, though the companies have hundreds of orders that they cannot deliver.

Mexicans Must Not Oust American Miners

Some Arizona corporations mining coal doubtless outside that state, presumably in New Mexico, were refused on July 6 the privilege of importing Mexican labor to work their coal mines. Mexicans will be admitted only for farming, railroad labor and, we are told, lignite mining. In the south of Texas is a large body of cannel, with lignite quite close nearby, and this cannel is probably included under lignite in the classification of the Department of Labor, for the basis of the order of the emigration officials is really not the character of the industry but the question whether on the entrance of Mexicans into that industry they will compete with American labor.

Putting Labor To Work Where Wanted

The War Labor Policies Board announced on July 7 that community labor boards would be established. The boards will have general jurisdiction over the recruiting and distribution of labor and will act in coöperation with the United States Employment Service of the Department of Labor.

The boards will enforce in each industrial region the policies of the United States Employment Service. Just as in the military service, the draft boards, under the

Selective Conscription Act, mobilize the army of the conscripted, so in industrial service the local boards now to be formed will mobilize the army of producers. In order that the boards may adequately represent the communities in which they operate, the employees and employers will each select representatives.

Community labor boards consisting of one representative of employers and one representative of employees with a third representative of the United States Employment Service are now being established wherever the industrial situation justifies it. While the final appointment of the membership of boards will be made by the state directors of the United States Public Service Reserve, the nomination of the representatives of industrial management will be requested from chambers of commerce and manufacturers' associations, while the state and city federations of labor will be asked to name the labor members. The third member of each board, to whom will fall the honor of presiding, will be in every case a representative of the United States Employment Service.

The community labor boards will not only assist in providing labor when there is a call for it, but will decide upon the relative needs of the different industrial establishments in the territory over which they have supervision and where the supply is less than the demand they will prorate the existing reserve.

Miners Quarrel and Quit Work

One hundred and fifty miners employed at the Tuxhorn mine, Springfield, Ill., returned to work Monday after having refused to work for several days on account of a racial clash between negroes and foreigners. The negroes predominate in the union and for five years Robert Jackson, a negro, has been the president of the local. There was an election recently and Jackson was reëlected. White members of the union complained that the election was irregular.

Later the factions almost got into a battle, and several were arrested for carrying concealed weapons. United States District Attorney Knotts took a hand. He talked to the leaders of the factions and the men agreed to return to work Monday if he would be at the mine to prevent trouble. He was there accompanied by a deputy United States marshal and work was resumed without trouble. The controversy is to be referred to the state officials of the union.

A committee of the union, in a public statement, blame the trouble on a socialist who has agitated opposition to Jackson among the foreigners. Charges which were filed by him against Jackson were dismissed by the district board of the United Mine Workers as without merit. Jackson, according to the statement, has been zealous in the interest of Liberty Bonds and the Red Cross.

Last week on pp. 24 and 25 under caption "In Illinois, Union Backs Minerettes" *Coal Age* referred to the strike at the Chicago, Wilmington & Franklin Coal Co.'s mine at Thayer, Ill. Apparently the manager of the mine, John Marland, denies the statement that the fuss originated in the refusal of the company to hire a Virden woman, the wife of a soldier, as weighmaster at the mine.

He puts the blame on a personal row between Riva and an official of the United Mine Workers of America. Whatever was the real cause, 600 men were rendered idle for two weeks. On June 28, however, they voted to return to work pending a settlement. Apparently the surface men were the persons most aggressive in declaring and maintaining a strike.

Mine Workers "Pass the Buck."

Frank Farrington, president of the Illinois District, No. 12, has written to the officers and members of the union directing their attention to the fact that by reason of a recent order issued by the United States Fuel Administration, mine operators are required to make a daily labor report to the administration, detailing the number of men employed, the number in the mine on the day of report, the potential working hours, the hours actually worked, the hours lost and the percentage of the potential time lost. There is reason to believe, he says, that although designed primarily to increase coal production, these reports will be used to help search out idlers and to assist in the enforcement of the "work or fight" rule.

"The report requested by the Fuel Administration will," he says, "create an erroneous impression and one that is apt to do great injustice and injury to the miners. And it will do it in this way: The mine owner is required only to show the aggregate amount of working time lost by the miners and is not obliged to show the reason why it was lost. Many men may be idle or have to return home after having reported for work, on account of having no coal cut or by reason of squeezes, fires, gas, water, falls, lack of timber or track, or because of disabled machinery necessary to serve their particular section of the mine, or for many other reasons over which they have no control.

"A report will be made merely stating that they have been idle all or part of a day and they will accordingly be classed as idlers or industrial slackers. Therefore, it devolves upon us to devise some measure of self protection and to that end I suggest that our men insist that their working places be kept in a workable condition, insofar as the mine management is responsible for them. Where men are prevented from working eight hours, as is required by our joint agreement, the cause of their inability to work the specified time should be immediately reported to the mine management."

Farrington declares that local rules which are in violation of the joint agreement and which restrict the output of coal must be abolished unless failure to do so can be justified in the eyes of the boys "over there" and in the eyes of those who have given them up to go "over there." Every member of the union, he says, should and must work eight hours a day and six days per week when given the opportunity to do so. So serious and solemn is the obligation, he says, that he doubts if even a stoppage of work to say farewell to conscripts leaving for military service can be justified unless only the relatives and very close friends and intimate friends of those who are leaving quit work for that purpose.

[Our correspondent at Washington informs us that the Fuel Administration is not requiring a report such as is here described —Editor.]

Department to Help Only War Industry

The Department of Labor authorizes the following announcement:

Only manufacturers engaged on war contracts and employing over 100 workers will be required to obtain their unskilled labor through the United States Employment Service of the Department of Labor by the ruling which goes into effect Aug. 1. So much uncertainty as to the scope of the new labor-recruiting policy has been shown in inquiries received by the Department of Labor from employers not engaged in war work that the Department today announced the exceptions under which private recruiting of labor may still be carried on:

"Nonwar industries must not offer superior inducements, prevent the transfer of workers urgently needed for war production, nor in any way attempt to compete with the government for labor.

"The following five classes of labor need not at the present time be recruited through the United States Employment Service, although of course the machinery of the Employment Service is available to all employers needing these classes. (1) Labor which is not directly or indirectly solicited. (2) Labor for railroads (except in so far as the Director General of Railroads has already or may in the future require that recruiting shall be exclusively through the United States Employment Service.) (3). Farm labor—to be recruited in accordance with existing arrangement with the Department of Agriculture. (4) Labor for nonwar work. (5) Labor for establishments the maximum force of which (including the additional number recruited) does not exceed one hundred employees."

EDITORIALS

Increased Postage Rates

NEW rates of postage on magazines became effective July 1. These increases are material, particularly at distances of more than 300 miles from the place of publication. The obvious step would be to raise the subscription rates in distant zones to cover the added postage.

For the present, however, the publishers of *Coal Age* have decided not to increase the subscription price, trusting that in the interests of national unity Congress will before long repeal the zone law and revert to the universal flat-rate system. Zone rates on magazines obtained in this country before the Civil War, but were abolished in 1863.

The publishers hope that they will not find it necessary to increase the cost of the paper to its readers.

Vein, Seam, Horizon, Blanket or Bed?

COMMON PARLANCE in the anthracite region describes the coal deposits as "veins." In the rest of the country this usage is regarded as grossly incorrect, and there is no question but a strict use of words would forbid us to name a deposit extending in all directions over a plane after anything as narrow and ramifying as a blood vessel, even though early in the history of coal mining coal was believed to worm its way through the rocks somewhat like a vein of gold-bearing material.

But the purists of the bituminous region do not better conditions much by using the word "seam," for the seam of one's coat is narrow also. In fact, neither "vein" nor "seam" expresses the meaning as well as "bed." It may be objected that a bed is always level, but then the coal bed was likewise level when deposited; and a folding bed does not cease to be a bed after it is upended. If, then, we would be accurate, we must term the coal deposit either a "stratum" or a "bed."

Where the coal is in a reasonably horizontal plane, the word "horizon" might be a fair substitute for the names now in use, but that expression is usually applied as including far more than a single bed, and, moreover, horizontality is usually one of the few qualities that a geological horizon is unable to preserve. For this reason the word is historically correct perhaps, but nevertheless misleading.

Furthermore, "horizon" is one of those rare locative substantives. It does not name the bed so much as express the locative quality. "Horizon" bears to "bed" the same relation that "location" bears to "lot." We talk of a pleasing location, but not of a location measuring 50 x 100 ft. So we talk of a coal horizon, but the accepted diction forbids us to say that a certain coal horizon is 3 ft. thick. "Horizon" is purely a locative word, expressing the relation between one bed and those above and below it.

One unusual word perhaps describes a coal bed better than any other. The idea of a "bed" in the mind of an ordinary person is of something about one-twentieth of a diameter thick, for the upholstery of a bed is about one-twentieth of its longest dimension. A blanket, on the other hand, is many times as long and wide as it is thick. The word accordingly helps to visualize the broad extent of a coal bed. Moreover, a blanket is readily and usually folded, thus recalling the nature of a coal stratum.

In fact, if one would convey to the man who does not understand the occurrence of coal and the true nature of that occurrence, the use of the word "blanket" will aid better than any other to make it clear. However, here again we are troubled, for our metal-mining friends will have it that a blanket deposit is one made after the strata in which it is found have long ago solidified.

If, therefore, one would avoid a controversy, the word "bed" or "stratum" had better be used exclusively, and the latter word, however accurate, also eschewed if the speaker or writer would prefer not to be thought pedantic. But after all, why be so careful in diction as to exclude "vein" and "seam"? They are based on imperfect analogies, it is true, but are not all analogies more or less incorrect and inadequate? Long use justifies a continuance of the customary word and skillfully hides the false ideas which gave currency to the ill chosen terminology.

He Who Saves Serves

WE PRINT a poster this week on the buying of "man-size bonds." The nation expects of the soldier man-size service, and of every man, woman and child man-size saving. If we ceased to buy so many trinkets and furniture, and no longer hustled around to entertainment that doubtfully entertains; if we embraced the "simple life" that Charles Wagner so eloquently advocated, it would be possible for us all to save more than we do. Large production and limited spending will put our civilian population on a war basis, and what reason is there that we should not all be conscripted for some kind of service?

No one knows how much we shall be asked to subscribe to the Fourth Liberty Loan. The poster has assumed eight billion dollars as the amount required; it may be more, it may be less. But if it is eight billion, then each earner has $200 to contribute to that fund. If we pay the subscription at the rate of $4 per week, we shall be a year meeting the liability. Why not hurry matters along by clearing up the payment in six months, so that we shall meet the next loan with a clean slate and perhaps with a few dollars of savings? A good way is to pay 10 per cent. of the undertaking every two weeks. The loan is then completely cleared in five months, and the subscriber is ready to pay a small amount down when the next loan comes along.

The past has seldom done due honor to the saver—the man who expends less than his labor produces. Not that monuments have not been erected to him. No form of patriotism has been more conspicuously monumented. But on these monuments there is usually no name. Still more seldom is a sentence of commemoration or honor written large upon them. But monuments they are, though they honor the unknown. They are memorials of the savers. They are the railroads, the bridges, the factories, the farms, the houses, the mines, the dockyards and the machinery—the implements by which are made possible easy and highly productive toil. It is the possession of these implements that has made possible big product for normal labor, and has consequently enabled the workingman to buy more for his day's work.

If we spent all we made, we would have none of these implements of economic production. They exist alone as the balance between receipts and outgo. They are the product of the abstemiousness of the human race. We hear too much about the miserly. It is true that there is at times a thrift that is not a virtue, but without thrift the world would be a wilderness. What we have and what we are is the outcome of our well-ordered thrift. Let those who brag they have never saved a cent remember that it is despite them, and not by them, that the world has reached its present stage of well-being.

Canal Route for Illinois Coal

DURING the 1917 session of the Illinois legislature, a bill was introduced outlining a plan to open up the Big Muddy River and convert it into a canal to barge coal to the Mississippi. A bill along these lines passed the Illinois senate in which an appropriation of $1,000,000 was made for the purpose noted. It undoubtedly would have passed the House, but at this point the governor of the state requested that further action be deferred on account of conditions such as exist today. In time it is expected that the bill will go before Congress.

This project includes dredging and straightening the Big Muddy River—in other words, to canalize it from Plumfield, or a little above, in Franklin County, to the Mississippi River. Locks are called for along the lower stretches of the river, and a new channel is planned from Sand Ridge to the mouth in Jackson County, some 50 miles above the junction of the Ohio and Mississippi Rivers. The United States Geological Survey has been over the Big Muddy territory, and both Federal and state engineers have pronounced the project entirely feasible.

Even if the Big Muddy project had gone through, it would have had to give way to the priority claims of a similar scheme with reference to the Illinois River, which is being deepened from its mouth to a point where the Chicago drainage canal empties into it. The southern Illinois coal field is exceedingly active, especially that portion tributary to the Big Muddy, and water transportation in this section would materially relieve the railroads. The demands for the Pittsburgh coals are so heavy at home, even if it were not for the zoning requirements, that other coals would have naturally tended to replace them. Franklin County particularly has stepped in and filled orders with coal which has done the work formerly claimed as the special field for western Pennsylvania fuel. Screenings, the great handicap to production at many Illinois plants, are especially applicable to the needs of cement and brick plants among other uses, and competitive transportation might act as an incentive to greater activity on the part of the railroads of the state, as regards the prompt handling of this grade of fuel, than has been shown in the past.

The initiative in matters similar to the Illinois and Big Muddy River projects generally originates locally, and such projects have sometimes been associated with "pork barrel" scheming during the period when the claims of the bill for recognition were being presented by congressmen at Washington. Many worthy projects have thus suffered changes due to political manipulation. A systematic plan covering the whole country has been urged many times to be handled by an Inland Waterways Commission, and the Big Muddy and similar projects might receive earlier and freer development under such guidance.

Correct Sphere of the "Country Bank"

BEFORE the war, we rarely, if ever, heard of the "wagon mine," much less of the "team-track mine"—not that these institutions were unknown. Whenever industry booms and the coal industry suffers from lack of cars, owing to the appropriation of coal cars to other uses, the wagon mine has loomed up large and made unhappy times for the railroads.

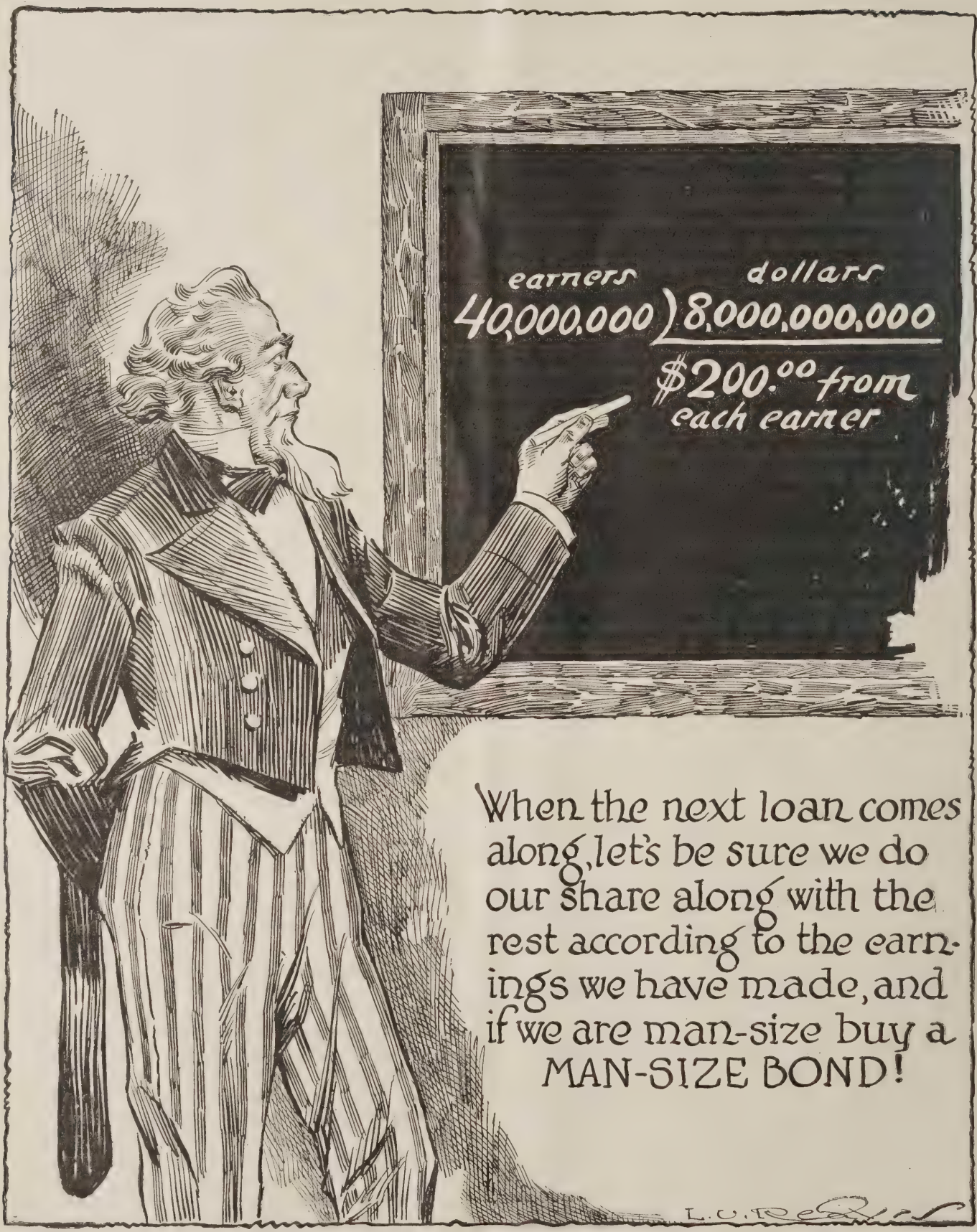
But heretofore it has been known as the "country bank." It took this, the greatest of all coal shortages, to give a new name—two new names in fact—to these mines in miniature. Country bank seemed too rustic an appellation for such a profitable and expanding venture.

The country bank, however, has had an honorable past, which it should not disguise under a new name; it has supplied coal in the winter directly to the purchaser, and so has saved railroad equipment; it has enabled the mines to meet the peak loads of the winter; it has given cheap coal to the country dwellers, and given it without the inconveniences of long storage; it has furnished winter work to the farmer and his team; it has furnished coal for the burning of lime, thus providing for the ready fertilization of the farmers' fields.

The country bank has also served as a school of apprenticeship to the regular coal business. The less fortunate farmers were digging coal and selling it long before the regular coal mine entered the territory, and even after its entrance, and these farmers later entered the regular mines. The wagon mine was also the grand prospector for new coal lands. It alone gave a broadly correct idea of the value of the coal territory, of its "wants," its dips and its coal thickness and quality.

The country bank has done, and will continue to do, a good work. With motor trucks it will probably supply coal over larger areas than ever before, and at a lower price. The burden imposed on the farmer in buying a motor truck, such as all should have for their regular agricultural work, will be lightened by the assurance that the purchaser will thereby be enabled during the winter to enter the coal trade under favorable conditions.

A Problem in Division



One Liberty Bond in every issue is like one rifle shot in every battle—better than nothing, of course, but sure not to end in victory.

The soldier uses all his cartridges and puts them where they will count. Are you doing the same with your dollars?

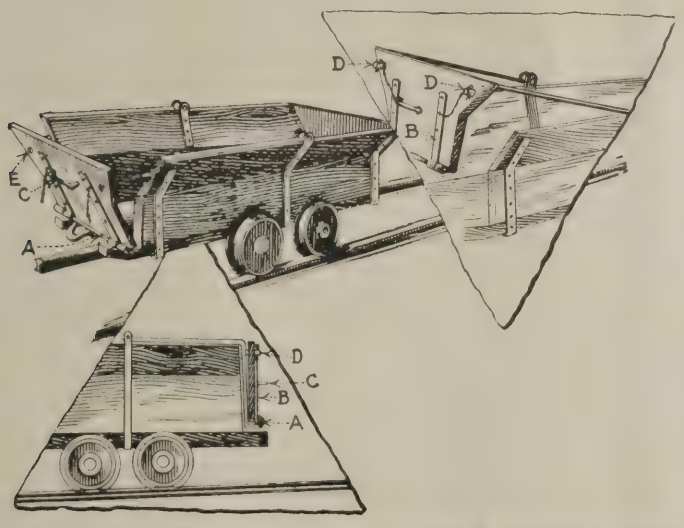
DISCUSSION BY READERS

Mine-Car Door

Letter No. 4—Kindly permit me to submit my solution to the inquiry of V. C. Robbins, *Coal Age*, June 1, p. 1031, together with a rough sketch illustrating the manner in which I think the car we are using, generally, with the self-dumping cage, can be altered so as to permit of its being loaded conveniently in a thin seam of coal, by dropping the end-gate, as suggested by Mr. Robbins.

The sketch shows the end-gate of this car mounted on long hinges made of bar iron and bent at right angles so as to permit the long arm of the hinge to extend over the top of the car, at each side, the hinge being pivoted at the center of the car and the shorter arm being bolted firmly to the end-gate. This arrangement permits the door to be raised automatically by the door-lifter, at the top of the shaft, coming in contact with the iron lug *C*, which is shown bolted to the end-gate at its center.

My suggestion is, that, in order to enable the end-gate or door to be dropped to the floor and permit coal



MINE CAR FOR THIN COAL AND SELF-DUMPING CAGE

to be loaded into the car, in a thin coal seam, the door should be mounted on hinges *B* turning on an iron rod *A* supported by the two bent hinges previously mentioned. Instead of the door being bolted to the two bent hinges, as has been described, it is now made to swing freely on the iron rod supported by them. When the car has been nearly loaded, the door is raised and made fast to the bent hinges by means of a strong bolt *D* fastened to each hinge. Each bolt passes through a hole *E*, in the door, and cotter-pins hold the door in position, as shown in detail in the figure.

I believe this arrangement will allow the car to be loaded in the manner described by Mr. Robbins, and that when loaded and hoisted in the shaft on a self-dumping cage, the door will be lifted automatically in the same way, as when it is bolted firmly to the bent hinges, as in the car now in use in this state.

Scammon, Kan. ROBERT LAWS.

Care of Coal Cutters

Letter No. 1—I was pleased, in reading the article on the "Care and Management of Coal Cutters," *Coal Age*, June 15, p. 1108, to note the many good points brought out and which are worthy of the careful attention of all operators and machine runners.

It seems to be the idea of the average machineman, at least here in Illinois, that all that he is required to do is to cut the coal. He does not consider that he is the least responsible for the care and proper use of the machine he is running. If a breakdown occurs, he at once calls on the repair man to remedy the trouble, while he idly awaits his coming. In most cases, the breakdown is due to the man's abuse of his machine. He either does not know or does not care to use ordinary precautions to prevent the mishap.

Some time ago I worked in a mine in the southern part of this state where only Sullivan short-wall machines were used. At that time, I was loading coal and working extra on machines. It was almost impossible to get eight hours' work out of any machine in the mine, owing to the mistreatment the machines received. The company had changed machine bosses so often that the machine runners did about as they pleased, until a boss was found who had worked formerly for the Sullivan Machine Co., in the capacity of demonstrator.

COMMON ABUSE OF COAL-CUTTING MACHINES

As an example of the abuse of the machines, let me cite a single instance where a machine runner, going from one place to another, ran past the switch. Seeing his mistake he promptly shut off the current, threw the reverse lever over, and again turned on the current while the armature was running at a high rate of speed. This was a common practice of machine runners, who were in the habit of "plugging" their machines in this manner.

On taking charge, the first step of the new man was to lay down a set of rules and give notice that a severe penalty would be imposed on anyone violating the rules. This put an end to most of the switch trouble. The new man kept a separate expense account for each runner he employed. If the account ran too high he moved the man to another job and put another man in his place. It was not long before a great change was observed and the management could depend on getting a full day's work out of each machine, barring unavoidable accidents.

In addition to his supervision of the men, the new boss studied carefully the nature of the coal and experimented to find the kind of bit that would do the best

work. He found that the old pick-points were not adapted to the work, as they cored badly. In their place he adopted a chisel bit and got better results.

The man used his head and educated his runners to do the same, and it was not long before there was a vast improvement in the machinework in that mine. Some men he found whom he could educate, while others he was obliged to change, with the result that he soon had as competent a set of men as could be found in any mine in the state.

For a considerable period the electric current at this mine was particularly poor. The new man investigated this matter also and made alterations in the wiring and bonding of rails. The result was such an improvement that it was found unnecessary to get another generator, as the company had contemplated. On my last visit to this mine, I was told that if one generator gave out at any time, it was possible to continue work with the smaller generator, until the larger machine could be repaired. Under the old state of affairs, this would have been impossible.

All of these improvements the man has accomplished in about twenty months. In that time, he has saved the company a year's salary, in the repair of machinery, by picking out of the scrap heap parts that could be used again after being worked over. My belief is that if all machine bosses were first-class, competent men and would lay down rules to guide the men in their charge, the result would be a great surprise to the company who employed them and the cutting down of the expense of operating.

Like the man I have mentioned, a machineboss should have had previous experience and understand thoroughly the difficulties to be encountered in cutting coal and the abuses that the machine runners are prone to inflict on their machines. MACHINE RUNNER.

Nashville, Ill.

Selecting Mine Foremen

Letter No. 1—I have been an interested reader of H. E. Gray's letter, *Coal Age*, June 1, p. 1030, and was particularly impressed with his description of the kind of man some operators would select to take charge of their work.

The reference made to the choice of "a young man who has the pep, push, vigor and vim to make things go," and the suggestion that if things go wrong the only thing to be done then is to get a new man, caused me to wonder who the next man would be for the job, and whether the choice would fall on the same type of young man who has the required push and who can, no doubt, make things go; or whether the lesson taught by the failure of such a one would cause the management to look for an older man who has the necessary experience and qualifications to insure success.

There is no question but that older men holding positions as mine foremen frequently fear that young men working under them will climb into their place. With this fear in their hearts, they watch every opportunity to discourage their efforts and work. This is liable to occur when the man in charge has neither the judgment nor qualifications that fit him for the position he holds. Recognizing the ability and ambition of the younger man, the temptation is strong to put every impediment in his way. I do not mean to say that this is the disposition of mine foremen in general, and am glad to state that it is the exception rather than the rule.

Because a man is older is no proof that he is better qualified to fill a responsible position than a younger man, but the test is in the qualifications which each may possess. An instance that came under my observation and which illustrates this point is that of a mine foreman who was employed by a large company. This man was 45 years of age and had plenty of pep, push, vigor and vim. He certainly made things go, but I am sorry to say they did not go right, and the company were obliged to seek another man for the place. The one then chosen was a young man, but he had the qualifications that insured his success, and from that time things moved smoothly at the mine.

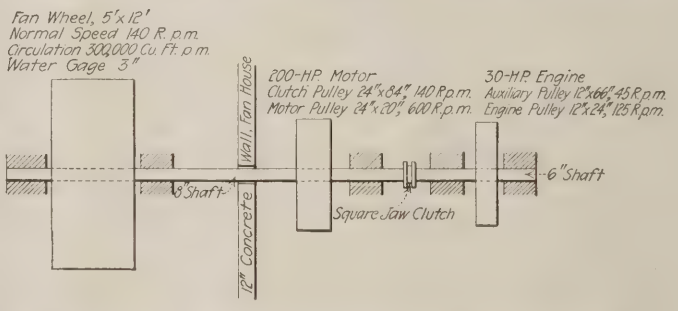
In closing, let me say that favoritism should be set aside entirely in the choice of men for responsible positions. The choice should depend on qualifications and fitness for the position, whether the man be young or old. Only in this way can results be obtained. The frequent change of mine foremen mentioned by Mr. Gray, is, in my opinion, a great mistake. Change should only be made when things are going wrong and it is unquestionably the man's lack of qualifications, in this case, that is to blame.

Sugarloaf, Penn. JOSEPH LAWRENCE.

Auxiliary Power To Drive Fan

Letter No. 1—Referring to the inquiry, *Coal Age*, June 22, p. 1173, relating to the installation of an auxiliary engine to be used to drive the mine fan, in case of emergency, permit me to give my own experience in respect to the same problem encountered in the development of a large mine.

After a thorough investigation of gasoline engines and the storage-battery problem, I concluded to use a



SHOWING DETAILS OF SHAFTING FOR MOTOR AND ENGINE DRIVE

steam engine as an auxiliary drive, by installing, at the wash house, a boiler of sufficient capacity to drive the fan.

In the case presented in this inquiry where a 75-hp. motor is used to drive the fan under full load, an engine developing 10 or 15 hp. would, in my opinion, be sufficient to create the necessary ventilation to keep the air current moving, assuming that when the power is cut off the mine ceases to operate, and the only object of maintaining the ventilation is for the safety of the mine.

The installation to which I refer here is illustrated in the accompanying figure, which shows a clutch pulley

driven by a 200-hp. motor. The engine drive is disconnected by a positive square-jaw clutch. In the ordinary method of operation, the clutch pulley is thrown in and the short shaft, which carries the engine-drive pulley stands still under a tight belt. The moment the electric power is thrown off, or fails, the clutch on the clutch pulley is disengaged, the jaw clutch thrown in, and the engine started.

In this particular instance, a boiler of 150-hp. capacity is installed in the wash house and banked with 75 or 80 lb. of steam, which is more than sufficient to operate the engine, and drive the fan at a speed of 45 r.p.m., which will produce about 70,000 cu.ft. of air per minute, the normal speed of the fan being 140 r.p.m. If only low-pressure steam is available, the size of the engine has to be correspondingly increased; but it is considered far more reliable to depend on a steam engine than to rely on an internal-combustion engine, especially since the engines now-a-days are built for lower-grade fuel and require from 3 to 5 min., under the most favorable circumstances, for starting.

CARL SCHOLZ,
Chicago, Ill. General Manager, Valier Coal Co.

Straightening Brittle Mine Rails

Letter No. 2—Relative to the inquiry of "Doubtful," *Coal Age*, June 29, p. 1213, I, too, have been eagerly scanning subsequent pages in the hope of learning the truth of the former correspondent's contention that brittle rails can be straightened without being annealed by heat or taken out of the mine. Perhaps our friend has discovered that he has something valuable up his sleeve, and is now unwilling to give out the information.

It occurs to me that it may be possible, through the application of electricity, to anneal the iron in some manner, since the electric return acts upon the rails to make them brittle. I have had some experience straightening brittle rails or rails that have been subject for some time to the action of the electrical return; and I am satisfied that the difficulty of straightening these rails is often greatly magnified through prejudice.

In straightening several tons of bent rails, weighing from 16 to 35 lb. per yd., which had been subject to long continuous use on main haulage roads and for gathering cars at the face, I have lost very little through breakage of the rails. When having occasion to straightening rails of this character I have been told, in quite a contemptuous manner, that "nine out of every ten will break," while the result showed that the reverse was nearer the truth, and perhaps one in ten would be broken.

Of course, 30 and 35-lb. iron breaks more easily than lighter rails. It would be even more difficult to straighten rails above 35 pounds in weight; but I believe that, in the average mine, there is not the same occasion to straighten the heavier rails, because they have been subject to such severe usage on heavy hauls and are so badly worn that they are seldom fit for further use.

On the other hand, it does seem quite a difficult feat to bend straight rails that have been rendered brittle through electrical action; as, for instance, where it is desired to lay a switch off an electric-locomotive haulage. But, even then, I have had little trouble from breakage in bending such rails. One should, however, be very careful in straightening rails that undue strain may not be applied at certain points in the curve. Take the precaution to move the bender after every three or four turns, so as to insure a more uniform stress throughout the length of the rail and give time for adjustment.

Thomas, W. Va. TRACKMAN

Interpreting Mining Laws

Letter No. 6—It is not surprising that we still hear the question asked, "What is the meaning of the word 'miner,' as used in the Anthracite Mine Law of Pennsylvania, in reference to the nature of a man's employment in the mine, before he can receive a miner's certificate." Ii is well known that, for a long time, there has been much dissatisfaction in respect to the requirements of what is termed the "Miner's Certificate Law," and complaints are frequent.

Section 1 of the Act of July 15, 1897 reads as follows:

> Sec. 1. Be it enacted, &c., That hereafter no person whosoever shall be employed or engaged in the anthracite coal region of this Commonwealth, as a miner in any anthracite coal mine, without having obtained a certificate of competency and qualification so to do from the "Miners' Examining Board" of the proper district, and having been duly registered as herein provided.

The qualifications of applicants for miners' certificates are stated in Sec. 5 of the same Act which reads, in part, as follows:

> All persons applying for a certificate of competency, or to entitle them to be employed as miners, must produce satisfactory evidence of having had not less than two years' practical experience as a miner, or as a mine laborer in the mines of this Commonwealth, and in no case shall an applicant be deemed competent unless he appear in person before the said board and answer intelligently and correctly at least twelve questions, in the English language, pertaining to the requirements of a practical miner, and be properly identified under oath, as a mine laborer, by at least one practical miner holding a miner's certificate.

The requirement that a man must work in the mines of Pennsylvania, as a mine laborer before he can apply for and receive a certificate authorizing him to mine coal, or work as a miner has not only imposed a grievous hardship upon many competent miners but has been detrimental to the mining service in the state. It has prevented many skilled workmen from foreign countries from entering the mines, as they often object strongly to spending two years laboring for men who are probably not as well qualified to do the work as they are themselves. Many of these men are perfectly competent to do the work as they have had a great deal of experience in coal mines in foreign countries.

Referring to the opinion of the state's attorney general that any one employed in underground work in the anthracite region is a miner, it may be stated that the definition of the word "miner," as given by the attorney general will hardly agree with that given in the Act of June 1, 1915, which reads:

> The term "miner" means the person who cuts or blasts coal or rock at the face of a gangway, airway, breast, pillar or other working place; also any person engaged at general work in the mine and qualified to do the work of a miner.

A man could hardly be "qualified to do the work of a miner" without having served his time as a miner's

laborer at the working face; and, by the previous act which is still in force, he must do so in the mines of Pennsylvania. FRANK HALL, Deputy Chief,
Harrisburg, Penn. Department of Mines.

The Mining Situation

Letter No. 2—At the present time, it would seem as if the Nation was at its wits' end, so to speak, to know what methods to adopt or how to proceed to increase the production of coal and secure a maximum output from every mine, which is necessary for the successful prosecution of the war. There is no doubt that coal operators, one and all, will welcome any suggestion that will help them increase their output, provided that the things suggested are practical.

One point appeals to me as being important enough to be borne in mind. Many coal mines are largely dependent upon coal-cutting machines and other necessary mechanical equipment. Should the Government find it necessary to commandeer the steel production, it would seriously embarrass the operation in many mines, as operators would then be unable to secure the prompt delivery, if at all, of such equipment as they require.

NEED OF LABOR-CONSCRIPTION

In this emergency, more dependence will have to be placed on increasing the man power in coal mining. It is true that we have many able-bodied and experienced coal miners who might justly be called slackers, for the reason that they work but half the time and lie idle the remainder. This may be attributed to love of pleasure, laziness or booze; but whatever the cause, the effect is the same as far as the production of coal in the mines is concerned.

I want to suggest that the time has come to adopt a law that will compel this class of slackers to continue at their work. Compare such a condition with that which exists in Germany, where every man is compelled to do his part and there is no opportunity to shirk. Here is a virtue that it would be well to emulate, though one of a common enemy.

It would appear that the only way to round up the class of slackers to whom I have referred would be by the enactment of a law as drastic as that of the selective-draft law. There is no reason why a labor-conscription law should not prove as great a boon to the coal industry as the selective-draft law has been to our army of fighters. Where individuals, whose labor is necessary for the welfare of the country, do not realize the seriousness of the present mining situation, they should be brought to feel their responsibility in the great cause by drastic action of the Government. Every man should feel it is his duty to work every day when that is possible.

OTHER CAUSES OF REDUCED COAL PRODUCTION

One source that lessens the production of coal is the celebration, by foreigners, of the large number of national holidays they have been trained to keep in their own country. But no man can serve this country loyally and continue to lay idle, on such account, at this time. No church, lodge or society can consistently and with loyalty insist on its members observing their customary holidays, as before the war.

Another unquestioned source of trouble is the booze habit that prevails too largely among the mining classes. Where this habit exists it should be controlled so as not to interfere with the regular operation of the mines. When local restrictions are found insufficient, Congress should enact a law that will eliminate this evil till after the war, and any violation should be treated as severely as an offense against the operation of the draft law.

Aside from all else, one cannot but realize that it is unjust to the boys we are sending "over there" to spill their blood in the cause of freedom, while workers at home are permitted to idle away their time in the pursuit of pleasure or appetite. The boys have a right to expect every ounce of physical energy to be exerted at home in the cause for which they are fighting. This, and this alone, will shorten the war. LOYALTY.
Thomas, W. Va.

Letter No. 3—The letter of Thomas Hogarth, *Coal Age*, June 29, page 1208, regarding the present mining situation in the country, strikes a deep chord. I can bear testimony to what he says in regard to the time lost by miners visiting from town to town and place to place.

The foreign element is largely in the majority in our mining camps, and it is no exaggeration to say that they are making more money today for their labor than they did before the war began. But, as Mr. Hogarth remarked, they are spending it on themselves—for drinks and pleasure—instead of investing it in War-Savings Stamps and Liberty Loans that would help the Government. I certainly do not begrudge these men or any one for seeking their own pleasure after they have met the demands laid on them by the war.

Time and again I have looked out on the long line of cars waiting to be loaded only to feel downhearted and disgusted when observing the small number of men whose names appear on the time sheet as working. It is true, as Mr. Hogarth has intimated, that automobiling has interfered greatly with the work of the miner, by enabling him to take extensive trips into the country to see his friends or attend a festival or other celebration. The question may be asked, What is the cure for this condition?

GOVERNMENT OFFICER TO ROUND UP TRUANTS

The plan Mr. Hogarth suggests of appointing a Government inspector who would act as a truant officer seems feasible if the fine imposed on idlers were used for Red-Cross work, after paying for the services of the inspector, which would be a reasonable expense. However, this is not a time to apply harsh and severe measures without restraint. If I may be allowed the expression, it is a time to employ the iron hand and velvet glove.

It is only fair to say that the majority of our slackers, in the coal mines, do not realize the great sacrifices their brothers are making. Could they see the devastation in their homelands, where whole families have been wiped out and nothing remains of the old homesteads but ruins and shellholes, every day would find them at work.

I sometimes think if more pamphlets could be printed in the different languages of the mine workers, describing the devastation of their homelands, it would have a wholesome effect on them and take away their desire for idling away their time and seeking their own pleasure.

One more suggestion and I will close. We are working an eight-hour shift, but many of our miners spend but five or six hours in the mine. This means a great reduction in daily tonnage and is a situation hard to remedy. There has been some talk of working a nine-hour shift, but how would this effect anything when men fail to work the eight hours that mark the present working day?

My suggestion is to cut the shift to six hours and work two six-hour shifts in every 24 hours of the day. If this could be done, it would give us a 12-hour working day during the period of the war. The plan might entail a little extra cost in the supervision of the mines, but I should like to see the plan discussed and learn the opinion of *Coal Age* readers with reference to its feasibility.

R. W. LIGHTBURN.

Perryopolis, Penn.

Sealing Off Fire on Intake

Letter No. 2—The sealing off of a fire that has gained some headway on the intake air is a matter of considerable importance. The work should be promptly and thoroughly done.

In the case set forth by "Ancora," *Coal Age*, June 22, p. 1173, it does not appear to me that there is any great danger of explosion, since it is stated that the size of the heading is 6 x 10 ft. and an air current of 30,000 cu.ft. per min. is passing, while the quantity of gas generated is so small that it has not been necessary to use safety lamps, heretofore, in driving these headings.

The fire is said to be located in the timbers 30 or 40 yd. back from the face, and I will assume that the distance, from the last open crosscut to the face of the heading, is 50 ft. This will give an air space in each heading of $6 \times 10 \times 50 = 3000$ cubic feet.

Immediately upon being notified of the discovery of the fire, I would order hauled into the mine eight pieces of 8 x 8-in. square timber of suitable length; also, a sufficient amount of 1½- to 2-in. lumber and 40d. nails, and plenty of good clay for filling in the space between the board stoppings to be built in each heading.

Having proceeded at once to the place, I would tear away an opening in the stopping outside of the fire so as to short-circuit a portion of the air current, and reduce the amount of air passing over the fire.

As quickly as the material arrived, I would set four of the heavy timbers in each heading as close to the seat of the fire as the heat would permit and where there would be no danger of the timber being ignited by the heat. I would employ two crews so as to build a stopping on the two entries at the same time.

In answer to the two questions asked in regard to the condition of the air, let me say that if the intake stopping were built first it would have the effect of allowing much smoke to stand on the return airway; whereas if the return stopping were built first the air on the intake would be practically clear of smoke. In order to protect the men who are building the stopping, I would hang curtains just inby of each stopping, so as to cut off the heat from the fire. I shall be glad to learn the views of others on this matter.

Worley, Ky. OSCAR JONES.

Shortage of Mine Labor

Letter No. 3—Referring to the question of shortage of labor in the coal mines today, permit me to suggest one thing that appeals to me as an important consideration and deserving of more attention than it has yet received at the hands of coal-mining officials. Mention was made of this in an excellent article that appeared in *Coal Age*, June 8, p. 1058, entitled "War as a Supreme Test of Efficiency," by Edward N. Hurley. Attention is drawn to the great need of efficiency, as shown through the cost accounting in coal mining and other individual industries.

Today, the question of industrial efficiency should be uppermost in the minds of every class of men and to none does this apply with greater force than to officials in charge of coal-mining operations. There are efficiency experts in almost every other industry, and why should they not be employed in the operation of coal mines. No industry affords a greater field for activity, in this respect, than the mining, preparation and marketing of coal.

UNWARRANTED WASTE IN COAL MINES

Attention has been drawn many times, in *Coal Age*, to the great waste of material in the operation of mines. Those acquainted with underground conditions know well that there is often sufficient steel rails, timber and other necessary material to meet all requirements for some time to come when orders for such material are sent to the purchasing department.

The man whose duty it is to purchase the supplies makes no investigation to ascertain, were it possible, whether there is absolute need of the thing ordered. No checking system is employed to show how much material has been used since the last order was filled and how much should now be on hand. The mine management seldom realizes the wealth of material that is left to be covered up and lost in abandoned places.

Again, there may be plenty of locomotives already in the mine, for hauling the daily output to the shaft or slope bottom, but, owing to a lack of efficient distribution or the adoption of a proper system of haulage, the present equipment is inadequate. As a result, a requisition is sent to the office, calling for further outlay. The management finds, later, that the cost of supplies is high, and believing that it is the result of the increased cost of material, fails to realize what is the true cause of the losses shown by the profit-and-loss account. While making every effort to increase the capacity of the mine, mine officials seemingly forget, or at least fail to employ means that will secure the highest economy.

I have mentioned only one or two things that a good efficiency man would remedy if given supervision of the practical working of the mine and a record of supplies of material and labor. This is an important matter, especially at the present time when the Government is demanding an increased output of coal and greater economy in the use of material, in every industry. Efforts to increase the efficiency of coal operations will go far to offset the present shortage of labor in the mine.

Lochgelly, W. Va. ROBERT J. WOOD.

INQUIRIES OF GENERAL INTEREST

Blue Gem Coal in Tennessee

I want to ask if *Coal Age*, or any of its readers, can inform me if the thin seam of coal known as the "Blue Gem Seam" is being worked in Scott County, Tenn. We are working, in our mine, a thin vein of coal that averages 24 in. in thickness and is of good quality. The operation is known as the "Oneida Consolidation Coal Co." and the name of the mine is "Morning Glory." What I would like to know is if this seam is the true "Blue Gem" coal. INQUIRER.

Oneida, Tenn.

Probably some of the readers of *Coal Age* can give the information desired by this correspondent.

Handling Electric Detonators

On several occasions, I have heard of peculiar accidents that have occurred through the handling of electric detonators. These accidents may have resulted through carelessness or the neglect to take ordinary precautions. Inasmuch, however, as we are using these detonators every day in our mines and many of the men are none too careful, I want to ask if it is possible to explode a detonator otherwise than by the electric current.

In one instance that was reported to me some time since, the detonator was said to be exploded by pulling, twisting or scraping the lead wires, and I have wondered if that is possible. Other instances have been reported of the accidental explosion of detonators where I am led to believe that the explosion was due to the wires, in some way, coming in contact with a charged wire or an electrical conductor. STUDENT.

Peru, Ill.

This question was submitted to different manufacturers of electric detonators and electric fuses, with the result that it can be stated with certainty that when electric detonators are properly handled and not permitted to come in contact with live wires or to receive a static charge of electricity, there is practically no danger of an accidental explosion occurring.

A number of peculiar accidents have been reported, from time to time; but, in practically every case, the explosion was due to an electric discharge. It is stated that the construction of the detonating cap is such that any amount of twisting or scraping of the wires entering the cap could not cause the explosion of the fulminate, which is separated from the ends of the wires by fully an eighth of an inch.

In the manufacture of electric detonators, the safest practice has been to embed the ends of the wires or the platinum bridge in prepared guncotton, which is not sentitive to friction, but which is readily ignited by the incandescence of the platinum bridge of a low-tension detonator, or the electric spark of a high-tension detonator. The ignition of the guncotton causes the explosion of the fulminate in the cap.

In one instance reported, a man was dusting a bunch of electric detonators with a feather duster. As he held the bunch of exploders by the wires, in one hand, and applied the duster with the other, one of the caps exploded. In explanation of this occurrence, it was thought that the contact of the feather duster with the bunch of wires produced sufficient frictional electricity to fire one of the caps. This, of course, could happen only in a very dry atmosphere and where other conditions were likewise favorable.

In mining practice, it is well known that electric fuses and detonators are often handled in a very careless manner, and it may frequently happen that the lead wires are unconsciously brought in contact with a conductor that is sufficiently charged to cause the explosion of the cap. It requires a very slight current to explode an electric detonator, about $\frac{1}{2}$ volt and from 0.3 to 0.4 ampere being sufficient.

Few persons realize how readily a static charge can be produced in the human body. On a dry, cold day, a man with full physical development, by walking briskly over a Brussels carpet, can develop sufficient static electricity to ignite a gas jet by touching his finger to the metal tip of the burner.

While it is doubtful whether a sufficient static charge could be produced in a person, in a mine where the atmosphere is more or less damp, it is very possible that an electric exploder could be fired in this manner when all conditions are favorable. The question is an interesting one, and we hope to learn the opinions and experiences of others in this regard.

In reply to the question of whether an electric detonator can be exploded in any other way than by electricity, the answer is, Yes. All practical miners and many who are less practical and who have learned by sad experience, know that a detonating cap can be exploded by percussion. Men have lost their fingers through the explosion of a cap, the contents of which they were attempting to ascertain.

On the other hand, strange to say, an instance is recorded of a heavy box of dynamite falling on a detonating cap, which was crushed by the force of the blow, the shell being broken so that the fulminate was exposed and yet the cap did not explode. It needs no argument, however, to convince one that such an instance as this is quite the exception and forms no guide to the safe handling of such material.

Other facts, equally strange and inexplicable are detonating caps that have been mashed flat to a thickness not exceeding $\frac{1}{32}$ in. without explosion taking place. While these facts cannot be disputed they do not warrant a miner taking any chances in the handling of detonators. There is only one safe rule to follow and that is to avoid the unnecessary handling of exploders and keep them in a safe place out of harm's way.

EXAMINATION QUESTIONS

Miscellaneous Questions

(Answered by Request)

Ques.—Suppose, in a main airway 8 x 10 ft., in section, the velocity of the air current is 1200 ft. per min. This volume is divided equally into two splits, whose respective areas are 6 x 8 ft. and 6 x 10 ft. What is the velocity in each split?

Ans.—The sectional area of the main airway is $8 \times 10 = 80$ sq.ft., and the volume of air in circulation is, therefore, $80 \times 1200 = 96{,}000$ cu.ft. per min. This volume being divided equally between the two splits, there is 48,000 cu.ft. of air passing in each split. The sectional area of the first split is $6 \times 8 = 48$ sq.ft., and the velocity in that split is, therefore, $48{,}000 \div 48 = 1000$ ft. per min. The sectional area of the second split is $6 \times 10 = 60$ sq.ft., and the velocity of the current is, therefore, $48{,}000 \div 60 = 800$ ft. per min.

Ques.—A mine car is 9 ft. long, 4½ ft. wide and 2 ft. high; how much coal will it hold, the dimensions to be inside?

Ans.—The cubic contents of this car is $9 \times 4\frac{1}{2} \times 2 = 81$ cu.ft. It is customary to estimate 40 cu.ft. of mine-run bituminous coal per short ton of 2000 lb. On this basis the car will hold $81 \div 40 =$ say 2 short tons when loaded without "topping."

Ques.—A mine is drained by natural means and the ditch carrying off the water is 12 in. wide and 12 in. deep. The drain is full of water, which has a velocity of 2 ft. per sec.; how many gallons of water are passing per minute?

Ans.—When the ditch is full of water, its wetted sectional area is $12 \times 12 = 144$ sq.in. A velocity of 2 ft. per sec. is $2 \times 60 = 120$ ft. per min. The quantity of water flowing in the ditch, under these conditions, is $(140 \times 120 \times 12) \div 231 =$ say 900 gal. per min.

Ques.—Where would you apply the water gage, and does it increase or decrease as the workings extend, all other conditions being the same?

Ans.—A water gage is used, in mine ventilation, for the purpose of computing the power on the air. It should therefore be placed on the fan drift in order that it shall take into account the entire resistance of the shaft and mine, which the ventilating fan must overcome. In this position of the water gage, its reading indicates the pressure established by the fan, which is above or below the atmospheric pressure, according as the fan is blowing air into or exhausting air from the mine.

It is the mine resistance that *causes* the pressure, which the fan *creates*. If the connection with the mine was broken, and the fan was operating in the open air, it would be able to create little or no pressure because of a lack of resistance, which must always cause the pressure. For this reason, as the mine workings are extended, the mine resistance is increased and the reading of the water gage correspondingly increased, other conditions remaining the same.

Ques.—In opening up a new mine, what would be the essential points to consider in making the opening and laying out the mine workings?

Ans.—It is important to locate the mine opening with due regard to both surface and underground conditions. As nearly as practicable, the opening should be located in the center of the property if this will afford a suitable building site, easy shipping facilities and favorable haulage and drainage in the mine. Regard must be had as to whether the mine should be opened by a shaft, slope or drift, in order to secure the most favorable conditions in its future operation, in respect to economy and safety.

Where the seam is inclined, it may be advisable to sink a shaft on the dip side of the property, in order that both coal and water shall gravitate toward the shaft. But, if the seam outcrops at a point offering good facilities for shipping it may be of advantage to open the mine with a slope and work out the coal in successive lifts, by rooms driven to the rise of the gangways or crossheadings. All of these considerations must be carefully studied in the location of a mine opening.

In laying out the workings underground, the direction of the main entries or haulage roads should be such as to give a suitable grade in favor of the loaded cars and afford good drainage. In like manner the direction of the rooms must be such as to permit of the safe and easy handling of the cars from the working face to the gangway or level.

Ques.—How many tons of coal in a room 200 ft. deep, 40 ft. wide and having an average height of 4 ft.?

Ans.—The cubic contents of this room is $200 \times 40 \times 4 = 32{,}000$ cu.ft. Taking the average weight of bituminous coal as 80 lb. per cu.ft., the weight of coal in the solid in this room is $32{,}000 \times 80 \div 2000 = 1280$ short tons.

Ques.—If a pressure of 2 lb. per sq.ft. produces a velocity of 200 ft. per min. what pressure would be required to produce a velocity of 400 ft. per min.?

Ans.—In mine ventilation, the unit of ventilating pressure varies as the square of the velocity of the air in circulation. To increase the velocity from 200 to 400 ft. per min., or to double the velocity in the airway will require, in this case, $4 \times 2 = 8$ lb. per sq.ft.

Ques.—Which gas is most dangerous to life, blackdamp (CO_2) or whitedamp (CO)? State why.

Ans.—Carbon monoxide (CO), commonly known, in the mine, as "whitedamp," is the more dangerous gas. It is extremely poisonous and gives no warning of its presence by the lamp flame; while carbon dioxide (CO_2) is not generally considered a poisonous gas and its presence, in the mine, is at once made known by the dimness or complete extinction of the miner's light. This gas is sometimes called "blackdamp" by the miners.

COAL AND COKE NEWS

What Happened in June

[The figures in brackets in the text refer to pages in the preceding volume when the figures exceed 100, and to pages in the present volume when the figures are less than 100. Reference to the items thus indexed will afford further information. "What Happened in May" appeared June 15 on page 1130.]

June 1—No. 5 mine of the Lehigh & Wilkes-Barre Coal Co. near Hazelton has button strike [1071, 1119]—Regulation enforcing the production of clean coal comes into effect [1068].

June 3—"Coal Week" (lasting till June 8) commences. All purchasers of coal are requested to place orders for all coal needed prior to Apr. 1, 1919 [973, 987] —Mt. Jessup colliery closed down by Fuel Administrator for shipment of dirty coal [1083].

June 4—Meeting of mine workers' delegates in the Huntingdon and Broad Top region vote in favor of returning to work pending arbitration [1071].

June 5—Operators' association formed in the new Elkhorn fields, Letcher County, Kentucky, at a meeting held at Whitesburg—Fuel Administrator issues estimates of bituminous coal likely to be needed from Apr. 1, 1918, to Apr. 1, 1919, at 634,594,000 short tons, or 79,866,000 tons more than produced in 1917. This will be an increase of 14.4 per cent. over last year's production [1116].

June 7—Production Bureau of United States Fuel Administration is inaugurated, with James B. Neale, anthracite advisor to the Fuel Administrator, as director [1162].

June 10—New freight rates under order of May 25 come into effect—United States Fuel Administrator states that the automobile factories will only be allowed 25 per cent. of the fuel necessary to maintain their former production [1162]—Strike at Bertha mine of Quality Cement Coal Co., in northern end of Fairmont region. Strike ends June 11 [1163].

June 11—Convicts mutiny at Banner mine, Pratt Consolidated Coal Co. Mutiny ends, June 13 [1164].

June 12—United States Fuel Administrator states that the curtailment of the fuel supplied to automobile factories will consider only the manufacture of pleasure cars and not the production of trucks for war purposes nor the output of other war necessities — German Government lodges complaint against lynching of the miner, R. P. Prager—Director of Railroads amends order of May 25 by which intrastate rates are placed at the same level as interstate rates, at the level to which they were increased in that same order. Intrastate rates are to be raised only 25 per cent. Minimum rate of $15 is made to apply only to line-haul shipments, and not to coal, coke or certain other bulky shipments. Prepayment of freight not required till Aug. 1 [1162]—Strike at Coal Brook colliery of the Hudson Coal Co., Carbondale, Penn. Strike ended June 20 [1164, 1202].

June 13—United States Fuel Administration gives the following list of precedences in coal distribution, all classes being preceded by the domestic user: (1) Railroad, (2) Army, Navy and Government departments, (3) state and county institutions, (4) public utilities, (5) retail dealers, (6) manufacturing plants approved by the War Industries Board for preferential coal, (7) less important industries [1161].

June 14—Fuel Administration of New Jersey removes 56 tons of coal from summer home of John F. Dryden, president of the Prudential Insurance Co. This is the first excessive stock of domestic coal reduced by Government action.

June 16—Announcement made by Secretary McAdoo that the next offering of Government bonds would be in October and for six billion of dollars.

June 17—"Clean-coal" Conference at Kansas City attended by operators, labor leaders and coal inspectors of Oklahoma, Kansas, Missouri and Iowa (23)—Cavein kills three men at Short Mountain colliery, a Susquehanna Collieries Co. operation near Lykens, Penn. [23].

June 19—J. P. O'Connor, doing business as the Penn Fuel Co., is deprived of his license as a coal distributor having sold high-volatile coal as bunker fuel.

June 20—Notice is served on the Tidewater Coal Exchange to dump coal promptly as received and not hold it for foreign bunkering so as to receive the higher price provided for such coal—Short Mountain colliery closes for two days while three men are buried [23, 24].

June 21—United States Fuel Administration declares that "Government prices" are maximum prices and that coal may be sold at lower prices to railroad and other customers at the pleasure of the operators.

June 22—New prices are set for anthracite received by rail or water on Lake Michigan and Lake Superior docks [1201].

June 24—United States Fuel Administrator approves prices set by local administration for coal produced in Texas [1201] —New prices are made for coke produced in Cumberland County, Tennessee, and at Ansted, W. Va. [1201].

June 25—James H. Hoover, of McClellandtown, Penn., is made to pay $2500 to American Red Cross for having violated the Fuel Administrator's orders in regard to the shipment of coke and having neglected to make reports as demanded by the Fuel Administration—James T. Lind, of Detroit, Mich., is made Director of the Bureau of Gas Plants in the Fuel Administration—Freight rates are increased in accord with General Order No. 28, dated May 25, 1918 [1020, 1021]—Dr. James Douglas, of Phelps-Dodge & Co., Inc., and of the Stag Canon Fuel Co., dies at Spuyten Duyvil, N. Y. [1217].

June 26—Henderson W. Knott appointed to take charge of engineers and inspectors investigating the power plants of the country and making recommendations relative to fuel economy—Coal operators of central Pennsylvania meet in Washington and condemn the giving of bonuses and like wage inducements. A board of nine persons will hear charges against operators whose rates of wage fail to conform to those set for them under the Washington Agreement [24].

June 27—Wagon Mine Owners' Association formed at Pittsburgh.

June 28—J. M. Roan is appointed field manager of the inspection section of the United States Fuel Administration [21]—Maximum price is set for cannel coal, the price to be $1 per ton in advance of the prices for bituminous coal in the district surrounding and 50c. a ton more being allowed where coal is shipped in a box-car [22].

June 29—New prices are set for coal produced in Hocking and Athens County, the southern half of Monroe township in Perry County, the Bailey Run or No. 7 seam, Guernsey Muskingum, Meigs and Jackson Counties [22]—Report of Federal Trade Commission condemning profiteering, the price of coal being quoted as an instance [21, 22].

Harrisburg, Penn.

A hearing was held in the Common Pleas Court of Pittsburgh recently on a petition of the Pittsburgh Coal Co. asking that an injunction be granted restraining the Pike Coal Co. from mining coal claimed to be the property of the petitioner and also from running an entry through an entry of the Pittsburgh Coal Co. The coal in question lies in a 112-acre tract of land in North Fayette township, where the Pittsburgh Coal Co. operates its Partridge mine. Each of the companies concerned has mining rights in the property and each claims that the other is mining coal that does not belong to it. The Court is asked to pass upon the question of how much of the coal in the property belongs to the Pittsburgh Coal Co., the deed to the Pike Coal Co. granting all the coal not previously granted to the petitioner. The Pike Coal Co. has found it necessary in order to reach all the coal owned by it, to drive an entry across an entry of the Pittsburgh Coal Co., and the latter asks that the Court restrain the former from crossing at grade. Judge Shafer directed that briefs be filed.

The acute labor shortage in the anthracite fields, due largely to the operations of the draft, is to be discussed at a conference of the local boards of the nine anthracite counties with state representatives at a meeting on Tuesday, July 16. The call for this meeting was issued on July 3 from state draft headquarters in this city. Early in the week the draft boards received from the district board at Scranton a circular stating that in future calls men holding certified miner's certificates, pump runners and others who cannot be replaced in the operation of mines would not be taken, and it is thought that the meeting to be held on the above date has been called to explain this action and discuss the advisability of further exemption.

The Board of Investigation appointed by the United States fuel administration to inquire into wasteful and uneconomic mines decided on July 1 to proceed at once against at least 25 bituminous coal mines in the central Pennsylvania district. Mines proved guilty of waste will be closed. Hearings will be granted in every case.

It is said that a good part of the car supply troubles in the central Pennsylvania district are due to the allotment system of the Pennsylvania R. R., which bases its rating of mines upon an estimate of working places instead of actual loading capacity. Under this system old mines are getting full-car supply, it is said, and in some cases are even getting more cars than they can load, while newer mines, with greater actual loading capacity, are restricted in supply and are hard pressed to hold their labor intact.

There has been an effort on the part of mine owners to get reratings from the Pennsylvania, but without effect. Now, it is understood, J. P. Cameron, the district distributor, is taking an interest and is endeavoring to get a rearrangement of car allotments.

Charleston, W. Va.

All the coal men of the state who have given the matter any thought assert that the most perplexing problem with which the industry is confronted is that of securing adequate man power to keep pace with the increasing car supply. Coal men conversant with the situation have no hesitancy in saying that the crux of the whole situation is the failure of miners to work for as long a period as they might and the inroads made upon the ranks of the miners by the draft. This is particularly true in the southern part of the state.

While the car supply this week for the Kanawha district is fair, the probabilities are that production will be curtailed owing to the fact that so many miners laid off for the holidays. Reports from Coal River in particular indicate that the mines there will be handicapped because so many of the miners went to Ohio or Kentucky over the Fourth.

The car supply in the New River district is all that can be desired, but the difficulty of getting men to work hampers production. In the opinion of one well known coal man identified with the New River field, it is no longer a car shortage which interferes with greater production. He is of the opinion that the government will have to more drastically enforce the "Work or Fight" order. The bonus system has had a tendency to disorganize the industry in sections where it has been attempted because it amounts, in the opinion of some operators, to nothing more nor less than stealing men, and the National Fuel Administration has advised against it. Hereafter it will be discouraged.

Conditions were somewhat improved in the Pocahontas and Tug River Districts during the last week in June, though labor shortage resulted in a loss of 40,508 tons. The car supply was a little better, however, there being about 42 more cars in the district. However, the increase in tonnage was not commensurate with the improvement in the car supply and in the labor supply, the total production for the districts mentioned being 439,672 tons. This repre-

sented a total of 7327 hours worked. From all causes, however, there was a tonnage loss during the week of 58,761 tons.

There was in the Fairmont field a fair run of cars during the week especially at the beginning and ending of the week. There was an over supply on Monday of last week but on Tuesday only a little over 1000 cars. By Saturday however, with 1573 cars available, only one mine of all those reporting was not in operation.

Louisville, Ky.

Kentucky's coal mines produced 27,355,727 net tons of coal during the year ended June 30, according to a report of Prof. C. J. Norwood, chief inspector of mines, at Lexington, Ky., and forwarded to Wiley B. Bryan, Fuel Administrator of Kentucky. The 19 coal counties in eastern Kentucky produced 17,479,194 net tons, and the ten counties in western Kentucky 9,876,533 net tons. Pike County, in the eastern Kentucky field, led the 29 counties in production with 3,838,358 tons. Missing reports and production from some wagon mines, which could not be obtained, would probably add 100,000 to 150,000 net tons to the total for the state. In order to take care of the 25 per cent. increase in coal freight rates, and increased cost of retail operations, the Jefferson County Fuel Administration has announced a general increase in all grades of coal, this increase being at the rate of 50c. a ton. Western Kentucky has gone to $5.90 a ton; Jellico, $7.10; Harlan, $6.75, and Hazard, $6.65. Western Kentucky mine-run is 25c. a ton lower than lump, and all other coals are 35c. a ton less for mine-run. For steam and industrial purposes the price is 50c. a ton less than to the domestic consumer. The dealer is allowed to charge $2.30 a ton for profit and operating expense on anthracite, $2.50 on coke, and $2.20 a ton on all other coals sold on this market.

Birmingham, Ala.

Coal miners throughout the Birmingham district, and from every section of Alabama, have given most patriotic response to the Government's appeal, and operations since July 1, including the Fourth of July, have been uninterrupted. The increased production is particularly noticeable at the Acton, Acmar and Margaret mines, where railroad freight cars in numbers were loaded July 4 and the day celebrated by full-time work on the part of the miners.

Efforts are now being made, particularly in the Birmingham mining district, to bring in labor for the mines, as the great complaint thus far has been that the unskilled worker is retarding rather than helping production. The Fuel Administration is lending every assistance to the mine operators and is using its influence to divert skilled workers to this district.

The Central Alabama Coal Co., with mines at Kimberly, in the northern part of Jefferson County, has begun mining of coal on the Black Creek seam, which lies under the Jefferson seam. The new seam coal will be brought out of the mines on the same slope, the haulage system being extended so as to reach the greater depth. It is intended to add to the force employed at Kimberly and increase production just as rapidly as possible.

All new mining propositions in the state are being worked to capacity, and the only trouble now being experienced is the inability to obtain sufficient skilled labor. The Railway Fuel Co.'s new mine at Parrish, the stripping proposition of the Eagle company in the lower section of Jefferson County, and the several other new mines recently opened up, are all doing exceptionally well.

The Woodward Iron Co. will soon be getting coal out of its mine west of Fairfield, where a camp is now being constructed. New mining projects of the Tennessee Coal, Iron and Railroad Co. in the Blue Creek region and elsewhere will also be pushed to the utmost during this month, it is officially stated.

Victoria, B. C.

Discussing the disallowance by the Dominion Government of the Provincial Statute giving the early settlers within the Esquimalt & Nanaimo Ry. belt the right to apply and, their claims on examination proving sound, to receive Provincial title to the coal rights in their lands, Hon. John Oliver, Premier of British Columbia, recently stated that he saw no reason why the Provincial Legislature, at its next session, should not be asked to reënact the legislation. This is taken to mean that the Province will insist on its power to give the settlers the privilege indicated. It also means that the present British Columbia Government is likely to maintain the principle of Provincial authority in the case in question. The issue is one of vital import not only to the settlers, whose coal lands are at stake, but as well to the Granby Consolidated Mining and Smelting Co., which holds Provincial title to valuable coal areas, and to the Canadian Collieries (D), Ltd., which claims title to all the non-alienated coal lands in the railway belt by virtue of the terms of the subsidy granted to the Esquimalt & Nanaimo Railway Co., in 1884.

PENNSYLVANIA

Bituminous

Connellsville—The Enterprise Coal and Coke Co. has bought a tract of land in Morgan Township, Greene County, Pennsylvania, for the record price of $700 an acre. The coal is the Pittsburgh seam, and it is said will be opened and operated immediately.

Connellsville—Announcement was made on July 6 that the coke workers on the Fourth of July had manufactured 60,000 tons of coke, a record for the Connellsville field. This is about 2000 tons above the daily average. The miners and coke drawers went to work as usual, the majority earning about $10 for the day. The output for the last week was 362,000 tons, indicating that the men at the different works are working every day.

Connellsville—An employee of the Fredericktown Coal and Coke Co., in the Fifth pool, Monongahela River, claims the coal-mining championship of the Connellsville region. John Slifko, a pick miner, dug and loaded 300 tons and 1000 lb. of coal in 12¾ working days, receiving $240.32 for his labor. Another employee, Joseph Cadman, earned $178.08 by loading 278 tons. At the same plant 45 miners averaged $137.42 each is earnings during the first half ow May.

Uniontown—Payment of $10,000 war risk insurance, taken out by John Meckleburg while he was in the National Army, is believed to have established a precedent for the administration of the war risk fund. Meckleburg met his death last March in an accident at the Continental No. 2 mine of the H. C. Frick Coke Co., two weeks after he had been honorably discharged from the army. While in the service he took out a $10,000 insurance act, dividing the payments between his parents.

Blairsville—The Pennsylvania Railroad Co. has completed a new concrete coal tower in its yards here. One of the greatest drawbacks for years, that of loading the locomotives with coal, will be eliminated and an engine can be coaled in a few minutes. The tower has a storage capacity of several hundred tons. Other improvements under way here are the enlargement of the roundhouse and extension of the yards to care for the increased coal traffic from the Indiana branch and West Penn branch.

Uniontown—The trustees of J. V. Thompson have sold to the Stern Coal Co., a local corporation, the coal underlying the 75-acre tract of land adjoining the County Home west of the town and already opened through the Snyder mine. The basis of the transfer is a royalty payment of $5800 per acre as the coal is mined. This tops by $800 a similar contract made last winter for the 100-acre County Home tract and is the high-water mark for Pittsburgh seam coal deals. The coal taken from this acreage will be sold in Uniontown for domestic consumption.

Anthracite

Pottsville—The Sherman Coal Co., operating on Sharp Mountain, has made application to the City Council for permission to extend its works to include a portion of Cressona Road. It is planned to increase the capacity.

Hazleton—The old workings at Hollywood, near here, have been reopened by the owners, Pardee Bros. & Co., and will be worked by electrical equipment.

The Cranberry Creek Coal Co., operator of the Cranberry mines near here, is receiving bids on a stripping proposition which will remove the overburden from a 22-ft. seam recently proved and plotted, and which adjoins its No. 4 workings.

St. Clair—The Pine Forest colliery, the newly opened operation of the Philadelphia & Reading Coal and Iron Co., broke all records on July 5 for a new operation when 1270 tons of coal were shipped. Officials say the production will be increased until a maximum of 1500 tons daily is reached. There is a spirited rivalry between this operation and the Ravensdale colliery, also a new Reading operation, and shipments from both are constantly increasing.

Nanticoke—An explosion of gas in the Loomis colliery of the Delaware, Lackawanna & Western Railroad Co., on July 6, resulted in four mine workers being badly burned, necessitating their removal to Nanticoke State Hospital. Their condition is serious, it is reported. Soon after the men were removed from the colliery hospital, the superintendent and other officials descended the shaft and braved the danger of afterdamp in conducting an investigation.

Port Blanchard—Showing that they are alive to the country's need for a maximum coal tonnage, the workers employed at the No. 14 colliery of the Pennsylvania Coal Co. last week established a remarkably high average production. One day 2600 cars were sent through the breaker. To bring about such a big production the men worked longer than the limit designated by union rules; in fact, in some cases some of the men worked double shifts, with none of the workers filing the least objection to the requests of the officials.

Scranton—The Scranton Coal Co., which operates the Pine Brook colliery, is about to open the New County seam. This seam contains a large amount of fine coal and will greatly extend the life of the colliery. The New County bed is about 100 ft. below the surface and is overlaid by the Fourteen-foot seam, which was worked out some years ago. For some years there was doubt about the practicability of mining the seam, but boreholes made by the company prove the seam averages from 5 to 8 ft. thick. It will be mined with machines.

Forty Fort—The growing peril of mine caves in the Wyoming Valley was pointed out by attorneys for the Temple Coal Co. in its appeal from the assessment placed by the county on the coal properties of the company on the west side of the Susquehanna River. In 1916 the board of county assessors increased the amount of coal as minable and removable from 62 to 70 per cent. The coal company appealed and holds that it is impossible to remove that percentage owing to the river wash, sand and gravel, and that any increase above 62 per cent. would endanger the property through extensive settlement and water from the river.

Mauch Chunk—Harry A. Butler and N. D. Courtright, the lessees of the Switchback R. R., have organized the Mount Pisgah Coal Co. The mine is on the top of Mount Pisgah, along the Switchback R. R., only a short distance from the place where the first anthracite coal mine in the world was opened shortly after the discovery of anthracite coal in Summit Hill in 1794 by Philip Ginder, the hunter. The coal from this mine was then brought to Mauch Chunk over the Switchback and run down the river by means of chutes and loaded into boats. The coal mined on Mount Pisgah is of the very best quality, and the new firm is making arrangements to carry on mining of anthracite on an extensive scale.

WEST VIRGINIA

Montgomery—A number of new houses for miners are being built by the New Export Coal Co. at its Perryville mine on Campbell's Creek in the Kanawha field.

Philippi—Colonel Albert Thompson, of Philadelphia, who has been operating mines at Meriden for a number of years, has disposed of his interests there to the Franklin Coal and Coke Co., of Philadelphia, the price paid for the Thompson interests being $800,000.

Kingwood—Plans for the operation on a large scale of coal mines in Preston County are being made by the P. N. and R. W. Coal Co., which recently secured a charter from the Secretary of State for a $50,000 company incorporated by I. R. Nicodemus, of Fairmont; J. W. Wise, T. M. Rotruck, of Williamsport, W. Va.; C. W. Powers and Annie Powers, of Piedmont.

Fairmont—The tipple and other buildings at the Montana mine of the Consolidation Coal Co. burned down last Tuesday were restored before the end of the week and the mine was in commission again Friday. Working day and night shifts, C. H. Tarleton, manager of the West Virginia division, had the repairs made and the mine in operation within 86 hours after the fire.

Charleston—A large tipple is being built by the Smith Mining and Fuel Co. at Plus, W. Va., preparatory to opening a mine in the Coalburg seam.

Twenty-five hundred acres of coal land in Boone County, leased on a minimum royalty, will be developed if the railroad and fuel administrations give their sanc-

tion. With a view to such development, Quinn Morton, a prominent Kanawha Valley coal operator, Walter S. Wood, Staige Davis, L. H. Bobbitt and Mary E. Morris, all of Charleston, have formed the Hopkins Fork Coal Co., to which a charter has been granted, the company having an authorized capital of $99,000.

VIRGINIA

Graham—The Bradshaw Coal Co. is planning to increase the capacity of its works. Considerable new equipment for operation will be installed.

Roanoke—The Ragland Coal Co. is planning for the installation of new electric equipment at its works. The installation will include generator, engine and auxiliary apparatus.

KENTUCKY

Star Hill—The Star Hill Coal Co., recently incorporated, is planning for the development of extensive coal properties in this vicinity. The company's land includes a total of over 100 acres, and complete mining equipment will be installed for operation. J. B. Rogers is vice president.

Wallins Creek—The Wallins Creek Colliery Co. has recently taken over the holdings of the Wallins Creek Coal Co., having a capacity of about 700 tons daily. Plans are now under consideration for extensive improvements and the installation of considerable equipment to increase the present output.

Mayking—Thomas G. Langford, Memphis, Tenn., and associates, are considering plans for the construction of a new two-mile branch railroad extending to an extensive tract of coal property recently leased on Pine Creek. It is planned to commence active operations for development at an early date.

Paducah—The Columbia-Panama Coal Co. has commenced surveys for the construction of a railroad line to reach its properties in the Goose Rock district. At this location the company has about 2000 acres of land and will install a complete equipment of mining machinery to develop the property. W. A. Calhoun is chief engineer.

Sebree—The New Sebree Mining Co., capital $100,000, is being organized to take over the operations of the Sebree Coal Co., one of the older operating companies of the district. The incorporators are F. T. Patterson, J. D. Smith and J. M. Anderson, all of Birmingham, Ala. Mr. Patterson will be president of the company, Mr. Smith, vice-president, and Mr. Anderson, secretary-treasurer.

OHIO

Jacksonville—The Ohio Mining Co. has opened a new mine, located on the Toledo & Ohio Central R. R., which will have a capacity of about 150 tons daily. The mine works in the No. 6 seam, which is 6 ft. thick. A modern tipple equipped with screens has been installed.

Bannock—Elsworth E. Brown has disposed of his 400-acre farm to the Union Coal Stripping Co., of Cleveland, Ohio. The farm is situated near Lafferty, a few miles from Bannock, and is part of the extensive coal belt extending from Flushing to a point in the Buttermilk Valley.

ILLINOIS

Springfield—Automatic coal feeders are being installed at the city pumping plant which are expected to reduce the consumption 10 per cent.

Collinsville—Fire of unexplained origin destroyed the plant of the Arctic Ice & Fuel Co. here on July 4, causing a loss of $10,000. In addition to the building a large motor truck and five mules were destroyed.

Athens—In response to farmers' appeals, miners have been doing a day's work in the harvest fields after doing a day's work in the mines. On coming out of the mines they eat a hasty supper and then go into the fields and shock wheat until dark. As it does not get dark until nearly 9 o'clock, their day in the fields is almost as long as their day in the mines.

Harrisburg—Defective helmets are said to have caused the death of William Taylor, Loren Whitler and Robert Kennedy, members of the mine rescue crew of the O'Gara mine No. 1, who succumbed when they entered a room June 29 which had been sealed for four weeks on account of fire. It is claimed that this could not have happened if the helmets had been all right.

Spring Valley—Every miner employed in the mines of the Spring Valley Coal Co. at Spring Valley and Dalzall, is a member of the American Red Cross and of the War Relief Association. They are giving at the rate of 50c. a man during the period of the war. The motion to pay this amount was put through in three locals without debate, without a protest and without a dissenting vote. Last week the Spring Valley Coal Co. sent in its check for $500, as a lump-sum contribution for the year for that company.

Ziegler—The Ziegler Coal Co., which has completed the purchase of 2000 more acres of coal lands in Franklin County, Illinois, now has 9000 acres of the finest coal lands in the county. Best of all, these lands lie in one body. The Bell & Zoller Mining Co. is now operating the large 5000 ton-a-day mine on these holdings, and is at present sinking a new mine south of Ziegler which will give them a daily capacity of 6000 tons. The sum of $1,500,000 is being expended on the new mine, which will be one of the finest in the state. There are now 1000 men employed at Mine No. 7, and it will require 1400 men at the new mine. Most of the men earn from $5 to $9 per day. There are now 116 new residences in Ziegler all built along modern lines, and 200 more houses will be constructed by Jan. 1, 1919. Ziegler is now an incorporated town and has been since Aug. 17, 1917. Prior to that date it was only a mining camp owned by one man.

ALABAMA

Bessemer—W. C. and R. E. Sellers, of Birmingham, who recently sub-leased from J. J. Shannon and associates Bamford mine, about 12 miles from Bessemer, will shortly begin the production of coal from this opening, which has been idle for a number of years. The old spur to the Southern Ry. has been reconstructed, and structures and mining equipment have been provided for resumption of operation.

Birmingham—The Southern Cotton Oil Co. has purchased the properties of the Summit Coal Co., located near Dora, Walker County, and consisting of about 900 acres of Black Creek coal, the consideration as reported being $45,000. It is announced that improvements will be made, including the erection of a new washer and installation of electrical haulage. The purchasers expect to provide their various plants with fuel from the properties purchased, on which there is now an opening producing about 125 tons daily.

The Republic Iron and Steel Co. is making good progress in the construction of its new washeries and screening plants at Sayreton, Jefferson County, and Palos, Walker County, the only deterring features being the scarcity of labor and the difficulty and delay experienced in securing deliveries on equipment.

OKLAHOMA

Henryetta—The Fretwell Coal Co., which recently filed notice of an increase in its capitalization from $10,000 to $50,000, has commenced active operations on the development of a tract of coal lands comprising 490 acres. It is planned to have a daily capacity of 500 tons.

Foreign News

Winnipeg, Man.—At a joint meeting of the Board of Control and Civic Coal Committee on June 29, it was stated that of the 150,000 tons of soft coal required as a minimum for the winter supply only 25,000 tons had already been secured. Mayor Davidson stated that it was no longer a question of price, but one of getting the coal at any cost or freezing next winter. It was decided to send two members of the Civic Coal Committee to Alberta to investigate coal conditions there.

Personals

George Wall has been made superintendent of the Christian Colliery Co., at Mahan, W. Va. Mr. Wall was formerly superintendent of the Coal Valley Coal Company.

F. E. Herriman, coal traffic manager of the New York Central, who on June 19 was appointed vice president of the Clearfield Bituminous Coal Corporation, on July 8 was elected president of the corporation.

M. W. Price, who was safety engineer with the Lehigh Valley Coal Co. for a long period, and more recently with Weston Dodson & Co., in their southern mines, has taken a similar position with the G. B. Markle Co. at Jeddo, Pennsylvania.

I. J. Barry, of Indiana, Penn., has resigned his position as superintendent of the Indiana County Street Railways Co. to become general manager of the Bardes Six-Four Coal Co. in which he is interested. The Bardes company is opening two new mines near Homer City, Pennsylvania.

Josiah Bachman, secretary and treasurer of the Weston Dodson & Co., Widener Building, Philadelphia, Penn., and connected with the company for the past forty years, has resigned from active service, effective July 1. George C. Radford, formerly assistant treasurer, has been elected treasurer succeeding Mr. Bachman, and C. B. Jacoby has been elected assistant treasurer.

Obituary

Dr. John S. Wentz died on July 1 at his home in West Philadelphia, Penn., aged 81. He was prominently identified with anthracite mining for many years, representing the Wentz and Leisenring interests in the management of the Upper Lehigh Coal Co., Mary D. Coal Co., Midvalley Coal Co. and J. S. Wentz & Co., as president. Dr. Wentz and family associates acquired some 100,000 or more acres of bituminous coal lands in southwestern Virginia, organizing under the name of Virginia Coal and Iron Co. A part of these holdings was operated by the Wentz interest as the Stonega Coal and Coke Co. During the last ten years his son, Daniel B. Wentz, now in the service in France, was the practical head of these coal companies.

Trade Catalogs

Cambria Wire and Nails. Cambria Steel Co., Philadelphia, Penn. Pp. 47; 4¼ x 7¼ in.; illustrated. Latest edition of the Cambria company's wire and nail catalog.

C-H Battery Charging Equipment. Cutler Hammer Manufacturing Co., Milwaukee, Wis. Pp. 4; 8½ x 11 in.; illustrated. Describes charging equipment for electric vehicles and industrial trucks.

List of Steel and Other Products. Midvale Steel and Ordnance Co., Cambria Steel Co., Philadelphia, Penn. Pp. 55; 4¼ x 7¼ in.; Unillustrated. An index of the more important products manufactured by the company.

Circular Letter No. 123. Ironton Engine Co., Ironton, Ohio. Pp. 4; 8½ x 11 in.; illustrated. Describes three Ironton locomotives "that will gather coal under all conditions." Specifications are given for the three machines.

Twenty-eight Years of Steel Pipe Progress. National Tube Co., Pittsburgh, Penn., Pp. 4; 8½ x 11 in.; illustrated. Tells graphically the story of years of progress in the manufacture of the National Tube Co.'s product.

Sullivan Ironclad Coal Cutters. Sullivan Machinery Co., Chicago, Ill. Bulletin No. 73. Pp. 48; 6 x 9 in; illustrated. Describes this concern's cutter for room-and-pillar and longwall mining. Ironclads of both types are manufactured for electric drive, either direct or alternating current, or for compressed-air drive, with "Turbinair" motors.

C-H 9116 Starting Switch for Squirrel Cage Motors. Cutler-Hammer Manufacturing Co., Milwaukee, Wis., Pp. 4; 8½ x 11 in.; illustrated. Two-color pamphlet showing four typical installations of this type of switch. An interior view shows construction and arrangement of starting and running contacts, fuses, etc. Manner in which motor is connected to the line ahead of the fuses, without opening circuit to the motor in the transition, is clearly indicated.

Publications Received

Weights of Various Coals. By S. B. Flagg. Department of the Interior, Bureau of Mines. Technical paper 184. Unillustrated, 11 pp., 6 x 9 inches.

Monthly Statement of Coal-Mine Fatalities in the United States, March, 1918. Compiled by Albert H. Fay, Department of the Interior, Bureau of Mines. Unillustrated, 21 Pp., 5¼ x 9 inches.

Report of the Committee on the Standardization of Mining Statistics. Compiled by Albert H. Fay, Department of the Interior, Bureau of Mines. Technical paper 194, unillustrated, 39 Pp., 5¾ x 9 inches.

The Quick Determination of Incombustible Matter in Coal and Rock-Dust Mixtures in Mines. By A. C. Fieldner, W. A. Selvig and F. D. Osgood. Technical paper 144, illustrated, 33 pp.; 6 x 9 inches.

Abstracts of Current Decisions on Mines and Mining. Reported from September to December, 1917. By J. W. Thompson. Department of the Interior, Bureau of Mines. Bulletin 164, Law Serial 14. Unillustrated 146 pp., 6 x 9 inches.

Industrial News

Ashland, Ky.—The Green Rock Coal Co. has filed notice of an increase in its capitalization from $5000 to $25,000 to provide for expansion.

Richmond, Va.—The Sabine Collieries Corporation has filed notice of an increase in its capitalization from $500,000 to $600,000, to provide for business extensions.

Charleston, W. Va.—The Harry B. Coal and Coke Co. has recently filed notice of an increase in its capital from $100,000 to $300,000, to provide for business extensions.

Middlesboro, Ky.—The Riverside Coal Mining Co. has filed notice of an increase in its capitalization from $25,000 to $50,000, to provide for extensions, improvements, etc.

Chicago, Ill.—The Michigan Central Railroad Co. has taken bids for the construction of a new coaling station to have a capacity of 300 tons, to be located at North Toledo, Ohio.

Chelsea, Mass.—Ribock & Sevinor, 72 Walnut St., have awarded a contract for the construction of a new 1-story coal elevator plant at their works, about 30 x 60 ft., to cost $10,000.

Utica, N. Y.—The Bossert Co., 1019 Hickory St., has had plans prepared for the construction of a new coal pocket at its plant to cost about $10,000. James R. Jones is general manager.

Juneau, Alaska—Preliminary work has been started by the Alaskan Engineering Commission in the construction of a spur track into the Baxter coal mines on Moose Creek, from the Chickaloon branch.

Mannington, Ky.—The Memphis Coal Co. is considering plans for the immediate erection of a new steel tipple. The company is also planning to increase the capacity by the development of an additional mine.

Whitesburg, Ky.—The Long Ford Coal Co., recently organized, has leased an extensive tract of coal lands near Long Fork, and is planning for the immediate installation of the necessary machinery for development.

Baltimore, Md.—The Penn Smokeless Coal Co., Pittsburgh, Penn., has recently acquired property at Lawrence and Decatur Sts., Baltimore, and is planning for the construction of a new coal tipple, storage bins and offices.

Whitesburg, Ky.—The Elkhorn Superior Block Coal Co. has filed notice of an increase in its capitalization from $35,000, to $100,000, to provide for the installation of new equipment at its plant, including electrical machinery.

Birmingham, Ala.—The Turkey Creek Land and Coal Co. has been incorporated with a capital of $10,000 to engage in a general coal-mining business. Charles E. Francis, A. W. Stearns and George Maesta are the incorporators.

Oakdale, Penn.—The Carnegie Coal Co. is rebuilding its tipples at Armide and Oakdale mines, having contracted with the Roberts & Schaefer Co., engineers and contractors, Chicago, for Marcus picking table screens at each mine.

Akron, Ohio—The Canton-Akron Coal Co. has been incorporated with a capital of $50,000 to mine and sell coal. The incorporators are James R. McAllister, Charles Blain, J. E. McAllister, Leo A. McAllister and John E. Morgret.

Hornell, N. Y.—The Erie Railroad Co., Jersey City, N. J., has awarded a contract to Fairbanks, Morse & Co., South Wabash Ave., Chicago, Ill., for the construction of new coal pockets with equipment, at Hornell. The work will cost about $150,000.

Charleston, W. Va.—Having leased a tract of coal land on Campbell's Creek in the Kanawha field, J. S. Cheney, formerly of the Stonegap Colliery Co. at Glamorgan, Va., and James Raisbeck, together with their associates, will develop the leased property.

Seattle, Wash.—The price of Wyoming coal has increased 35c. a ton in California, the raise being granted by the fuel administration to meet a higher price at the mines. Increases of 50c. per ton on California coal and 75c. per ton on coke to cover added cost of transportation were authorized July 1.

Cincinnati, Ohio—The Reliance Coal and Coke Co., 897 Union Trust Building, is pushing arrangements for installing modern coal-handling equipment in the old Marmet Coal Co. yards, recently acquired, and is purchasing coal-elevating and handling machinery as well as trackage and equipment for yard purposes.

Louisville, Ky.—Philip M. Riefkin, of Washington, D. C., and Alexander Henry, Jr., of Wilmington, Del., have contracted with 41 operators in the western Kentucky field for 7000 tons of coal per day to be delivered to the Hadley's Bend plant of the DuPont Powder Co., near Nashville. The contract is dated Apr. 1, 1918, and runs for a period of one year.

Henry Ellen, Ala.—The Donaldson-Stobert Coal Co., recently organized, is planning for the immediate development of approximately 280 acres of coal lands to have a capacity of from 300 to 400 tons daily. J. W. Donaldson is president; Thomas Berry, vice president; and T. Stobert, secretary and treasurer. Offices of the company are in the Brown-Marx Building, Birmingham.

Warfield, Ky.—The Easton Coal Co. has leased extensive properties on Buck Creek, including several mines having a capacity of about eight carloads per day. It is said the company is planning for extensive improvements and the installation of the necessary machinery to provide a daily capacity of about 35 carloads. The work is estimated to cost approximately $300,000. D. W. Farquharson, Welch, W. Va., is president.

Clendenin, W. Va.—The Elk Gas Coal Co., recently incorporated with a capital of $50,000, has perfected its organization and is planning for immediate work on the development of 400 acres of coal lands, to have a capacity of about 100 tons daily for initial operations. Work will be commenced at once on the installation of the necessary machinery, including hoisting apparatus, electric motors, etc. L. V. Koontz is president.

Columbus, Ohio—The Ohio Board of Administration has started to purchase approximately 500,000 tons of coal for the various state institutions under its care. This is the earliest that the board has started its purchasing, but a valuable lesson was learned last winter. The board has also purchased four large motor trucks to transport coal to the institutions whenever possible. Additional storage space has been provided at most of the institutions.

St. Louis, Mo.—The East St. Louis Retail Coal Dealers' Association, of which John Thomas is president and J. T. Maule, secretary, has filed with Fuel Administrator Baxter a petition for permission to charge higher prices for coal. They state that at the present prices, $4.50 for Standard, $4.75 for Mt. Olive and $5.25 for Carterville, the gross margin is $1.20 per ton, which they say is much below the margin allowed in St. Louis and St. Louis County, and in various Illinois cities.

Columbus, Ohio—Joseph H. Frantz, the newly appointed Ohio Fuel Administrator, has taken up his duties, and his first announcement was the retention of C. F. Mayer as executive secretary. Mr. Mayer has been operating the office since the resignation of H. H. Johnson, the former administrator. The administration has started a new survey of the amount of coal in the cellars and bins of domestic users, and a full report will be forthcoming in the near future.

Chicago, Ill.—The Chicago Pneumatic Tool Co. announces the appointment of L. C. Sprague as its special representative in connection with the sale of pneumatic tools to railroads. Mr. Sprague was formerly connected with the tool company, but more recently has been connected with the railroad department of the H. W. Johns-Manville Co., New York City. His long connection and association with the railroads of this country especially fits him for the work which has been assigned to him.

Toledo, Ohio—Considerable activity prevailed at the docks during the past week, despite the intervention of the holiday. This is shown by the records of loadings at the Hocking Valley and Toledo & Ohio Central docks. The Hocking Valley docks loaded 157,427 tons for the week ending July 6, as compared with 140,450 tons the previous week, making a total of 1,334,804 tons since the opening of navigation. The Toledo & Ohio Central loaded 61,000 tons, as compared with 63,735 for the previous week, making a total of 700,000 tons since the opening of the lake season

New York, N. Y.—The Quigley Furnace Specialties Co., Inc., has opened a branch office in Pittsburgh at 427 Oliver Building, to handle the sale of powdered coal equipment, and Hytempite furnace cement. The powdered-coal engineering department will be in charge of L. V. Marso, formerly maintenance engineer of the A. M. Byers Co. plant at Girard, Ohio, and the specialties department will be taken care of by J. L. Cummings, Jr., formerly connected with the sales department of the company at New York.

Columbus, Ohio—J. M. Roan, who has been appointed field manager for the inspection division of the Federal Fuel Administration, effective July 1, is now organizing his office force. He will have his headquarters in Columbus and his jurisdiction will be country wide, extending in all mining districts. He has authority to name deputy inspectors to see that coal is prepared and cleaned properly. Just how many inspectors he will name has not been determined as yet. He also has authority to make suggestions and orders if necessary, to both operators and miners, in carrying out his duties.

Buffalo, N. Y.—The Consumers' Collieries Corporation has been organized here, with W. H. Hayden, president and treasurer; Willis M. Spaulding, secretary, and Charles B. Kinne, general sales manager. The company owns the Good Hope mine near Reynoldsville, Penn., which has been operated in a small way for the past year. It is now being put into condition to produce 300 tons daily in about 60 days. A second opening was planned, which is expected to bring production up to 1000 tons daily. The principal office is in Buffalo.

Louisville, Ky.—The Gordon & Miller Coal and Coke Co., composed of Ross E. Gordon, J. S. Miller and Boyce Watkins, is planning to file charter papers with a capital of $200,000 within a few days. The company has arranged to take over the improved mine of the Lynndale-Jellico Coal Co., at Lynndale, Ky., near Barbourville, on the main line of the Knoxville division of the Louisville & Nashville. The company has a tipple and trackage into its plant. It is planned to put in additional machinery, a power plant and other equipment to increase the capacity to about 20 cars a day.

East Pittsburgh, Penn.—The Westinghouse Electric and Manufacturing Co. announces a change in representation in its Western District, with headquarters at Indianapolis, Ind. Prescott C. Ritchie has been appointed district representative to succeed H. S. Johnson, whose resignation becomes effective June 30. Mr. Ritchie has had a considerable amount of experience in the automobile industry, having been in charge of headquarters' inquiry work, for the Western District, in the main offices of the company for some years past, and prior to that time he was connected with the Thomas B. Jeffrey Co. at Kenosha, Wisconsin.

Columbus, Ohio—The Buckeye Coal and Railway Company, of Columbus, has closed a number of leases on acreage in Athens and Hocking Counties which means the opening of quite a number of new mines in the Hocking Valley district. In all cases the leasing company retains the sale of the coal. Among the leases are:

Snow Fork Coal Co., 200 acres in Hocking County located near Murray on the Hocking Valley Ry. to be developed at once and to produce about 50,000 tons yearly.

Riddle Coal Co., of Murray, 50 acres in Ward township, Hocking County, No. 6 seam, entry being driven and spur under construction.

Star Coal Co., not incorporated, De. E. M. Cox, manager, 100 acres in Trimble township, Athens County, partly worked-over land. A new plant is under construction to mine No. 6 seam.

The Oakland Fuel Co., of Sand Run, has leased 153 acres of No. 6 seam in Ward Township, Athens County, which has been worked over. A new plant is being constructed.

The North Hocking Coal Co. has leased 320 acres of No. 7 coal near Murray. The tract will be developed immediately.

MARKET DEPARTMENT

Weekly Review

Large Production of Bituminous Continues—Conservation and Curtailment the Order of the Day—Anthracite Industry Doing Its Utmost to Maintain Output—Distribution Receiving Attention—Markets Active

GRATIFICATION at the continued large production of bituminous coal is tempered by several circumstances which would tend to indicate that Fuel Administration officials, though optimistic, are in nowise prone to underestimate the probabilities of a fuel shortage next winter. "Lightless nights" are again to be resorted to, as much for their psychological effect on the coal-consuming public as for the coal saving that will result; non-war industries are discovering that the plan to curtail their fuel supply is no empty bubble—witness the 50 per cent. reduction to brewers of alcoholic and non-alcoholic cereal beverages; and now the Hoover idea has been extended to the domestic consumer, who will receive only enough coal to keep his indoor thermometer hovering around 68 degrees.

The railroads at this time of the year operate at the peak load of their efficiency. Weather conditions are propitious to the rapid movement of cars; crops have not yet been harvested and therefore do not congest transportation facilities; the unified control of the railroads makes for general betterment in service—all of which was reflected in the output of 12,458,000 net tons of soft coal during the week ended June 29.

The status of the anthracite situation has undergone no change. For the week ended June 29, shipments of hard coal amounted to 41,641 cars, 471 cars in excess of forwardings for the preceding week, but still less than the best performance made in the recent past. So insistent is the demand for anthracite that all the inventive genius in the hard-coal industry is engaged in the task of devising new means of producing more coal. Modern devices are being installed; old abandoned mines are being opened up and worked anew; more electric power is being used to supplant rapidly diminishing man power; miners are being asked to do their best in the interest of the Nation. Suffering from a shortage of labor, and with no relief in sight, the anthracite industry is doing its utmost to maintain a maximum output close to 275,000 tons of hard coal daily.

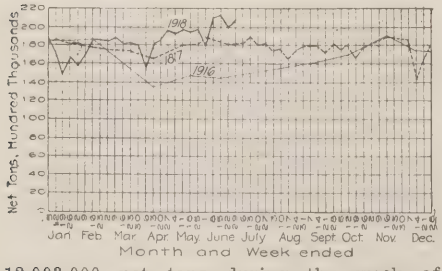
Recognizing the importance of stimulating and speeding up the production of both anthracite and bituminous, the Fuel Administration at the same time realizes that unless there is a proper distribution of the coal after it leaves the mines many injustices and hardships will be worked. To that end each retailer in the United States has been ordered to report the amount of his coal receipts, the quantity he delivers and the stock he has on hand. The plan has been in operation in New England for some time, and now it is to be extended throughout the country. For failure to comply with the regulations in this regard, 750 retailers in New England recently were given five days in which to file their reports or have their supply shut off. So it can readily be appreciated that this order has teeth in it.

Both the wholesale and retail domestic markets are active, and much coal is being distributed and stored. However, retailers are not receiving anything like their requirements, and householders are thus being greatly delayed in laying in their winter supply. New York and New England seem to be as needy of coal as ever, and the trade is wondering if the movement of 900 cars a day to New England will be ordered to continue throughout July.

With the steady shipment of coal to the Lakes from the West Virginia section which was set aside exclusively for that purpose, the movement of coal to the lake ports is assuming larger proportions. It appears to be more and more evident that unless something unforeseen occurs the Middle West and the Northwest will be well taken care of by the time cold weather sets in.

COAL PRODUCTION

Production of bituminous coal during the week ended June 29 not only exceeded the production of the week of June 22 by 455,000 net tons, or 3.8 per cent., but resulted in the second highest weekly production in history. The output (including lignite and coal made into coke) is estimated at 12,458,000 net tons as against



12,003,000 net tons during the week of June 22 and 11,583,000 net tons during the current week of 1917. The average production per working day is estimated at 2,076,000 net tons, an increase over the preceding week of 75,000 net tons or 3.8 per cent. and over the same week of 1917 of 145,000 net tons or 7.5 per cent.

Increased shipments during the week ended June 29 were reported from all districts with the exception of central Pennsylvania and Alabama. The decrease from Pennsylvania amounted to 1.8 per cent. and from Alabama 2.4 per cent. Material increases in shipments from the district including northeast Kentucky, high-volatile fields of West Virginia and the smokeless fields of West Virginia amounted to 13.0 per cent., from southwest Virginia 11.8 per cent., from Ohio 10 per cent. and from the Fairmont district 5.7 per cent.

Anthracite shipments increased 471 cars during the week ended June 29, the total movement amounting to 41,641 carloads.

CARLOADS OF COAL ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended June 8	June 15	June 22	June 29
Bituminous shipments, 123 roads	219,839	222,892	212,849*	221,801†
Anthracite shipments, 9 roads	40,754	41,960	41,170	41,641

* Revised from last report. † Subject to revision.

Material decreases occurred during the week of June 22 in Illinois, Indiana, southern Ohio, Westmoreland, Fairmont, southwest Virginia and in Kansas and Missouri. Insufficient car supply caused production to decline in Indiana, southern Ohio and Fairmont, while in Illinois the declined production is attributed to both car and labor shortages, in Westmoreland and Kansas and Missouri mainly to labor shortage and in southwest Virginia to mine disability and other causes. Increased production in the high-volatile fields of southern West Virginia and in the Hazard and northeastern Kentucky fields is entirely attributed to better transportation conditions. The increase in northern and central Ohio and in Oklahoma and Arkansas is due to improvement in car and labor conditions. During the week there was a market in Illinois for all coal mined while in Kansas and Missouri and in the far west states market conditions improved considerably.

Beehive Coke—The production of beehive coke in the United States during the week ended June 29 is estimated at 604,000 net tons, a decrease compared with the week preceding of 6000 net tons or slightly less than 1 per cent. The average production per working day is estimated at 101,000 net tons as compared with 102,000 net tons during the week ended June 22. The principal operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania report production for the week ended June 29 at 401,114 net tons, the plants being operated at 77.4 per cent. of their present capacity in comparison with 75.5 per cent. during the week of June 22.

Byproduct Coke—The byproduct plants of the country were operated at over 90 per cent. of their full-time capacity during the week ended June 29. The operators reporting produced 496,396 net tons, their plants being operated at 90.5 per cent. as against 89.4 per cent. during the week of June 22. Losses due to labor shortage and repairs to plants decreased during the week, causing the improvement. Material increases in production occurred in Alabama and Pennsylvania. The operators in the former state attribute the improvement to a hundred per cent. coal supply and repaired plants, and the latter state to better labor conditions.

Atlantic Seaboard

BOSTON

A gradual increase in all-rail receipts, but volume is still inadequate to build up necessary stocks. Clear now that 4500 cars weekly from central Pennsylvania for New England cannot be relied upon. Several instances at tidewater where cargo space is in excess of coal available. Diminished output and heavy requisitions for naval and army transport account for smaller volume at Hampton Roads for New England consignment. While supply of shipping increases from week to week, loss of 25 per cent. efficiency estimated through difficulty in getting and keeping crews, especially in boiler rooms. Railroad situation begins to get action from Washington, but results thus far are meager. Coal at Boston & Maine gateways still being diverted from commercial users. Fuel authorities keep close check on receipts both by rail and water. Anthracite shipments fall off week ending July 6. Much anxiety over inroads of the draft on certified miners. Barges still move slowly.

Bituminous—Efforts at Washington a month ago begin to show results. The receipts of bituminous at the five New England gateways have gradually increased the last fortnight, the average for the first 7 days of July having been 741 cars against the 615 daily average for June. This is apparently the result of the order dated at Washington, June 10, instructing district representatives to direct operators to ship up to 100 per cent. on all New England orders and contracts in hand, after certain important needs in market territory had been cared for. Aside from occasional diversions to relieve congestion at New York piers, nothing has so far been shipped on special requisition by the New England Fuel Administrator, a provision designed to help those steam-users who had been unable to secure contracts, but it is possible that this month will see consignments of this kind started forward.

By this time it is perfectly plain that the weekly movement from the Altoona district alone cannot be worked up to 4500 cars, under the heavy demands in other directions. Bunker purposes at New York are necessarily favored for transport and other service, and the volume for other requirements at the piers has thereby been reduced. Important munition plants in Connecticut have had to encroach on their stocks of high-volatile to feed their steam plants, receipts for their account having fallen off so rapidly during June.

The time when there will be a surplus of coastwise shipping as compared with coal available at the piers is fast approaching. Already there have been cases where steamers under charter by important utilities have been sent to Hampton Roads with no assurance the coal would be furnished. In other cases a number of shippers have had to join in loading part cargoes in order to clear waiting vessels. Large requisitions in favor of byproduct plants and then also the exacting demand for export to the Allies and for transport, the navy, and other Government services have materially curtailed the volume of coal available for this territory. Output in the smokeless districts has also fallen off, and what most operators have foreseen is already taking place. The draft is seriously cutting into the labor supply, especially in the Pocahontas field, where the proportion of non-citizens is very small. The great demand for coke also has its bearing on the supply of run-of-mine, and shipments west are still continuous under special permits. July is likely to make an even more unfavorable showing for New England, than June, and at this writing it is hard to see how ships are to be given dispatch later in the season.

The movement via Curtis Bay and Port Covington has increased, but not to the extent called for by program. The flow of coal is irregular, and already colliers arriving at the piers have been subjected to delay. There are many in the trade who are skeptical of Baltimore & Ohio and Western Maryland movement, and there are many buyers who join in the same opinion. With the New England railroads still moving coal freely from connecting roads, it is hard for them to see much merit in restricting Somerset, Georges Creek and Fairmont coals from the all-rail route.

Were it not for the delay in manning and keeping in operation the 94 steamers now in the coastwise coal service, surplus of shipping would be much more pronounced. It is figured that the loss in efficiency is at least 25 per cent. for this one reason, taking the fleet as a whole. Steamers that were counted upon to make 34 to 38 round trips per year are barely making one trip a month. Time was when certain of these ships would make 47 trips per year. The problem of securing crews and keeping them aboard grows more and more serious.

The railroad fuel situation shows no real improvement. Under the distribution plan announced late in May railroad and Government departments were to be supplied through the Fuel Administration at Washington. The New England roads have found it necessary, however, to make frequent calls on Mr. Storrow, to such extent that not only a considerable tonnage is still being diverted at the gateways from commercial consignees, but hardly a cargo reaches Boston for inland distribution that is not heavily requisitioned for railroad fuel. Even with strenuous efforts the Boston & Maine reserve has increased hardly any. The proper department at Washington has now taken notice of the situation, and two cargoes, amounting to 5900 tons, have been put in process at Baltimore. The summer consumption of the Boston & Maine is about 4700 tons daily.

An interesting meeting was held on July 9 in Mr. Storrow's office with further regard to the compensation to be granted "wholesalers" who do not handle cargoes through their own wharves in such a way as to meet the regulation on "physically handling." A fortnight ago Mr. Storrow fixed the Massachusetts compensation as 23c. per net ton (including purchasing compensation), but since then the New York Fuel Administration has granted 35c., and the Connecticut and Rhode Island administrators have felt it incumbent on them to meet the advance or see coal go to New York consignees. It developed at the meeting that there was a pronounced feeling among shippers against anything that would look like profiteering or that would open the gate to paying bonuses for coal. As an outcome the Massachusetts compensation will probably be advanced to 35c. on shipments out of New York, leaving Hampton Roads deliveries for the present on the 23c. basis for such wholesalers as come within the rule. Washington should now see the point and revoke the celebrated licensing rules 24 to 26, and thereby shut down on any such competition as has already come to light between different territories drawing coal from the same source.

Anthracite—The holiday had its usual effect upon hard-coal shipments, and shipments from the mines since then have fallen off noticeably. The trade is anxious over the continued drafting of skilled anthracite mine workers and one frequently hears the hope expressed that the authorities will find some way to remedy the loss in labor that will presently make itself felt in reduced output. For the first five days in July the average daily receipts of domestic sizes at the New England gateways were 491 cars. Steam sizes averaged 177 cars. Barge movement has slowed up to quite an extent, due chiefly to the precautions still being taken against sea raiders, and partly also to thick weather. It is certain that July receipts will be considerably less in New England than in June.

NEW YORK

Anthracite conditions continue serious. Domestic coals scarce. Organizations ask for State Fuel Administrator. Change to be made in bunker coal pools. Demand for bituminous remains heavy, with free coals hard to pick up.

Anthracite—The continued heavy production is having but little effect on the situation, which is becoming more critical as the season advances, with the increased demand from war industries and domestic users. Labor conditions are not improving. Men continue to be drafted, while others are leaving the mines for higher wages at munition plants, shipyards and other industries. It is claimed that some collieries, because of the labor shortage, are unable to operate more than 50 per cent. capacity.

Locally the situation remains serious. There is a continued scarcity of domestic sizes, including pea, and dealers are thoroughly aroused over the prospects of a shortage here next winter. For this reason the trade is anxious that a State Fuel Administrator shall be appointed at once. They continue to put forth arguments as to the necessity of an appointment being made at once if this market is to have its share of coal. Frequent meetings are being held in various parts of the city, and Dr. Garfield is being urged to fill the vacancy caused by Mr. Wiggin's resignation several weeks ago.

The newest order of the Anthracite Committee, wherein it is directed that water shipments into New England must be on the largest possible scale, and that shipments by rail should exceed one-twelfth of the rail shipments of the 1916-1917 period plus the increased percentages allotted the state into which shipments are made, attracted considerable attention here. The committee says that shippers who have not during April, May and June exceeded one-third of the annual shipments of the 1916-1917 period plus the increased percentages should make up during July the deficiency, in addition to the other rail shipments. This will result, in the opinion of some of the trade in this market receiving less coal than it would if the order had not been issued.

There were 6951 cars of anthracite dumped at the New York tidewater docks for the week ended July 8, as against 7426 cars the week previous, a decrease of 475 cars, due in part to the holiday, on which only 14 cars were emptied.

The New York County Fuel Administrator, Reeve Schley, has issued an order to all retail dealers and shippers prohibiting the delivery of buckwheat No. 1 and larger sizes of anthracite coal to other than the consumers named in Section No. 1 of the order of the United States Fuel Administration of Jan. 17.

Dr. Day, Commissioner of Public Markets of this city, has announced that he has closed negotiations with the DeJulio Co., of 220 Broadway, whereby this city will receive 300,000 tons of coal from the Schuykill regions to take care of the needy next winter. Deliveries are expected to begin soon after the formal contract is signed.

The steam coals are scarce, with a good demand. Buckwheat No. 1 is hard to pick up, and with the new order of Mr. Schley is not expected to increase in supply.

Current quotations per gross ton f.o.b. tidewater at the lower ports, follow:

	Circular	Individual		Circular	Individual
Broken	$6.50	$7.25	Pea	$4.90	$5.65
Egg	6.10	6.85	Buck	4.85	5.60
Stove	6.35	7.10	Rice	4.35	4.80
Chestnut	6.45	7.20	Barley	3.85	4.00

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates. Prices for buckwheat, rice and barley are not fixed by the Government.

Bituminous—The local situation continues serious. Stocks are low and there is small opportunity for consumers to lay in an extra supply. Large consumers and regular customers are able to obtain sufficient to keep their plants going, but are not able to store any for future use. Car supply shows some improvement, but the labor situation remains a menace.

There is plenty of bunker coals to be had; in fact, some shippers are said to be over-stocked. This supply will probably be reduced shortly, and the quantity of coal available for commercial uses increased by the issuance of an order on Monday by the United States Fuel Administration to the effect that coals in Pools Nos. 1 and 9 are to be used for transatlantic ships and that coals in Pools Nos. 4 and 10 are permissible for coastwise and river steamers.

Dumpings of bituminous at the local tidewater docks for the week ended July 8 show that 7089 cars were dumped as against 7228 cars the preceding week, a decrease of 139 cars.

The order issued from Washington a couple of weeks ago directing that 900 cars be sent daily from the central Pennsylvania fields into New England is still in force, with the result that this market is not receiving as much coal as it ought to get.

In regard to the margin of 35c. per ton on coal physically handled by jobbers, Ellery B. Gordon, assistant to the State Fuel Administrator, has written to Charles S. Allen, secretary of the Wholesale Coal Trade Association, explaining further several points in connection with the ruling. He says that sales agents who obtain this commission from the mines will be expected to take this margin minus the amount of commission they received from the mines; that the order is a provisional one and quite liberal, and that he wishes to caution wholesalers from taking advantage of it where their conditions of operation do not justify the full margin of 35c.; and thirdly, that it is not the intention that the ruling will bring about a competition between sections, but that irrespective of the margins permitted at various points served by New York wholesalers they will place their tonnage where it is needed most without regard to margins, following their usual proportionate distribution as far as possible.

Current quotations, based on Government prices at the mines, net ton, f.o.b. tidewater, at the lower ports, are as follows:

	Mine Gross	F. o. b. N. Y. Gross
Central Pennsylvania:		
Mine-run, prepared or slack	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of-mine	3 08	5.23
Prepared	3.36	5.51
Slack	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite tonnage does not improve. Dealers' yards empty. Making receipts go as far as possible. Some domestic buckwheat demand. New light and power regulations. Increased retail prices account freight raise. Operators call on public to conserve fuel. More statistics ordered from retailers. Bituminous slightly improved, over previous week. Talk of changed price fails to attract attention. Stocks being accumulated.

Anthracite—From the retail standpoint it cannot be said that any noticeable progress has been made lately toward filling bins, but there is an apparent feeling of confidence that conditions are about to improve. Larger shippers, while they expect much heavier shipments into this market, hesitate to give the dealers much encouragement for fear something will happen to change their plans, or that they will be besieged by the retailers for more coal than it will be possible to ship. Thus far this month tonnage receipts are even lower than the average for June, much of this being traceable to the Fourth of July holiday, which materially cut production.

Reports recently filed with the local fuel administrator show practically no prepared sizes in the retail yards, with an enormous tonnage to be delivered. A number of dealers have gone into the market for No. 1 buckwheat coal for domestic trade, and are endeavoring to secure a stock. This size has not been sold in any appreciable quantity for this purpose, but is being sought for emergencies. The dealers who are showing an interest in it feel that it will be good business to stock the coal in the empty spaces they now have, as they feel there will be no difficulty to move it when winter arrives.

Lightless nights have again been ordered, and other limitations placed on the use of electric current, effective with the 10th inst. Elevator curtailment and the staggered, or "skip-stop," system of trolley service has also been ordered for the 15th. Many of the commercial bodies here are much opposed to the skip-stop system on the street railways. In the curtailment of illumination the elimination of all window display lighting becomes a law instead of a request, as last year. Electric energy for power and lighting, as well as gas for cooking and heating, will thus be regulated and their consumption greatly reduced.

This week the fuel authorities have given much consideration to the alleged faulty reports of owners of buildings who had applied for permits to receive coal. There are cases against 87 owners of buildings who it is claimed have rendered false statements as to the amount of coal on hand and the amount consumed last year. Action in court will be taken against all those who are unable to satisfactorily explain their reports.

An announcement was made this week of the total shipments for the first quarter of the Government coal year, wherein it was shown they fell short of 600,000 tons, whereas 700,000 tons were needed.

Retail prices as quoted by the dealers have now reached the highest point since the big strike of 1902. One representative firm, which is supplied by the big companies as well as the independents, this week quoted as follows: Broken, $9.85; egg, $9.45; stove, $9.75; chestnut, $9.85; pea, $8.20; buckwheat, $8.

In comparison with these figures it is interesting to note the new figures issued by the chairman of a fuel committee in one of the suburban districts. The new prices are fixed at this time owing to the increase of 45c. in freight rates, and the suburban quotations are made for dealers handling both company and individual coal;

	Egg	Stove	Nut	Pea
Company	$9.00	$9.25	$9.25	$7.75
Individual	9.75	10.00	10.00	8.50

It was thought that all possible variations of statistics bearing on the retailers' business had been asked for, but the dealers have now been called on for still another statement. Late in the week they were in receipt of communications from Washington, inclosing forms of statements for them to fill out showing the amount of coal on hand during the week just past, together with the amount delivered and the tonnage en route. This statement is to be made out in duplicate each week, and one copy sent to the national administration at Washington, while the other is to be sent to the state fuel administration in this city.

There is no appreciable change in the steam coal situation. All sizes continue to be fully taken, with only the least possible leeway on barley coal, and this only in occasional instances. With the continued fair shipments of bituminous there is still little market locally for culm, and most sales are made at the $1 figure, although some of the companies insist on $1.25 for their shipments, the most of which goes to commission houses. It is noticeable in this territory that the manufacturing plants are storing considerable of the anthracite steam sizes, and even the non-war plants are getting good consignments and will likely have all the coal they are allotted for the year by the time snow flies.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.25	Buckwheat	$3.40	$4.45
Egg	4.50	5.85	Rice	2.90	3.80
Stove	4.75	6.10	Boiler	2.70	3.70
Nut	4.85	6.20	Barley	2.40	3.30
Pea	3.45	4.70	Culm	1.25	2.15

Bituminous—Fairly good shipments have continued to come out, although the car supply is far from the liking of the operators. It is only fair to state, though, that this week there has been a slight improvement in this respect, as we have come across operators who state they have received a little better than 50 per cent., and some even as high as 60 per cent. of rating, as compared with an average of about 50 per cent. for the previous week.

The preferential order of 4500 cars per week for New England continues in force and at the moment there is no prospect of the order being rescinded for some time to come.

The operators seem to be but little disturbed at the agitation for a price reduction caused by the report in Washington of the alleged profits under Government price fixing. As a matter of fact the producers do not see how the price can be reduced, with the likelihood at any time that the workmen will ask for increased pay due to the manner in which the cost of living has mounted in the last six weeks.

BALTIMORE

Big slump in movement of soft coal noted. Inspection at mines for bad coal apparently not very rigid. Anthracite men report light receipts and in many cases are refusing more orders. Work or fight order both hurts and aids.

Bituminous—A decided falling off in the receipts of soft coal here is noted. Handlers of the fuel in this section report that there has been a decided decrease in direct movement of fuel and an almost complete elimination of the diversions that had kept this section well supplied for a few weeks. The fact that the lines north have been cleared of much congestion, while local freight yards here have suffered a jam of freight other than coal, has militated against the receipt of any great quantity of diverted coal. The preferential list of deliveries to steel works and for railroad fuel, much heavier in the past two weeks than for some time previous, has also absorbed much of the flow of fuel from the mines. The result here has been that a number of the industries have been forced to go into the slender surplus stocks they had managed to amass during the fairly free supply period. Numerous requests for fuel that have come to the Maryland Fuel Administrator have been sent to the district representative for assignments, but the response has been extremely light.

Anthracite—Dealers here report receipts comparatively light. The movement to this section continues not only below the 10 per cent. increased allotment basis, but below the standard set at this time last year, when there was much more coal in cellars and in yards of dealers than at this time. Numerous dealers are now figuring that they can not possibly deliver more than the two-thirds business of the orders already on their books before winter, and the list of those refusing to take more orders at present constantly grows. The public, too, is becoming more and more uneasy as they find increasing difficulty in even getting promises of partial delivery before October or November.

Lake Markets

PITTSBURGH

Doubts as to magnitude of prospective shortage. Labor supplies uncertain. Narrow market.

In view of the heavy production of coal, some observers are wondering whether the shortage, or prospective shortage, is not being exaggerated. Allowance is made, of course, for the unprecedented consumption of many industries, but on the other hand it is held that measures of economy should count for a great deal, and the high cost of coal must be a great incentive, apart from the regulations and vigorous pleas of the Fuel Administration.

Car shortages continue in the Pittsburgh district, but there is also some labor shortage, and it is doubtful whether an increased car supply would result in a large increase in production. It is pointed out that there is this important difference between present conditions and those of the early months of the year. Then cars were not only short, but in irregular supply, the result being that miners frequently came to work and found nothing to do. Now the case is different. Car supplies are regular, even though not adequate.

The miners are not producing as much coal as they could by working full time, but they are probably producing nearly if not quite as much as they are disposed to produce until fresh measures are taken to stimulate their activities, contingent of course upon there being the added car supply. By the last two weekly reports of the Geological Survey western Pennsylvania shows a deficiency of about 17.6 per cent in production, 11.5 per cent being attributed to car shortage and 3.6 per cent to labor shortage.

The market is still a narrow one, nearly all the coal produced going out on contracts or Government requisitions. Brokers are still able to secure from consumers a commission on the major portion of the small tonnages of coal they can secure for sale. The market remains quotable at the set maximum prices: Slack, $2.10; mine-run, $2.35; screened, $2.70, per net ton at mine, Pittsburgh district, brokers being permitted to charge 15c. brokerage to consumers.

TORONTO

Prices increased owing to increased freight rates. Coal coming forward freely, but dealers much behind with deliveries. Consumers unable to place new orders.

There is practically no change in conditions. Coal is coming forward freely, but the supply is entirely inadequate to enable dealers to overtake large orders on hand. Customers are all anxious to lay in supplies for the winter, but dealers as a rule are refusing to accept new orders. Quotations for best grades per short ton are as follows (subject to an increase of 45c per ton to cover increased freight rates when new orders are filled). Retail anthracite egg, stove, nut and grate, $10, pea, $9; bituminous steam, $8.50; slack, $7.50; domestic lump, $10; cannel, $13. Wholesale, f.o.b. cars at destination, three-quarter lump, unprepared, $6.11: prepared, $6.31; slack, $5.18.

BUFFALO

Still the shortage report. All varieties of coal sure to be scarce. Consumers agree and try to stock up. Cars are fluctuating. Anthracite falling off.

Bituminous—Not much change has taken place in the trade. The movement may be called normal for war time, which is of course under much restriction and with prospect of more of the same thing. Nobody looks for an easy time next winter, and the owners of all sorts of factories are wondering if they will be allowed to run at all. It is hard to get much idea of the future course of the authorities. In fact it will be governed by the amount of the shortage, for a shortage is certain.

It is still hard to get a price list to which all will agree, but the following is as authentic as it can be made: Thin-vein Allegheny Valley, $4.65; Pittsburgh lump, $4.45; Pittsburgh mine-run and slack, $4.20; cannel, $6.15; smithing, $5.85, all f.o.b. Buffalo, per net ton, with jobbers' profit added.

Anthracite—Following the general plan of summer distribution, the city supply is much less than it was early in the season. Many consumers are complaining that their orders, given in March, are not yet filled by the distributors, and other authorities say that no one has reason for complaining, as the prospect is for a usual supply. The real

difficulty is with the natural gas supply, which nobody can size up, so that the people with gas apparatus in their houses are unable to determine what to do. They prefer gas to coal and will probably still use it if it is to be had, even though the price is advanced from 30 to 35c. per 1000, as the company demands. A guarantee supply is what is asked now.

The anthracite shippers are doing their best to keep up the lake movement, but with a holiday last week the loading was only 77,500 net tons, of which 25,400 tons cleared for Milwaukee, 21,400 tons for Duluth and Superior, 18,000 tons for Chicago, 7100 tons for Fort Williams, 3000 tons for Hancock and 2600 tons for Houghton.

The shipment for the season to July was 866,156 tons, as against 1,123,495 tons to the same time last season. June shipments fell off 86,450 tons from the amount in June last season.

CLEVELAND

Holiday cuts receipts of bituminous coal. Mine equipment hard to get. Consigned car statistics. Coal receipts at head of lakes.

Celebration of the Fourth of July at the mines in the No. 8 district, and the consequent slackening of work on Friday and Saturday, cut heavily into receipts of bituminous coal here. Except for this factor, the movement showed an improvement over the preceding week. With the wiping out of the preferential car-supply system, more equitable distribution of cars and an increased output is expected. Car supply on nearly every road showed improvement. The general feeling among operators is that stocking of coal at industrial plants in lower lake cities should be stopped until the demands of the Northwest are better met. In some cases operators report difficulty in getting mine equipment ordered before the priority plan of distributing steel was adopted.

In the week ended June 29 the operators belonging to the Pittsburgh Vein Operators' Association of Ohio consigned 1626 cars to railroads, 3193 to the lake, 1533 to Ohio, 246 to Michigan and Indiana, and 87 to Canada. Mines on the Baltimore & Ohio shipped 6685 cars, on the Pennsylvania 3290, on the Wheeling & Lake Erie 1584, and on the New York Central 169. For the month of June the car supply in the Pittsburgh vein district was about 37 per cent short. By roads the shortage for the month was: Baltimore & Ohio, 41 per cent.; Pennsylvania, 36 per cent., Wheeling & Lake Erie, 33 per cent., and New York Central, 16 per cent.

On the average about 3200 cars of bituminous have been dumped in the week into upper lake carriers. Fourth of July celebrations are beginning to be felt, and some freighters have been forced to go to three docks in order to get a full load. Receipts of coal at the head of the lakes for June are shown to be: Bituminous, 905,700 tons, and anthracite, 238,500. This compares with 991,603 tons of bituminous in June, 1917, and 221,278 tons of anthracite. Total receipts of bituminous up to July 1 are 1,992,200 tons, and anthracite, 374,600 tons, compared with 1,692,540 tons of bituminous and 440,245 tons of anthracite in the corresponding period of last year. Statistics just compiled show that in June 1,649,088 tons of bituminous and 288,947 tons of anthracite moved westbound through the Soo canals.

DETROIT

Detroit's coal receipts are still light, with mine-run holding the lead. Domestic buyers delay. Lake trade shows favorably.

Bituminous—Much dissatisfaction is expressed among jobbers and wholesalers in the Detroit market concerning their inability to get coal moving into the city in larger quantity. Unless a heavier movement develops in the near future, the coal men fear there will be a serious shortage of supply during the coming winter. Attempts to improve the present supply seem to meet little success. While car supply is reported more satisfactory in many of the mine districts, there are still complaints from sections of shortage of transportation facilities, holding back production and shipment. Reports of production being curtailed by shortage of mine workers also are heard.

Inquiry from consumers of steam coal continues active and the available supply is taken so quickly that jobbers say it is almost impossible to find free coal on tracks in or around Detroit for filling emergency rush orders. Moderate progress has been made by some of the large users of steam coal toward creating reserve piles. Little opportunity is afforded, however, for selection of stock as the shipments received are chiefly mine-run, with only small amounts of slack and prepared sizes.

Sizes favored for household use are said to be forming only a small part of the shipments, and some of the dealers have found it difficult to obtain anything like an adequate supply. A moderate degree of success is attending the work of retailers in attempting to impress on customers the desirability of stocking up now for winter household needs. The consumers are being warned that limitation of anthracite supply and elimination of other substitutes make it probable chief reliance must be placed on domestic bituminous.

Anthracite—Little improvement is reported in the movement of anthracite into Detroit. Daily receipts are said to average under 40 cars, and retailers have been unable to get much of any stock in their yards. Orders placed three months ago remain unfilled.

Lake Trade—Though not averaging up to the loading that will be necessary to realize the schedule for lake shipments before cold weather, there was a better supply of coal at loading docks the latter part of last week and early this week. The movement of anthracite to Lake Superior ports in June was 268,947 tons, the lightest for the month since June, 1912.

COLUMBUS

A strong demand for all varieties of coal still characterizes the coal market in Ohio. There is some let-up in the domestic demand, but the steam and lake trades are absorbing all the fuel produced.

The coal trade in the Buckeye State continues active in every particular. Demand for tonnage from all sources is strong, and production is not yet up to expectations. During the past week there was a fairly good production, when the holiday is taken into consideration. All available tonnage is quickly taken up, and operators can dispose of their tonnage readily. The tone of the trade is generally satisfactory.

Domestic trade is still active, although there is not the feverish demand noted several weeks ago. This is accounted for by the statement that many domestic users are on their vacation trips and are not buying coal as formerly. Another reason is that many of the users have a full supply of fuel for the coming winter, and that the acute demand is now passed. But dealers are still having a good run of orders. West Virginia grades are in the best demand, though a large majority of the consumers are ready to take Ohio-mined grades. Retailers still have orders that will keep them fairly busy for the coming month. Their surplus stocks are low, and little opportunity is afforded to increase them. Retail prices are firm at the new levels, which include both the advanced freight rates and the new government price schedule. Anthracite is scarce and sells in the neighborhood of $10.70. Hocking grades sell from $4.80 for thick-vein to $6.20 for thin-vein.

The steam trade is strong, and consumers are taking advantage of the slight lull in domestic business to increase their surplus stocks. This is especially true of the larger consumers. Railroads are taking a good tonnage, and some are trying to stock for the heavy fall use. Many of the schools have now been supplied and public and state institutions are looking after their fuel supply. The threshing season is now at hand, and a considerable tonnage of mine-run is being distributed to various sections to take care of the grain harvest promptly.

Lake trade is still active, although records show that there is a shortage of between 1,500,000 and 2,000,000 tons on lake shipments compared with pre-season estimates. This is accounted for because of the late opening and of car shortage and labor difficulties. Lake shippers look for a priority order to be issued later in the season.

CINCINNATI

Diminished receipts caused by holiday, but other conditions are favorable, including car supply. Lake movement continues heavy and steady.

The Fourth of July holiday, with the reaction of the following day, caused the usual loss of production at the mines, although some instances are reported where the men voluntarily worked part of the holiday in order to keep coal moving. Aside from this loss, conditions are all favorable to increasing production, as the car supply is much improved and bids fair to continue its betterment, while miners seem generally to realize that their work is among the most important in winning the war, and in consequence labor troubles have been reduced to the vanishing point. Consumption for industrial purposes is large, but shipments are beginning to gain on current consumption, and storage for future use is therefore possible for local concerns, as well as for those in the Northwest, furnished via the lakes. The lake movement is assuming record-breaking proportions with the steady shipment of coal from the West Virginia section set aside for that purpose exclusively, and it is becoming more and more evident that unless some unforeseen interruption to production and movement of fuel occurs, the Middle West and the Northwest will be in the best position for the winter ever known, even in ordinary times.

LOUISVILLE

Domestic stocking demand considerably in excess of supply, with retail yards empty and dealers holding orders for several thousand tons. Slight surplus of screenings and steam coal. Car supply satisfactory at mines, but labor shortage serious.

In the eastern Kentucky fields considerable improvement of properties of operating companies is under way, although there are practically no new mines going in under Government regulation. Many companies are increasing their capital in order to make improvements to facilitate operations. The car supply is generally good, and no complaint is heard on that score, but all mines are short of labor.

Practically the same situation exists in western Kentucky, which has been shipping capacity production and unable to supply the demand. Little eastern Kentucky coal, with the exception of some low-grade Hazard coal, has been coming to the Louisville market, resulting in the demand for western Kentucky being extremely heavy.

More coal is being stocked this year by domestic consumers than ever before. It is claimed that deliveries during May and June were ten times heavier than during any previous spring months on record. One large concern reported that it had orders on its books for about 5000 tons of coal, while two of its largest yards are empty. At this season of the year 2000-ton orders would be considered heavy. The retailers are all snowed under on domestic orders, and are not promising any prompt deliveries. More cash business is developing than usual, and several dealers believe that it is only a question of time before retail business goes on a cash basis, credits now being on a thirty-day basis.

Steam consumers are well taken care of, and there has been some surplus steam coal, including screenings, on the market. A few domestic consumers have been taking such coal, but consumers in general are afraid of stocking west Kentucky mine-run and screenings, as this grade of coal has a habit of firing. However, in small tonnage lots for domestic consumption such coal doesn't fire, but the consumer cannot be convinced of the fact.

BIRMINGHAM

Railroads active in closing fuel contracts. Industrial demand for steam coal strong. Domestic grades being eagerly sought. Output as a whole has improved only slightly. Still a question of labor.

Representatives of the various railroads centering in this district have been busy the past week endeavoring to place orders with the mines for their 1918-1919 coal supply. The demand from industrial sources has been brisk and the supply with many plants has been inadequate and uncertain. Data which are now being compiled on the essential industries in this zone are expected to eliminate many consumers from participation in the coal supply and will afford a measure of relief to the preferred class.

Both the wholesale and retail domestic markets are active and much coal is being distributed and stored. However, retailers are not receiving anything like their requirements and householders are thus being greatly delayed in laying in their winter requirements.

The labor supply is retarding coal production greatly and numerous new operations fail to add to the output the tonnage that would otherwise be easily gained. Practically normal outputs were obtained at many mines throughout the district on July 4. However, daily productions are so spasmodic that it is difficult to discern much improvement as a whole.

Coke

CONNELLSVILLE

Holiday makes no trouble. Coke surplus a possibility in near future. Production increased.

For the first time in history when the blast furnaces were really active there has been no flurry by reason of Independence

Day. In other years, except when pig-iron production was light, there has been scurrying for spot coke before Independence Day, with a sharp advance in the market. This year the furnaces picked up such extra supplies as they could, with the limitation that they could not pay above the Government maximum, and this week they have found themselves comfortably fixed as to coke. If there was a curtailment in shipments last week it was made up by stocks accumulated. An effort was made by all operators, however, to avoid loss of time, by working on the eve of Independence Day.

A few blast furnaces are idle that might perhaps be in operation if there were more coke, but there are practically no cases of operating furnaces being short of coke, and some of the furnaces report moderate reserves. Predictions are made by some close observers that if present conditions continue for a few weeks there will be a surplus of coke in the market, and that might possibly result in some shading of the Government price. It is quite certain there is more profit in coke than in coal at the present set prices. Up to the present time nearly all the free furnace coke that has developed has been picked up promptly by furnace representatives in the region, never reaching the stage of being openly offered in the market. Foundry coke, however, is offered with some freedom, as the operators generally make more 72-hour coke than the foundry trade can consume, and the $7 price cannot be charged blast furnaces. More often than not brokers secure a commission from operators for the sale of foundry coke, but such instances in the case of furnace coke are very rare. The market remains quotable at the set prices: Furnace, $6; foundry, 72-hour selected, $7; crushed, over 1-in., $7.30, per net ton at ovens. Coke screenings from old dumps are bringing up to $6.50, for fuel purposes, and better preparation may bring somewhat higher prices, up to the $7.30 maximum prescribed.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended June 29 at 353,590 tons, an increase of 7640 tons over production in the previous week, which was record since the first of the year.

Buffalo—The jobbers in this market are still unable to get beehive coke to any great extent, but the demand for it is good, though the Canadian furnaces are not up to the average here. Dealings are with the coke producers direct for the most part, but byproduct coke is moving freely. Some jobbers report sales of a coarser coke than they have formerly obtained. While the breeze price is still $2.75 at the producing point, the larger sizes sell all the way to $5.50 a ton and the demand is much above the supply. Makers of illuminating gas are asking $8.50 a ton undelivered, and report that they are obliged to use practically their entire output, though they prefer coal.

Middle Western

GENERAL REVIEW

Federal Trade Commission report excites comment. Labor question still serious. Demand for coal keeps up well.

The recent report of the Federal Trade Commission to Congress, in which coal operators were termed "profiteers," has caused a lot of comment among mining men in the Middle West. At this time, when 90 per cent. or more of the operating companies are up to their respective necks in difficulties of labor, transportation and finances, and at the same time bending every effort toward increasing their production, the report comes somewhat as a surprise.

There is some optimistic talk in the trade about help on the labor question from Washington. A number of the optimists think that Mr. Garfield has enough influence with the President to overrule Major General Crowder's order which does not exempt the miners. The belief is that the miners will have to be exempted or the output of the mines will be lessened to such an extent that the country will suffer a serious loss.

Local conditions throughout the Middle West are practically unchanged; the car situation is perhaps a trifle better, but the labor question is as serious as ever. The demand for coal, both for domestic and steam use, keeps up steadily, with most operators having enough unfilled orders on their files to run them for the next six weeks without taking on any additional business.

CHICAGO

Production does not keep pace with demand. Domestic situation unchanged. Several cargoes of anthracite moving toward Chicago.

The demand in Chicago for steam and domestic coal, all grades, still continues to exceed by a large figure the production. A number of large steam buyers were of the opinion that there would be a decided slump in mine-run and fine coals shortly after the advance in railroad rates went into effect. Much to their chagrin there have been no signs to date of the steam market weakening to any appreciable extent. It is true, however, that screenings are sold a little more freely than they were a week ago. The efforts on the part of a number of purchasing agents to get their plants under cover so far as the coal question is concerned has proved unavailing, and these men are still making the rounds of the coal offices trying to place their orders.

The domestic situation is practically unchanged, the dealers trying every possible means to prevail upon the operators to accept their orders.

It is expected that the anthracite situation will be relieved some in the near future because there are several cargoes of anthracite moving toward Chicago, and these are expected any day.

Quotations in the Chicago market are as follows, per net ton f.o.b. cars at mines:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.55@2.70	$2.55@2.70	$2.40@2.70
3x6-in. egg	2.55@2.70	2.55@2.70	2.35@2.55
4x3-in. nut	2.55@2.70	2.55@2.70	2.35@2.55
No. 2 nut	2.55@2.70	2.55@2.70	.....
No. 3 nut	2.55@2.70	2.55@2.70	.....
No. 4 nut	2.55@2.70	2.55@2.70	.....
No. 5 nut	2.05@2.20	2.05@2.20	.....
2-in. scrgs	2.05@2.20	2.05@2.20	1.25@1.50
3-in. lump	.....	.....	2.25@2.40
2-in. lump	.....	.....	2.25@2.40
Steam egg	.....	.....	2.25@2.40
Mine run	2.35@2.50	2.35@2.50	1.85@2.00
Washed:			
No. 1	2.75@2.90	2.75@2.90	.....
No. 2	2.75@2.90	2.75@2.90	.....
No. 3	2.55@2.75	2.55@2.75	.....
No. 4	2.55@2.75	2.55@2.75	.....
No. 5	2.05@2.20	2.05@2.20	.....

There is no change in the retail price, and the prevailing market on Standard is much the same as last week, as follows:

Williamson and Franklin counties, $1.10; Duquoin field, $1; Standard and Mt. Olive fields, 95c.

There is a shortage of water throughout the Carterville field that is keeping some plants from getting out a better tonnage, and some washing plants are idle. The railroads still continue to take coal heavily out of this field, although it is understood there is to be a 60-day suspension of railroad loading, in which time this coal is to be shipped to Chicago and northern cities for domestic purposes.

In the Mt. Olive field the working time is fairly good. Equipment is rather plentiful and the labor problem is not so bad as in some other places. The tonnage here is just about equal to the demand. In the Standard field the labor problem is a serious one. The miners want to work at mines that give them steady employment, and some operators are unable to move the tonnage produced.

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La-Salle, Bureau and Will
Steam lump	$2.55@2.70	$2.55@2.70	$2.95@3.10	$2.55@2.70	$2.55@2.70	$3.25@3.40
Domestic lump	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Egg or furnace	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Small egg or nut	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Stove	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Chestnut	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Pea	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Washed egg	2.75@2.90	.....	.....	2.75@2.90	2.75@2.90	3.45@3.60
Washed stove	2.75@2.90	.....	.....	2.75@2.90	2.75@2.90	3.45@3.60
Washed nut	2.75@2.90	.....	.....	2.75@2.90	2.75@2.90	3.45@3.60
Mine-run	2.35@2.50	2.35@2.50	2.75@2.90	2.35@2.50	2.35@2.50	3.00@3.15
Screenings	2.05@2.20	2.05@2.20	2.35@2.50	2.05@2.20	2.05@2.20	2.75@2.90
Washed slack	2.05@2.20	2.05@2.20	.....	2.05@2.20	2.05@2.20	2.75@2.90

MILWAUKEE

Anthracite price schedule held up pending investigation as to proper margin of profit. Wisconsin allowed more Illinois coal.

Notwithstanding a fortnight or more has elapsed since the scale of prices for anthracite coal at Milwaukee was publicly announced, no bills have been rendered at the new scale, as the state fuel administration directed a suspension of billing until a proper margin of profit had been definitely determined.

For sixty days beginning July 1 Illinois bituminous screenings will be allowed to move to the entire State of Wisconsin, and the state fuel administration is urging manufacturers to take full advantage of the dispensation so that coal received by lake may accumulate on the docks for use later in the season.

The Central Board of Purchases of the city has entered into contract with a pool of local dock companies covering 65,000 tons of soft coal at prices ranging from $5.74 to $6.50 per ton. No bids on anthracite were received. Dealers who handle bituminous coal by rail underbid the dockmen, but the board decided that it would be unwise to depend upon rail supplies. The bid of the dock men on 51,000 tons aggregated $342,363 and that of the rail men $305,653. The rail men refrained from bidding on supplies to some of the city utilities requiring a long haul, but declared they would include such points if awarded the contract.

Since last week 18,125 tons of hard coal and 133,766 tons of soft have been received by lake, making the total receipts since the opening of navigation 157,772 tons of hard coal and 923,307 tons of bituminous.

ST. LOUIS

The market is somewhat inactive. An unusually heavy surplus of Standard coal on the market and steam is dragging. Cars are plentiful on account of zone restrictions. Carterville getting more plentiful. Country demand fair. No outside shipments. No eastern or Arkansas coal coming in.

The local situation is much easier. For the past week there have been an unusually heavy surplus of Standard coal on the market of all sizes, and screenings and mine-run are dragging, with no prospect of conditions improving unless the railroads begin to buy.

Conditions in the Carterville field are favorable with the short car supply, but not so bad as it has been at times. The labor problem still continues to be serious.

SEATTLE

Revision in freight rates boosts price of coal 20c. Wider use of Washington blacksmith coal demanded. Penalty clause for miners who lay off adopted by organized labor.

The price of coal mined in western Washington mines has been advanced 20c. per ton, owing to the advance in freight rates. This is the second raise in price in the recent past, the last being a lift of 10c. per ton. If the teamsters in Seattle are successful in pushing their demands for more wages, retail prices are expected to go up about 50c. a ton more. The Fuel Administration office has notified local industry to use Washington blacksmith coal in preference to the Pennsylvania, imports of which will be stopped in the near future. D. C. Botting, of the local fuel administrator's office, states that Washington blacksmithing coal is of the highest quality and has been used for years by such firms as the big Tacoma car shops of the Northern Pacific, the Oregon-Washington R. R. and others. Blacksmithing coal to the extent of 1000 tons a month can be produced by the mines at Wilkeson, if necessary, the fuel administrator estimates.

At the recent convention of the representatives of District No. 10, United Mine Workers of America, it was voted to restore the penalty of fines for those who took time off from work when it was not necessary and thus contributed to the shortage of coal which now exists. When some of the mines shut down in April men working irregular hours, as well as their employers, were relieved of the penalty feature of the last agreement between the unions and the operators. District officials now declare that these men are too well satisfied with the wages they receive and are not working as steadily as the union believes they should. The order will affect 6000 miners.

COAL AGE

Volume 14 New York, July 20, 1918 Number 3

Mechanical Energy versus Human Muscles

IT HAS been stated that the mines of this country must produce between 75 and 80 million more tons of bituminous coal this year than every before or some of our industries will be forced to go on short fuel rations. Of the two alternatives, that of increased production is the more desirable in every sense.

Increasing the output of coal is much like multiplying a vulgar fraction—we may either mutiply the numerator or divide the denominator. In other words, we may either increase production by working the present labor supply under existing methods a greater portion of the time, or we may change the means, methods or manner of working but expend the same amount or less of physical exertion.

To increase the amount of manual labor of any individual in a given length of time or to greatly increase the hours of labor both have their obvious limitations. Nature will not stand being driven too far. A change of method, on the other hand, usually entails a considerable increase in mechanical equipment; but the results attained often pay handsome dividends upon the initial outlay.

As an example of how mechanical equipment may aid physical effort, let us consider the following: A man traveling on foot can cover, say, 20 miles a day. We change the process of locomotion—substitute ball bearings and rubber tires for shoe leather—place the man on a bicycle, and with the same muscular effort he can cover 60 miles a day. Let us now make another substitution and place the man on a motorcycle. He is now able to travel 200 miles a day with even less effort than he walked 20 miles. Thus by the aid of mechanical help the man's "mobility" has been multiplied by ten, yet his physical effort has been decreased.

All the operations involved in the production of coal are not so readily solved by the application of mechanical energy as is the simple case of locomotion cited above. Many of them, such as undercutting for instance, have already been accomplished, while others still await solution or have as yet been only imperfectly or partially solved.

One important consideration to remember when considering the installation of mechanical equipment is that man's muscles are so weak that they can but little more than move his own limbs; his brain is big enough and active enough to guide and control the largest and most complicated machines that he has yet devised.

Without sufficient fuel our war effort must slow down. There is but one way to produce more coal with fewer men, and that is to substitute mechanical energy for human muscles. Have you done your level best to increase output at your mine by putting in plenty of equipment? Every eye in America is focused on the producers of coal.

IDEAS AND SUGGESTIONS

Simple Face Conveyor

BY H. G. DAVIS
Kingston, Penn.

The mining of the thinner or poorer quality beds of anthracite in the Lackawanna and Wyoming fields brought with it new and perplexing problems. The depleting also of the operating forces by the war and the increased demand for coal has resulted only in adding seriously to the perplexing situation already existing.

The coal mining companies have therefore been placed at their wits' ends to devise means for keeping

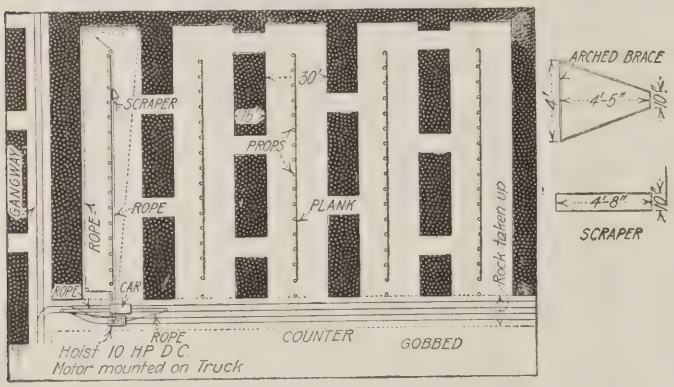


DIAGRAM OF SCOOP AND ITS OPERATION

up anything like a normal output. The Delaware & Hudson Coal Co. has successfully introduced in some of its mines in the vicinity of Scranton a loading arrangement that appears to be giving satisfactory results.

The scraper or conveyor used in bringing the coal from the face to the gangway or loading road is made of ¾-in. steel, and is reinforced at the top and bottom with light angle iron. It is V-shaped, 10 in. wide at the rear end, 40 in. wide at the front, 4 ft. 5 in. long and has no bottom. It is braced across the top by a piece of ½ x 2-in. iron, in a bow shape, so as not to interfere with the releasing of the load at the car, or discharging point, as shown in the accompanying illustration.

I am informed that with this arrangement the Delaware & Hudson Co. is loading out 25 to 30 cars per shift of eight hours, from a panel of four to six chambers in a bed 38 in. thick. This system can be successfully used in the thicker beds of this region, and the man power employed thus made much more productive.

I have been informed also that Cadwallader Evans, Jr., who is now with the International Salt Co. as general manager, is applying this method for loading salt in the mines of northern New York. I might incidentally state that Mr. Evans was the first to introduce this system in the coal mines, and I am under the impression that he has patented some parts of the equipment.

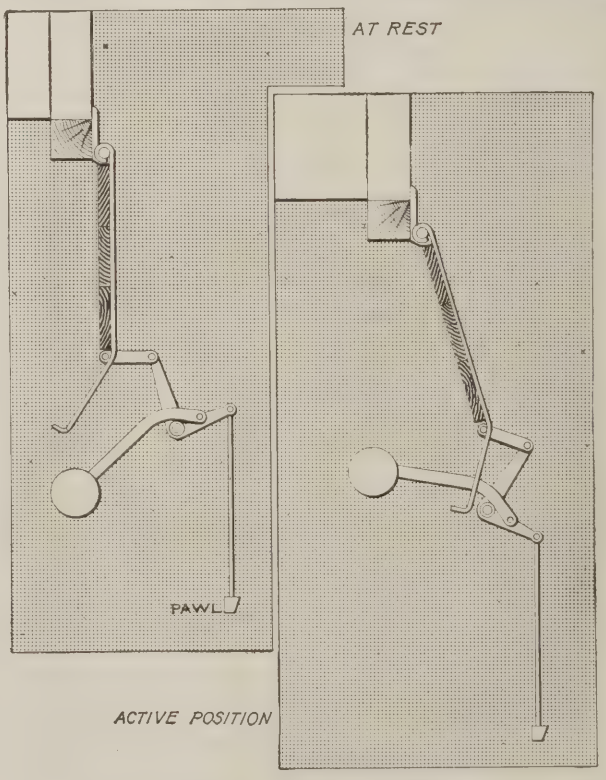
As already stated, there is no special reason why this invention could not be used more universally for loading anthracite coal, particularly in thin beds, so as to avoid the necessity for expending the large amount of energy now wasted on the top and bottom rock cut necessary to make height for mine cars, and in the thicker beds in which the pitch is not enough for the coal to run on sheet iron and is too heavy for cars.

There are several other face conveyors on the market which are quite successfully used in connection with the undercutting machine. The adaptability of all of these should be investigated by the employers of labor today, in order to assist in a greater production during the present crisis.

An Automatic Deflector

There is always danger to men working at shaft bottoms—especially at times of caging cars—from pieces of coal or other objects falling down the shaft. The open space between the cage top and the side of the shaft may be a source of danger to men passing underneath when the loaded car is being run onto the cage. At such times anything falling down the shaft may strike unprotected workmen.

To remedy this state of affairs, the Madison Coal Corporation, of Illinois, devised a scheme which was



TWO POSITIONS OF AUTOMATIC DEFLECTOR

installed at its No. 6 mine near Divernon, Ill. An automatic deflector was attached to the collar at the shaft bottom on the side of the shaft nearest the loaded sidings, at each compartment. The device is shown in the accompanying illustration at rest on the left and in

active position on the right. Each deflector constitutes a 3 x 6-ft. wooden shield.

In operation, when the cage about reaches the bottom landing it engages a pawl which connects by rod, bell crank and connecting link with the bottom of the deflector. The shield is thus moved into the active position shown by the illustration, thus roofing over the open space between the cage top and the side of the shaft. When the deflector shield is in the active position it intercepts falling objects and protects the men passing underneath it.

The policy of the more progressive companies is to guard against accident or injury to their employees in every practicable way. Automatic safety devices often do more than conserve life and limb, they may bring about greater efficiency through increased security.

Portable Saw for Mine Use

Instead of taking the wood to the saw, the mill is moved to the timber at the Glen Carbon plant of the Madison Coal Corporation, of Illinois. At this mine considerable prop timber is stored at the plant, as it is used in large quantities underground. The prop timber is stacked on the ground so as to be convenient to a track which runs the length of the yard.

A portable home-made sawmill runs on this railroad-gage track, as shown in the accompanying illustration. A 36-in. circular wood saw and a 25-hp. motor are mounted on a truck built of 8 x 10-in. sills. A pair of wheels at each end and a house superstructure to protect the machinery and operating workman in bad weather complete the outfit. A feed wire through the yard permits of electrical connection at any point, for power for the motor on the truck.

The circular saw can be seen at the front left-hand corner of the truck, directly over one of the track wheels.



PORTABLE SAW IN TIMBER YARD

Suitable arrangements are provided for holding the timber being cut. The mines use so many props that the timber covers a lot of ground, and it is much easier to move the saw up as the timber is used than to handle timber over a large yard to a stationary mill. At the Glen Carbon mine one prop is required for every 3½ tons of coal mined; at the No. 6 plant of the Madison Coal Corporation one prop is used for every 10 to 12 tons produced. Ordinary mine requirements in this section call for props with a 4-in. diameter, small end, as a minimum. Where smaller timber is received in a lot, it is utilized for mine track ties.

Keeping Track of Miners' Safety

By Ernest L. Mandel
Editor, "Magyar Munkaslap," New York City

In my travels through the coal fields of southwestern Virginia I noticed with interest the practice of the Stonega Coal and Coke Co., of Big Stone Gap, Va., which operates 16 mines at seven plants, all the plants being electrically operated. C. G. Duffy, the superintendent,

Stonega Coke and Coal Company

_____ PLANT

No._____ Mine _____ 191__

_____ Mine Foreman

Check Number	Experienced		Time Inspected	Props on Hand		Miner Notified to Set Props	Miner Notified To Take Down Roof Slate		Condition of Roof		
	Yes	No		Yes	No	Number	Yes	No	Good	Fair	Bad
			M								

THIS RECORD SAFEGUARDS MINER'S LIFE

has an interesting form for recording the condition of the roof and the means taken and the provisions on hand to protect the miners. This form was prepared by R E. Taggart, the general manager of the company, and it appears to have done good work in prevention of accidents. The Stonega plant, at Stonega, Va., for instance, in 1917 mined over a half a million tons of coal without a single fatal accident. The record this year up to the close of April was equally good.

Backing Up Our Soldiers

The first thing they teach soldiers is teamwork—the "get-together" idea. For it's teamwork, and teamwork alone, that wins battles.

So it behooves us war savers to "get together" too. Wherever you and others get together for work or play, form or join a team of war savers whose purpose will be to get folks all working together on this big idea of thrift (systematic saving) to win the war. The Government calls these teams War Savings Societies and is counting on them for real service.

Just think of it—25 members of a War Savings Society, by each buying four Thrift Stamps a week, can in six months supply a whole company of soldiers with steel helmets.

Also, this team idea sets new and patriotic standards of living. It becomes the popular thing to do with less; to make what we have do a little longer.

By buying only the needful things we give the Government a better market wherein to purchase things for soldiers.

Join or start a team of savers today. Sign a promise to spend wisely, save regularly and invest your savings in Thrift or War Savings Stamps. Talk over new ways to save. Get your friends into the game—sign them up for the team.

It's not the individual
Or the army as a whole,
But the everlasting team work
Of every bloomin' soul.—*Kipling.*

Increased Coal Output by Stripping

By A. C. VICARY
Erie, Penn.

SYNOPSIS — *Wherever the stripping method of producing coal can be employed it should be used, as it effects a 75 per cent. saving in labor per ton. Contrary to popular belief, small steam shovels will handle overburden at practically the same cost per cubic yard as the large special machines.*

ANY coal operator knows a great deal more about actually mining coal than I do. Before making even the most modest suggestion relating to underground mining, I would make doubly sure of my premises, and even then go very slowly. But I don't feel so much hesitancy in talking about strip-pit operation. It is a well-established fact that there are hundreds of coal-mine owners who do not fully appreciate what can be done by applying the methods of the "dirt-mover" to mining coal.

So we will look at the possibilities of coal stripping from the dirt-mover's standpoint—keeping in mind that the dirt-mover does not know everything about coal stripping, by any means. The experience of men raised from the cradle to coal mining is always a good thing to have when stripping. Here is one sad case of the lack of such experience by way of example:

Two young men happened to observe a wagon mine, which was located on the side of a hill near a peaceful little town in western Pennsylvania. The little mine was giving employment to a mere handful of workers, and the tonnage was small, less than 100 tons a day.

Forget to Consider the Coal

These two young men were old in dirt-moving experience, and they saw a fine chance for the application of steam shovel ideas to coal mining. So they told the operator of the little mine just what they thought of his methods, and how much better they could get out the fuel by stripping. Finally they secured a contract to excavate the coal, at a figure which was satisfactory to the coal man, and high enough to promise fat profits for them. They leased a shovel and brought it to the job. Everything went swimmingly.

About one month later the operation was at an end, and the two young men were dead broke. One of the would-be coal-stripping barons went to work for the man who had leased out the shovel, to repay the rental due. The savings of both men were gone.

Every detail had been carefully planned except the coal, which Mother Nature had unthinkingly left out of the hill. The two men had moved the steam shovel to the job and had made a fatal investment of their savings on the mere say-so of the inhabitants of the nearby town, who had confidently said: "Oh, that hill is just full of coal!" It would have cost them only about $25 to dig three or four test holes to verify this confidence of the natives. Three or four holes would have been sufficient to arouse their suspicions, as there was no coal in the hill except the little pocket which was being worked by the wagon mine and which would have "petered out" probably within a few months anyway.

I don't think any real coal operator would be likely to make such a mistake as that. He would know the tricks of coal beds, and he would have secured an accurate estimate of the quantity of coal present, its depth, and the thickness of overburden, before going ahead with stripping.

Most coal operators whom I have met are just about the exact opposite of those two young dirt-movers. They know pretty accurately what coal exists on their acreage, but they are too slow in starting to strip rather than too hasty. If every coal operator who really ought to start stripping (in justice to his own pocketbook and as a duty to the coal-hungry nation) should suddenly decide to do it, the manufacturers of steam shovels would be hopelessly behind in their orders for years to come.

There are literally hundreds of experienced coal operators who have idle coal on their acreage which could be stripped to excellent advantage. In most cases the total labor expense per ton on this coal would run about one-quarter of the labor cost per ton that is expended in mining the deeper coal on the same property. The operator has not attempted stripping, usually because of one or more of the following reasons:

1. He does not really believe the statements he has heard about the low cost of moving dirt and rock by steam shovel. Deep down in his heart he is scared by the amount of overburden to be handled—a yardage which perhaps would merely induce a dirt-moving man to take out his pencil and start figuring.

2. Possibly there is not a great quantity of coal near the surface, and the operator concludes that there is not enough strip coal to bother with—forgetting that coal mined by stripping is usually produced with a much larger margin of profit, and is consequently



LOADING THE STRIPPED COAL
Erie shovel owned by Cochran Bros., stripping and loading for the Youghiogheny Coal and Coke Co., Dawson, Penn.

equivalent financially to several times the tonnage of coal that lies deeper. And that's what he is really looking for, after all—the profits.

3. In many cases I have found that the coal operator has been frightened by accounts of enormous stripping operations, and has come to think of coal-stripping equipment as being represented by six figures. For instance, he is alarmed by visions of an enormous steam shovel costing about $200,000. Now, as matter of fact, steam shovels are available, as well as other equipment, to fit stripping operations of any size. Some coal operators are uncovering 200 to 300 tons of coal a day with a total plant investment of about $10,000, and are enjoying the most handsome profits they have ever made from coal. And it is a remarkable fact that on these smaller operations the cost per ton is almost as low as it is when stripping with an immense shovel.

I note that some coal men have received the mistaken impression that a large steam shovel will strip coal at a much lower unit cost than is possible with a



ANOTHER VIEW OF ERIE SHOVEL LOADING OUT STRIPPED COAL

smaller shovel. In fact, one man who stands high in the councils of coal operators recently made the following remarks, among others, before an important gathering of coal brains:

"The size of the [stripping] proposition has a lot to do with it. With a large operation and a large acreage, you can buy expensive machinery, because your cost of machinery per ton of output will be very small; but in an operation of only a few acres, your actual cost of machinery is prohibitively high per ton."

Now, it does seem as if this might be true, but it isn't! The statement seems reasonable, and the man who made it may be pardoned for making a natural mistake—one which anyone except an experienced dirt-moving man would be likely to make.

This man quite possibly arrived at his faulty conclusion by timing one "swing" or cycle of a steam shovel from the cut to the dump and back; then dividing this time for one swing into the total time worked per day, to get the total number of dipperfuls, which he then multiplied by the capacity of the dipper. Very simple!

He overlooked a fact which is well known to steam-shovel men: that the cost of moving a steam shovel increases rapidly as the size of the shovel increases—



ERIE SHOVEL STRIPPING FOR THE ELSIE COAL CO. AT BRIDGEVILLE, PENN.

disproportionately so. At the very start, in getting the shovel to the work, a large machine must be shipped in parts and practically built on the job, while the small shovel comes from the factory on a railroad car and is ready for work a day or two after the arrival of the car.

The same comparison is forced upon the notice of the operator every time that the two shovels dig themselves out of work and have to move up for more. The large shovel loses disproportionately more time in moving up.

Another fact which should be borne in mind is that the depreciation of the large shovel must be figured as being much more rapid than that of a smaller shovel. The large shovel is a special machine that is adapted only for special conditions, and is useless for other work. At the conclusion of a stripping operation, the large shovel must be moved to the nearest heavy stripping location, no matter how distant or at whatever cost. The owner must either move the shovel to where it can be used or lose the capital invested in it.

The small shovel, on the other hand, can be sold practically anywhere, because such shovels are used by excavating and building contractors, brick yards, cement mills, crushed-stone producers, sand and gravel producers, etc., and have a ready market. If a small shovel receives the right kind of treatment, it can safely be depreciated slowly. The capital does not shrink to any great extent. To prove this for your own satisfaction, just try to buy, say, a ¾-yd. Erie shovel second-hand. You will find it impossible to procure one for less than 80 per cent. of the cost of a new machine!

These are some of the points in favor of the smaller shovel, but I do not for a moment want anyone to get the impression that I am arguing for the small steam shovel and against the large one. Each has its distinct field and neither can compete with the other. Each machine does work that the other could not do. I merely wish to emphasize the fact that the obvious advantages of the large shovel are just about counterbalanced by advantages of the small one, with the result that, strange as it may seem, the small machine will move 600 or 700 cu.yd. of earth per day at about the same cost per yard as the 3000 or 4000 cu.yd. moved by a monster shovel.

Getting back to the discussion of the coal operator's natural hesitancy about embarking on a stripping proposition, I admit that it is perfectly natural for the operator to be most inclined to follow the kind of mining that he knows best, and that he should be somewhat more cautious in starting a method of mining with

which he is not familiar. One coal man said to me: "I am making enough money now; why should I spoil my sleep by trying to make more? If anybody comes along and makes me a good proposition, I will let him strip on my acreage, but I won't undertake it myself."

Most mining men are more ambitious than that, especially since it has been demonstrated clearly just what kind of a fix the nation is in, and is going to be in, for coal.

There is no more difficulty about running a stripping operation in connection with underground mining than there is in managing an old mine and opening up a new one at the same time. In fact there is likely to be much less difficulty in operating the strip mine. There are some miners whose ambition nowadays seems to be to get a barrel of beer and lie under a tree—and go back to work only when the bank-roll is gone. But labor problems are hardly problems at all when you are stripping. The labor force is small, and you can afford to select high-grade responsible employees and pay them well. If you pay a good steam-shovel operator 50 per cent. more than the market rate for his labor, the effect may quite possibly be to lower your per-ton cost. In any event, the one-man pay-roll increase is sure to be insignificant when divided by the total tonnage. But it would be a different matter to raise the per-ton rate to miners to 150 per cent. of the prevailing rate.

In order to give some idea of what can be accomplished on a small stripping operation with a 20-ton shovel, carrying a ¾-cu.yd. dipper, I submit some figures that have been taken more or less at random. These estimates are too general to be of value in any particular case, still they are based upon actual averages and may be depended upon as conservative.

With a 3-ft. coal bed, underlying 12 ft. of overburden, the 20-ton shovel will uncover from 125 to 150 tons of coal per day. With a 4-ft. bed, under 10 ft. of overburden, the shovel will uncover from 175 to 200 tons a day. With a 6-ft. vein, and 8 ft. of overburden, the shovel will uncover 350 to 400 tons per day. Working on a 9-ft. coal bed, underlying 10 ft. of overburden, the shovel will uncover 450 tons of coal or more.

These figures are for a box cut, and are of course less favorable than the records which the shovel can make if digging into the side of a hill, and casting down the slope at the side. The estimates of the tonnage uncovered are based upon the shovel moving 600 cu.yd. of overburden a day, which is a conservative figure often considerably exceeded. With favorable conditions it would do better.

Of course, the foregoing figures can give only an approximate idea of the probable output. No real estimate can be made without considering the specific conditions which govern each particular case. The estimated cost of the shovel for a day's work will be about as follows:

Interest on shovel at 6 per cent., plus a depreciation of 20 per cent. (Note: As explained above, 20 per cent. depreciation is much greater than the actual loss of value. If you set apart even 10 per cent. to depreciate a good small shovel, and then take reasonable care of it, the shovel will in five years be valued on your books far below its actual market worth.)	$ 8.75
20 per cent. depreciation and 6 per cent. interest on cars, track, etc.	2.60
Shovel runner's wages per day	8.00
Wages of fireman and pitman at $4.50 per day each	9.00
Wages of handy man, for water and coal supplies	4.50
Incidental supplies per day	1.00
Total	$33.85

Now divide this figure, the cost of a day's operation of the shovel, by 200 tons, if that is the amount of coal uncovered, and the cost of stripping the coal by steam shovel is approximately $0.17 a ton. In case conditions were so favorable that 400 tons of coal per day could be uncovered with one ¾-yd. shovel, the cost per ton for stripping would be about $0.085 a ton.

This does not include the cost of loading the coal, which a shovel will do for about 15c. per ton, or perhaps less, in either case. This gives a total cost of 32c. a ton for stripping the coal and loading it on the cars, when 200 tons per day are uncovered; or 24c. a ton for stripping and loading, when 400 tons are uncovered. To this must be added at the start the cost of hauling away earth to begin the operation.

These are figures based upon actual work, and may be relied upon. In adding the wages of management to these costs, it is justifiable to estimate not more than the unit charge for management in deep-seam mining; and this charge should, if anything, be still less after the operator is reasonably experienced in stripping work.

It is not necessary for me to comment on the comparison that the coal operator will involuntarily make between the cost per ton when stripping and loading by steam shovel, and what it is costing him to produce coal by deep-mining methods. Under present conditions, the moral is almost too obvious to recite. With the nation's double shortage (of coal and of labor) it is a patriotic duty for the coal-mine operator to strip coal, if he has any that can advantageously be produced by this method. It is a clear case of getting three times the tonnage per man employed—or better. If there are stripping possibilities on your property, now is the time that they ought to be realized.



SHOWS THE PORTABILITY OF THE SHOVEL
A 20-ton Erie shovel climbing up the side of a mountain, along the bed of a creek, to get to the coal-stripping operation of the Elkhorn-Piney Coal Mining Co., Powellton, W. Va.

In closing, I wish to make it clear that this article is not interested testimony, designed to promote the sale of steam shovels. Nowadays the manufacturer of steam shovels has a great deal more trouble building them than selling them. If these few remarks should lead anyone to investigate and finally buy a steam shovel, he will probably find that it will be necessary for the shovel manufacturer to divert a machine from some less essential industry, and sell it to him in preference because of the vital importance of *more coal* at this time, when the country is already facing a shortage.

Maximum Production for Humanity's Sake

By H. K. PORTER
New York City

SYNOPSIS—*Maximum production is necessary during the present war, but this is unobtainable unless efficient apparatus is provided. Locomotive haulage, both trolley and storage battery, has done much to increase coal production. Easy running cars would doubtless do vastly more.*

IT HAS been aptly said that the titanic conflict now being waged across the water is no longer a struggle of the people of a number of nations against the people of a number of other nations, but rather it is a struggle of nations against nations—the struggle of the allied nations, with their liberal democratic governments, against the corrupt military rulers of our enemies.

Of the ultimate victory of the Allies and the vindication of the principles for which they are fighting there is little doubt in the minds of clear-thinking men, and the vast preparations which are being made by our country go to further insure the complete success of the allied cause and the ultimate victory of humanity.

All industry in the United States must bend its every endeavor toward producing the greatest volume of materials, both raw and finished, with the greatest possible economy and efficiency.

It is not possible that maximum production for humanity's sake will be realized in every instance, but to insure maximum output in all of our industries it is necessary that there be a closer coöperation between employer and employee. This desired harmony of effort can only be realized through a closer understanding of the problems of the employees, the men at the lathes, in the mines, at their work—wherever they happen to be.

Workers Now Better Understood

In many of our industrial establishments the laboring man has become better understood through the medium of welfare work and kindred activities than in the years gone by, and his standard as a working man—as a producer—has been raised by a goodly percentage. Many of the foreign-born have had instilled into them the love for our country and its ideals, and they have come to love the industry in which they are working.

It can be admitted, however, by those of us who are familiar with conditions in and about the mining operations, that many operators have failed to realize that through a study of their miners, by helping them to raise their standard of living, by more acutely realizing their thoughts, aims and ideals, more efficient and more willing work would be performed by the foreign-born miners, who through birth are temperamentally different from us in almost every way.

My sentiments were accurately expressed by an editorial in *Coal Age* which said: "It may be that the foreigner is the man of the stricken barn, the blighted field and the crippled horse, but no good will come of reminding him of his misfortune. In the language of the streets, 'have a heart.' What a foreigner wants more than your praise of America or your denunciation of his Fatherland or Motherland is the grip of your hand, the tremor of your voice and the exultation of service which your patriotism evokes."

The coal-mining industry should adopt this as its motto and as its guide, because in it lies the possibility of maximum production for humanity's sake.

Most of us will admit that we can instill the desire to work from patriotic motives in the majority of our foreign-born miners. And if through a clearer understanding of their aims and ideals we can accomplish our avowed purpose, it then becomes necessary to give them the proper tools to work with the economical tools, to remove as much of the drudgery from their toil as we possibly can. No man is a willing worker if his energy is taxed to the limit, if his energies are drained to such an extent that when he arises in the morning the exhaustion of the previous day has not been removed by a night of rest.

Progress Made by Introducing Machinery

We know that coal-cutting machinery has been responsible for increased production, because it enables the men to do their work faster and in a pleasanter manner, and because it permits them to earn more per day.

We know that the electrification of the main haulage provides a better supply of empty cars for the miner and has helped to increase production greatly. The use of storage-battery locomotives for gathering purposes also has, and is, and will have, a tremendous effect toward a more willing and more economical production of coal.

The elimination of the mule for gathering service was a humane step, both for the mule and for the men working in the mines. It has undoubtedly worked toward a greater production.

Almost any mining man who has studied mine labor problems will tell you that more grumbling, discontent and layoffs have developed through the dislike of handling cars than from probably any other cause originating within the mines. Of course, paid disturbers have hatched up and magnified imaginary troubles, in many instances, which have also upset the routine of coal production. But the handling of mine cars by the miners has always been a source of annoyance and friction.

Imagine yourself struggling with a stiff-running mine car, trying to push it over irregular tracks or a wooden emergency track. Could you within three-quarters of an hour afterward devote yourself to your work with your best energy? How many of your men have ever been laid up for two or three days by a sprained back? Your company doctor can cite numerous instances where a disabled miner has attributed his injury to attempting to move a stiff-running mine car. It is positively back-breaking.

Most of the people who have a knowledge of coal mining and who are actually engaged in the production of coal will say positively that their cars are placed for the miners under all circumstances. They will assert

that cars are rarely, if ever, handled manually; but in many instances, and in fact in the majority of cases, they are considering ideal and not actual conditions. Little as they want to believe it, thousands and tens of thousands of loaded and empty mine cars are moved by the labor which should be loading coal, every day that our mines are working.

The miner and his "buddy" must push the loaded car to the parting and push the empty car back into the room. The men must move the stiff-running mine cars at the shaft bottom and they must push them on the tipple. Every second's delay in the handling of one mine car, when multiplied by one thousand or by ten thousand, means an enormous waste of time throughout a complete working day.

It would not be so bad if one man could handle the ordinary stiff-running car, but now that mine cars are getting larger in size, so that they hold from 4 to 5½ tons of coal, they are heavy to handle and in many instances it takes three or four men (we have heard of instances where it took five men) to push some of the heavy mine cars. If you figure the time of the extra men needed, you cannot but realize that increased production for humanity's sake is being seriously crippled by the lack of proper cars in which to haul the coal.

In one of the accompanying photographs three men are seen pushing a loaded mine car. This car weighed about 4¼ tons and was equipped with ordinary plain bearings—back-breakers. In the other photograph is shown a car of the same weight, which is being pushed by one man—and this man was able to start the car from rest without assistance and propel it with ease.

The track where the photographs were taken was approximately level, and while it might take two men to push the roller-bearing car up a slight incline, it certainly would have taken four or five men to push the plain-bearing loaded car up the same slope. The advantages of the antifriction bearing are especially potent in the anthracite region, where storage-battery locomotives for gathering are not as numerous as in the bituminous section, and where a severe shortage of mules exists at the present time.

This means that in the anthracite region a great many more cars must be pushed by hand this year than last year. The same is true beyond the question of a doubt in connection with a great many of the bituminous mines, of which we have no definite record.

The photographs which are here shown were taken before an assemblage of about 30 prominent mining men and was sufficient proof to them of the desirability of using roller-bearing mine cars. These are easy on the men, as compared to the plain-bearing cars which make the labor of pushing extremely tiresome.

Then again, roller-bearing mine cars need to be lubricated but once every three or four months as compared to the every-day lubrication of those with plain bearings. In fact, a prominent operator of western Pennsylvania recently stated that the proper time to oil a plain-bearing mine-car wheel is every time you look at it, because every time you look at it it needs to be oiled. Consequently, the labor involved in oiling the plain-bearing car is wasted, because if roller-bearing mine cars are utilized the services of the oiler can be employed in a more profitable manner. In other words, the use of roller bearings releases another man for work in the actual loading of coal.



THREE MEN NEEDED TO PUSH A LOADED MINE CAR EQUIPPED WITH ORDINARY PLAIN BEARINGS. THE SAME LOAD, IN A MINE CAR WITH ROLLER BEARINGS, WAS PUSHED WITH EASE BY ONE MAN

It seems rather far-fetched to speak of roller-bearing mine cars and maximum production for humanity's sake in the same breath, but the operators who are using roller-bearing cars know that the two are synonymous. Many of them will tell you that their miners fight for the easy-running mine cars. They well know that if they secure the easily pushed car their work is going to be lessened. They will then not be compelled to break their backs attempting to produce the coal which is going to win the war for us and our allies, and which is going to help the miners to become better citizens. Simultaneously, the coal operators through an increased production will be enabled to expend greater efforts in making true-blue Americans out of the nomadic foreigners that now produce the Nation's fuel.

Only when combustion is very poor, owing to inadequate space above the fuel bed and rapid cooling of the gases, are hydrocarbons likely to be found in flue gas.—*Bureau of Mines Bulletin No. 135.*

Reliable Gears

By C. J. BROWN
Pittsburgh, Penn.

SYNOPSIS—*A maximum production of fuel is highly necessary at this time. All elements of the equipment upon which the production of coal depends should be selected with care. Gears, in order to be reliable in use, should be both hard and tough. These qualities are brought to a maximum by heat treating the steel of which the gear is made.*

CONTINUOUS operation in any essential activity is demanded and absolutely necessary at this time. The needs of our Government make this imperative; especially is this true in the coal-mining field. To produce the coal necessary every sinew must be stretched to the breaking point; every feature of operation must be carefully studied and acted upon in order to eliminate curtailment of output; there must not be any delays due to breakages or other avoidable causes; mines must produce their maximum tonnage continuously.

Gearing represents an important item in the chain of equipment, the parts and supplies of which, when linked together, go far toward making continuous operation possible; and too much attention cannot be given to its selection and care. This is not only true insofar as locomotives are concerned, where much time is required to replace broken gears or pinions, resulting in serious delays to haulage systems and consequent loss of time spent by mechanical men in making repairs, who might be otherwise engaged, but it is also true of all other gearing that is used in and about mining operations.

Case Hardening Not Ideal Treatment

So far as gearing is concerned, the delays illustrated can only be successfully avoided by using a superior grade of material. This is a practice that the R. D. Nuttall Co. has been endeavoring to have the mine operators follow, and with a considerable measure of success. This company has advocated heat-treated gearing for mine service for a number of years, correctly claiming that it is false economy to use anything else.

Case hardening was the first step, but although it proved to be quite a success as compared with untreated gearing, it was not the ideal treatment for mine service because the glass-hard surface with soft core or center, while it was ideal from the viewpoint of wear alone, did not have the necessary toughness to withstand the severe shocks and stresses to which mine gearing of all descriptions is continually subjected. Consequently, earnest and extensive research and experimental work were carried on by this firm to perfect a treatment better adapted to mine conditions.

There are two important points to be considered by the mine operator when deciding upon the type of gearing best suited to his purpose, especially when his locomotive gearing is the issue. These are hardness and toughness. One is just as important as the other. It is not wise to select a gear or pinion with great surface hardness and soft core, capable of giving long service if steady and continual wear were the only consideration, but unable to withstand breakage due to the many stresses and shocks incidental to mine service. Neither should there be selected gearing tough to the point of successfully eliminating breakage caused by frequent starting and stopping, inexperienced motormen, uneven and crooked haulage roads, etc., but without necessary surface hardness to give long service from the viewpoint of wear.

Hardness and Toughness Ideal Combination

The ideal is a combination of the two good qualities, hardness and toughness, and this combination unquestionably has been obtained in specially heat-treated gearing; in fact, the principle of the treatment has been solely founded upon these two qualities. The treatment referred to is well known to the larger number of mine operators and is fast becoming the standard—namely, Nuttall BP grade when applied to forged steel and NP grade when applied to cast steel.

To better appreciate the benefits to be derived from the installation of treated gearing—gearing that will show results at the end of the year—the following record should be carefully noted:

A Westinghouse electric mine locomotive No. 38581, equipped with 35-hp. motor, operating over a 5000-ft. haulage road with two maximum grades of 2½ per cent., around 75 deg. curves, and hauling full trips up grade, covered 4000 miles, and hauled 100,000 tons of coal per year. A BP grade pinion in this service gave 100 per cent. results for a period of five years and was not entirely worn out when removed. It hauled during this period 500,000 tons of coal under heavy service conditions. In this same service an oil-treated pinion wore out in six months; it hauled 50,000 tons of coal. In five years ten oil-treated pinions would have been necessary, resulting in ten interruptions of service. Allowing one-half day for each interruption, this would mean a reduction in output of 3000 tons. A case-hardened pinion broke in 1½ years; it hauled 150,000 tons of coal; but the vital point is that it broke. The broken teeth wedged in the gear and locked the wheels. Not only was the locomotive disabled, but the haulage

TABLE OF COMPARATIVE DATA

Grade	Material	Carbon	Ultimate Strength	Elastic Limit	Elongation in 2 In.	Reduction of Area	Surface Hardness Brinell	Relative Life	Relative Cost
CS	Cast steel (Untreated)	Medium	60,000 to 75,000	30,000 to 40,000	18–22%	25–35%	121–155	$1.00	$1.00
BP	Forged steel	Medium	115,000 to 130,000	80,000 to 90,000	8–12%	25–35%	418–555	4.00	1.30
NP	Cast steel	Medium	110,000 to 120,000	75,000 to 85,000	6–10%	20–25%	360–512	3.00	1.20

road was blocked for two hours, which alone meant a reduction of nearly one-half day in production. It will not be necessary to go into detail with the mine operator to illustrate the saving in ultimate cost effected by having in service the type of pinion whose performance is first cited.

The table of comparative data, shown on the preceding page, gives interesting and valuable detail information for anyone interested in the subject of gears and gearing.

It will be noted that the tensile strength of the BP and NP gear from the test piece is not in proportion to the tensile strength corresponding to the Brinell hardness. This is due to the test piece being a measure of the physical properties at the center of the tooth, while the Brinell test gives physical properties of the gear at the surface of the tooth. The equivalent tensile strength as shown by the Brinell tests of the two grades is as follows:

Grade	Brinell Hardness	Equivalent Tensile Strength
NP	360–512	178,000 to 253,000
BP	418–555	204,100 to 273,300

It can readily be seen that the great resistance to fracture of these grades is due to this high strength of the outer fibers of the steel. This hardness grades off very gradually in a straight line ratio to the center of the tooth.

Erico Portable Bonding and Welding Apparatus

By W. E. Huber
Cleveland, Ohio

The electrical distribution of energy and its attendant losses is one phase of the momentous problem of coal. The heavy current flow of the electric railway where the track rails serve as part of the circuit may be a source of loss against which conservation tactics may well be employed. Better maintenance of track than has obtained in the past cannot be expected, therefore the return circuit of the electric railway is a field of increasing interest, for progress in method and appliance.

The old method of applying a welded copper bond to a rail joint made use of a bonding car which carried a pair of resistance welding clamps with a suitable motor-generator and low-voltage transformer. In the early days of electric traction when the problem was the bonding of new track, the bonding car left little to be desired, and under the maintenance conditions of some roads it still meets all of the requirements that have developed. It is a work car as well as a first-class bonding apparatus.

The problem of a small portable apparatus which would comprise all of the welding functions of the bonding car was studied from the beginning; constant effort and the aid of developments along other lines has brought the solution in the Erico portable welding apparatus, which weighs about 200 pounds. It comprises in its functions all those of the three-ton bonding car and in addition, when it is not in use for installing bonds, it may be transformed into an arc welding set for work either in shop or along track. The complete apparatus for rail bonding on a 600-volt line consists of a welder, a rheostat and a grinder for cleaning the rail. Fig. 1 shows the apparatus adapted for a 250-volt line, in which case the rheostat, having a lesser demand for radiating capacity, is quite small and is transported as a hand tool weighing about 25 pounds. The evolution from bonding car to portable welding apparatus for a 250-volt line thus brings the total weight of apparatus from three tons to a trifle over 100 pounds Fig. 2 shows the 250-volt rheostat as an arc welding set.



FIG. 1. WELDING A RAIL WITH THE ELECTRIC WELDER



FIG. 2. MAKING REPAIRS IN THE SHOP

The original bonding car makes use of heat generated by the flow of a heavy, low-voltage current across the terminal of the bond, at right angles to the rail; the carbon electrode of the welding clamp presses the bond terminal against the rail until the heat generated by the current from the transformer effects the welded union of bond terminal and rail. The portable welder also presses the bond terminal against the rail by means of an electrode and, in so far as the heat action and welding of the terminal is concerned, is similar in its action to the bonding car; the full intensity of heat and consequently the completed operation is obtained more quickly with the portable apparatus than with the car. The electrode of the portable welder which engages the bond terminal is not the solid carbon block used with the bonding-car type of electric welding apparatus, but consists of a hollow composite box with a graphite contact against the bond terminal; within this small chamber the heat is generated at the terrific intensity of the arc, to be conducted through the thickness of the graphite plate and diffused by the graphite medium into an ideal, uniformly incandescent welding electrode at the contact with the bond. The heating medium of the portable welder is a form of inclosed magnetic arc, the negative electrode of which is the graphite plate which contacts with the bond terminal. The remarkable part of the apparatus is the effect of the magnetic field within which the arc is drawn. The effect of the field upon the arc flames may be likened to that of an air blast applied to a gas flame, the analogy holding as to the increased quantity and intensity of heat, due to a higher voltage drop, and as to the vigor of the action, which is accompanied by an explosive vibrating sound. The magnetic field of the welder is the result of the rectangular solenoid which forms the body of the welder, the axis of which is the center line of the arc.

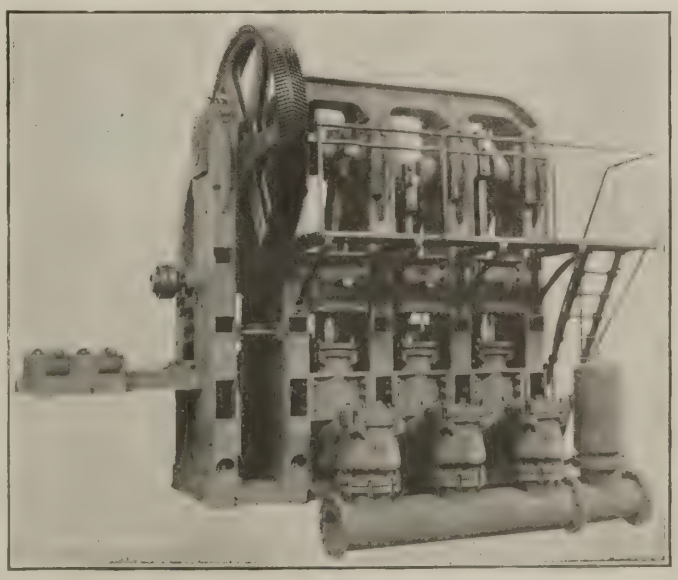
The welder is supported in operating position at two points on one rail and by a chain and hook reaching over to the other rail. To disengage the apparatus, merely pick it up. Adjustment of the contact between the negative electrode and the bond terminal is obtained by varying the length of the chain, which changes the inclination of the apparatus, and by the hand wheel which raises or lowers the body of the welder. For a given rail these adjustments need not be changed. Pressure of the electrode or front plate of the furnace box is secured by a pressure screw.

The inclosed magnetic arc of the portable welder has a drop of about 125 volts and requires about 100 amp. when in normal operation. An open arc pencil has a drop of from 20 to 50 volts. In case of operating either the welder as in Fig. 1 or the open arc pencil as in Fig. 2, the rheostat is interposed between the operation and the trolley wire. The rheostat comprises a number of unit resistance paths, each of a common current capacity under the same potential source. The operator of the welder may therefore at all times secure the most efficient amperage for his apparatus regardless of any drop in the line voltage, by adding to the number of current paths of the rheostat in operation; likewise the arc welder may keep his current up. The current capacity of the rheostat is thus increased until all of the current paths are in operation. The apparatus as a whole is one of the most timely improvements to assist in meeting the great maintenance difficulties of the present time. The bonding feature of the apparatus alone gives it a prominent place in the list of up-to-date appliances, while the arc welding feature is coming more and more to be first thought with the emergency man.

Modern Mine Pump

The accompanying illustration shows a recent development of the vertical triplex plunger pump for mine use. Mine water, as a general rule, is acidulous and calls for a pump the cast iron of which is protected. The water end of this Scranton mine pump is lined with wood, lead and bronze, so that not one square inch of cast iron is exposed to the action of the water.

A mine pump to be serviceable must be simple, yet rugged in construction. It must be sectionalized as far as possible and all parts be readily accessible. The pump shown has a five-bearing crankshaft with adjustable wedges located on the top half of the bearing. Since on a single-acting pump the thrust is on the top half of the journal box, any necessary adjustment can be readily made without throwing the crankshaft out of alignment. The crank- and wristpin brasses and



A WOOD LINED TRIPLEX PUMP

crosshead shoes are made of a special bearing bronze and provided with adjustment for taking up wear.

Pumps of this type are usually driven by single-reduction herringbone gears and direct-connected by flexible coupling to the motor. The water valves, which are the most important part of a mine pump, must be especially designed for each individual case. The water velocity is held down to 3 ft. per second, which insures a quiet-operating and long-lasting valve.

The valve seats are of the double-ported type and flanged, facilitating easy removal for refacing. This is essential, as the water handled by most mine pumps is gritty and the faces of the seats become scored. The valves up to 600 ft. vertical lift are made of rubber and inserted in a bronze plate which extends down and around the periphery of the valve, holding it rigidly in place. Rivets, studs or tap bolts should not be used to hold a rubber valve to its plate, as they are quickly affected by the acid water and result in considerable trouble.

The valve stem and spring are of phosphor bronze. The spring is incased in a bronze cage, as a protection against the scouring action of the water. The valves, seats, chambers, and all parts where possible, are made interchangeable to eliminate the necessity of carrying a large stock of repairs.

Mine pumps and their driving motors should in all cases be mounted on heavy cast-iron baseplates, securely tied together. This arrangement facilitates the erection of the pump and guarantees a permanent installation. Triplex pumps of the foregoing design have developed an efficiency of 85 per cent. for the pump alone.

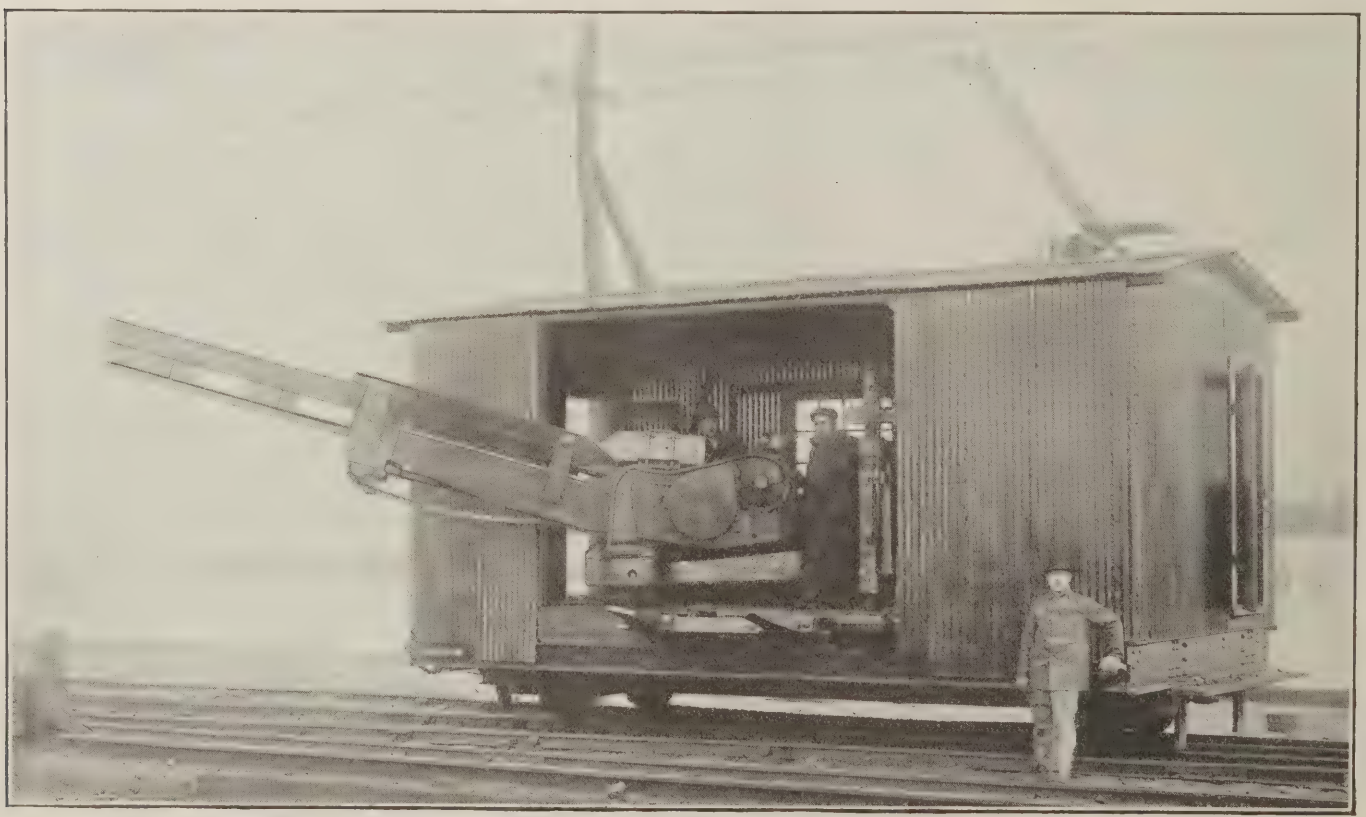
Box-Car Loader in the Present Emergency

By ELLIS B. USHER
Milwaukee, Wis.

THE Government's warning that 75,000,000 to 78,000,000 tons more coal will be needed in war industries this season than last, and that this amount must be had by increased output or drastic curtailment in nonessential industries and domestic uses, leaves no chance to escape the conclusion that, with known labor shortage, steadily growing worse, all the mechanical aid available to mining must be utilized. Machines that will increase production at the mines, that will handle and move the product more expeditiously and at the same time economize labor, must be put to work.

Machines of proved efficiency naturally should be the first to be chosen. The mechanical box-car loader built by the Manierre Engineering and Machinery Co., of Milwaukee, Wis., although one of the newer loaders for coal and coke, has during its nine years' career taken a place that justifies calling attention to it as an instrument that may greatly assist in winning the war. The Manierre loader was the first machine to load coal, coke and other bulk material into box-cars on the conveyor principle without throwing it, and therefore practically without breakage.

All the different types of this loader are built on the same principle, and consist of a conveyor frame



MANIERRE LOADER, FOR LOADING COAL, COKE AND OTHER BULK MATERIAL INTO BOX-CARS

carrying the motor and conveyor balanced in a fork supported on the end of a box-section, cast-steel arm, which is journaled on another similar arm, in turn carried by brackets upon a post. This post is securely attached to a monolithic foundation or other adequate support. The arms are journaled on ball and roller bearings and move with great freedom. The loader can thus be placed in the car with great facility since it is without complicated mechanism. The balanced feature of the conveyor frame makes it easy for the operator to tip the conveyor to the floor when starting to load, thus avoiding throwing and breakage. This is accomplished by a worm gear at the rear end of the machine.

The chutes, which are of several varieties to meet different conditions of installation, have the common characteristic of a universal motion at the delivery end, where attachment is made to the loader. This enables the chute to follow the loader, in all positions, as the coal is distributed throughout the length of the car.

Any of these loaders (there are seven standard types) can be built stationary or portable. They all will load box-cars on either side, on two tracks, or the machine may be placed on the opposite side of the car from that on which the chute enters. Special conditions are easily met by construction adapted to them.

Space does not permit more detailed analysis of the mechanical construction of this machine or the many engineering problems that it has successfully solved, but results accomplished are vital at this time and testimony to such accomplishments is easily to be had.

One of the leading dock companies of the Great Lakes says: "One man operating this loader in box-cars takes the place of four men trimming by hand and does the same work in one-fifteenth of the time that the four men will do it. With this loader we frequently load run-of-pile bituminous coal at the rate of one car every five minutes or twelve cars in an hour, while it is good work for four trimmers to load a 40-ton car in one hour and 15 minutes."

A large byproduct coke shipper gives testimony as follows: "The cost of loading per ton on a type 'C,' 16-in. machine is $0.0235, and on the 24-in. machine $0.03. At the same labor rates the cost of loading box-cars by hand would be approximately 23c. per ton."

A large mine owner in Illinois, who has just put in a machine at a second mine, tells the manufacturers that the first loader "took the place of six men loading by hand and in addition increased the number of box-cars loaded 400 per cent. in eight hours' work."

From coal mines and large dealers in all the fields in this country and Canada comes the cry of distress as to labor and car shortage. Nothing therefore is more important to the Government and to the public than to utilize every successful and proved mechanical device available. The Manierre loader is in this class, and the manufacturers looking farther ahead than many other concerns have prepared with a supply of standard machines and motors on hand. This has been done in order to meet rush orders with a promptitude that will in itself be a public service.

Back up those who are offering their all—buy War Savings Stamps.

When you buy War Savings Stamps you do not give—you receive.

Safety Powder Flasks and Fire Pails

A consideration of great interest to those engaged in coal production is the large number of men employed in the industry that are subject to draft. The number amounts to roughly one-sixth of all the men employed. The labor supply is limited, and the gap made in the ranks of the coal miners by the needs of the army can be filled, if at all, only with great difficulty. Under such circumstances the questions of labor efficiency and conservation become even more important than in normal times.

As a result even greater care than ever should be exercised in accident prevention, and only such equipment should be employed as has demonstrated its econ-



SAFETY POWDER FLASK

omy and durability. "Fibrotta" powder flasks or jacks as manufactured by Cordley & Hayes, of New York, come under this category.

These flasks are entirely non-metallic and are consequently non-conductors of electricity. An electrical conductor coming in contact with the exterior of the flask will thus have no effect upon the contents and will not cause an explosion. This safety feature has been recognized by many mine inspectors throughout the country.

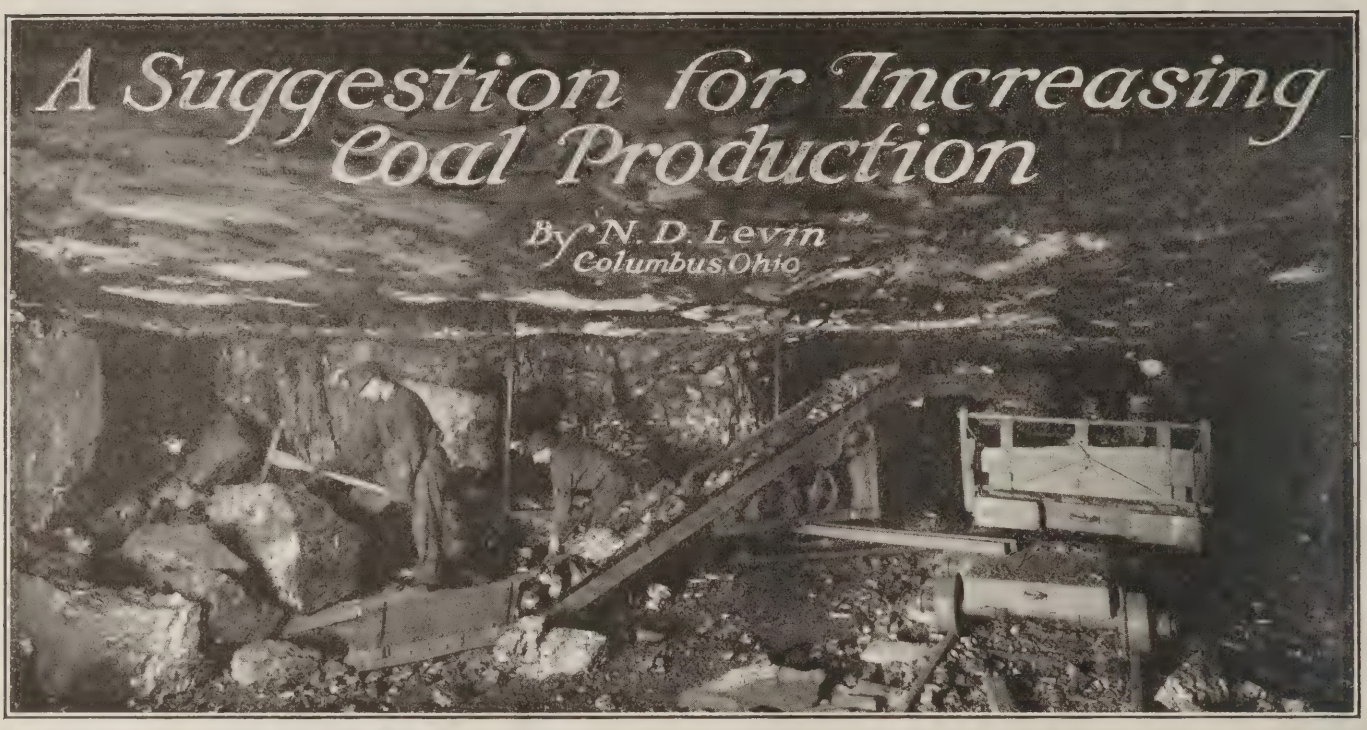
These powder flasks are made in one piece under heavy hydraulic pressure. They are consequently seamless and jointless. The surface is so treated chemically as to make it hard and glasslike and impervious to moisture. The cork stopper is attached to the flash by means of a strong linen cord, thus preventing the loss of the cork.

Flasks of this kind are economical because of their long life, which exceeds that of many of the metal containers the price of which is high and still rising. It is claimed by the makers that Fibrotta flasks will not swell, rust, warp, leak or dent out of shape. The material of which they are constructed is hard and strong and will stand rough usage. In addition it is a non-conductor of heat as well as electricity. As a result of all this these flasks are light and easy to handle and will not sweat on the inside and injure the contents.

The manufacturers of these flasks also made funnels for filling them, as well as fire pails of the same material. Some of the latter have been in continuous use for many years without serious deterioration. Such pails are not affected by anti-freeze solutions and when properly labeled are approved by the Underwriters' Laboratories and recognized by all the fire insurance companies.

A Suggestion for Increasing Coal Production

By N. D. Levin
Columbus, Ohio



SYNOPSIS—*As the demand for coal grows stronger, the man power available for its production will doubtless become less. To offset this shortage various means have been proposed, but none appear to possess greater merit than the employment of light, easily portable loading conveyors, which perform the most arduous work the loader has to do. In practice these have made possible an increased production per man employed.*

AT THE present time the production of coal is limited by the ability of the railroads to handle the output of the mines. The time will come, however, when the transportation companies will have sufficient equipment and be in position to handle and distribute the coal produced. The question will then be, Will the mines be able to maintain, or rather increase, the tonnage? One or two more drafts will, in certain localities, reduce the man power to such an extent that its lack will be felt keenly.

The demand for coal next winter will be enormous; it is claimed that it requires 16,000 tons of coal to build an 8000-ton ship, and 80 lb. of coal to produce a single 3-in. shell. We must build hundreds of these ships and millions of shells. At the same time every effort should be made to keep the industries of normal times going so far as possible.

Several remedies have been suggested; for instance, to exempt miners from military duty. But this would hardly seem practicable, as there are many other industries—railroads, steel mills, iron mines, ship-building yards, etc.—that would have equally good reasons for claiming exemptions. It has also been suggested to allow boys to work with relatives in the coal mines; also to employ women for work underground. The general opinion is, however, that such means should not be resorted to except in case of extreme necessity, and we trust that the war will be won before it becomes necessary to send our women and children into the coal mines.

Another suggestion is to lengthen the working day from 8 to 10 hours. This would not give the desired result; England lengthened the working hours during the war without deriving any benefit therefrom. The object of this article is to make a suggestion that may be helpful.

Despite the fact that most modern coal mines are equipped with machinery especially adapted to undercutting and hauling a maximum output, and each operation necessary to obtain such output has been carefully studied and special machinery designed therefor, primitive methods of loading the coal still prevail to a large extent.

Efficient and reliable apparatus is available for undercutting the coal bed; holes for the insertion of the blasting charge are drilled either by the use of electric or compressed-air apparatus; explosives have been brought to a high state of perfection; electric gathering and haulage locomotives have practically replaced animal power, yet the coal is still almost universally shoveled into the mine cars by hand.

Experiments have been made during the last two



THE LOADER AT WORK

years with a small conveyor, such as shown in the accompanying illustrations. It has been found that two men will average 50 to 80 tons per shift using this loader. It is obvious that less labor is required to shovel the coal onto the end of the conveyor (which is only about 6 in. high) than to shovel it into a car 3 or 4 ft. in height. A second handling of the coal is unnecessary, as the conveyor can be so located in a room as to reach the far corners. Where the coal is not shot down onto the floor, a considerable quantity of it can be pulled down from the face in such a manner as to cause it to fall onto the conveyor. In certain instances an apron is used on each side of the conveyor. This is not shown in any of the illustrations. Coal falling upon this apron can be readily pushed into the conveyor.

In states where the shooting of the coal is performed during working hours, the conveyor can be set so that the coal is shot down onto its outer end and onto the aprons. The conveyor is so light that it can be handled and placed in position by one man if necessary. The truck is equipped with roller-bearing wheels, and can be pushed from one place to another by two men unless the grades are heavy.

My reason for recommending a light, inexpensive machine of this kind is that delays will not seriously affect the usefulness of the machine. It is evident that if the conveyor is compelled to remain idle, say 15 minutes, waiting for a car, the men will have work to do in the meantime; they may pull down coal from the face, or load up the front end and aprons so as to have a carload ready without any shoveling, as soon as an empty is secured; or they may take a rest, which under many circumstances can hardly be considered a waste of time.

A man shoveling coal into a car is desperately inefficient from the mechanical standpoint. In order to lift a shovelful of coal weighing, say 20 lb., through a distance of, say 3½ ft., he must lift his entire body through a certain distance while he raises his trunk (from the hips upward) from approximately a horizontal to a vertical position. The total muscular energy thus expended is large, while the portion of it consumed in useful work is small.

By the use of the conveyor it has been demonstrated that an increase in output can be secured, employing the same number of men. If the men can double the number of cars loaded per shift by the use of this machine, it is obvious that each place will be loaded out in one-half the time required by the use of shovels only, and therefore each place can be cut and loaded out twice as often. This is equivalent to doubling the output with the same number of loaders, or from the same territory the same output can be obtained with



THE LOADING MACHINE UPON ITS TRUCK READY TO BE MOVED

less men and no development work will be necessary for some time to come.

Conveyors of this kind can be quickly produced in large quantities, thus securing an early increase in tonnage, much earlier than could be secured by opening new territory. What the country needs is output, and for quickest results at comparatively small expense, I know of no way to equal the use of this small conveyor equipment.

It is easy to understand that two molecules of CO can find one molecule of oxygen in the furnace gases much more quickly than one molecule of soot can find 12 molecules of oxygen. Therefore, simple gases, like CO and H_2 burn quickly in the furnace, because they more readily find the small amount of oxygen needed for their combustion; whereas the more complex combustible like soot burns slowly.

Efficient Haulage Methods

By PAUL TEAS
Cleveland, Ohio

SYNOPSIS—*It is useless for the miners to dig coal unless it can be transported quickly and promptly to the tipple. Mine transportation is the "neck of the bottle" that must be kept open if coal is to be shipped. Gasoline-locomotive haulage is proving efficient for this purpose.*

EVERY new responsibility created by the war taps a new source of energy that the American people had scarcely dreamed of possessing. The number of men from the coal-mining industry who have been and will be called to the colors leaves a serious gap—but the situation can and will be met. America's "will to do" is more than equal to the demand.

The problem of getting coal from the workings to the tipple is as important as that of digging it. The miners would soon bury themselves if the coal were allowed to pile up behind them. A well-organized haulage system is the vital connecting link between the mine face and the railroad—the "neck of the bottle" that must be kept uncorked if the mine is to work to capacity, and if the owners are to do their part toward supplying the world shortage of fuel.

It took the prod of war to really "show up" animal haulage. The flop-eared, perverse mule has been associated with coal hauling for so long that some people had almost come to think that mules grew in mines, like mushrooms.

But when the war came, mule prices went up; owners began to realize that mule and horse haulage never had made a good showing. They were "ripe" for some better methods—and fortunately the methods were ready.

The owner or operator looking for increased production, setting down his arguments "for" and "against," will find these points in favor of internal-combustion-locomotive haulage as compared with animal haulage. The cost of a reliable locomotive has not increased as rapidly in proportion to the work it does, as has that of mules and horses; it will haul far greater loads per trip; it will keep at its task, hour after hour, all day, without requiring any rest between trips; if properly designed, it will operate successfully underground as well as on top, without giving off objectionable fumes; it will burn only a small amount of fuel in proportion to the work it does, and will require but little lubricant; it will not require a licensed engineer, but can be operated by any man who has a fair knowledge of machinery; being built properly in the first place, it will not require any heavy outlay for upkeep; and practically without deterioration when not in use, it will not add appreciably to the overhead operating expenses of the mine when not working.

To verify the belief that one of the solutions of the acute labor shortage in our coal mines is through the introduction of efficient haulage methods, an inquiry has been conducted among some representative concerns who have given this type of haulage a thorough trial.

Their reports would indicate that the day of animal haulage is now well past and that owners who look to gasoline power may also confidently expect and realize lower operating costs.

At Philippi, West Virginia, the Morrell Coal Co. has used internal-combustion haulage from the time it started in business. The power unit is a three-ton friction-drive locomotive, and its performance has been carefully checked by the superintendent, C. M. Wolfe.

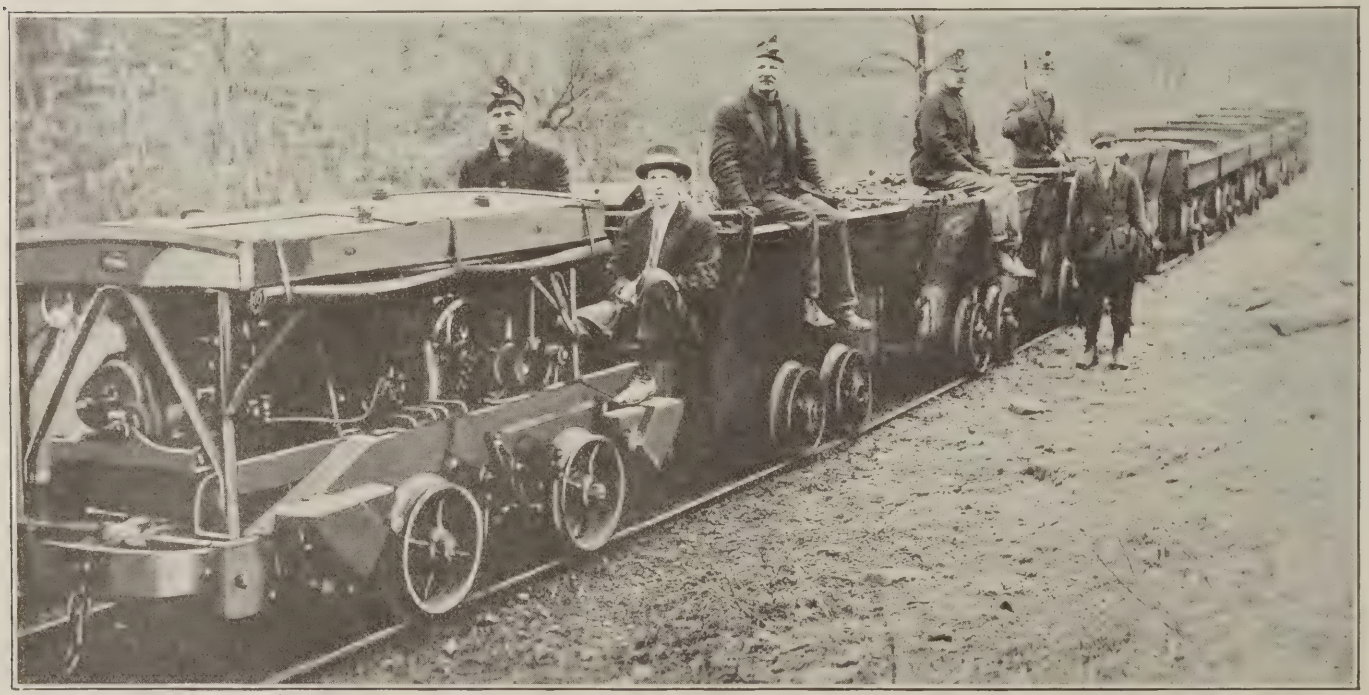


FIG. 1. GASOLINE LOCOMOTIVE WITH TRIP OF CARS AT SOUTHERN CONNELLSVILLE COKE CO., UNIONTOWN, PENN.



FIG. 2. LOCOMOTIVE WITH A SHORT TRIP OF LOADS, MORRELL COAL CO., PHILIPPI, W. VA.

Production averages about 400 tons per 8-hour day, and the locomotive handles the entire output with ease. It takes six-car trips, each car holding 1½ tons, and covers the round trip between mine and tipple in ten minutes.

So far—and the owners feel that a year and a half is long enough for a test—the locomotive has been economical both in fuel and lubricating oil. An average of 9 gal. of gasoline and a limited quantity of lubricant are used, and the outfit is operated successfully with only two men—neither of whom is an expert mechanic.

Using this type of power, these advantages are noted: Low operating and maintenance cost; saving in operator's wages, since no skilled engineer is required; ability of locomotive to pull extra-heavy load, taking up slack between cars without stalling; and ability to pick up speed quickly under load.

Over in an adjoining county, at Clarksburg, another company adds an enthusiastic word for gasoline-locomotive haulage. The Central Fairmont Coal Co. started its search for a worthy successor to the patient mule some years ago. Finally the president, D. Howard, found a type of locomotive that looked suitable. He questioned officials of other companies, owning the same make, and then ordered one.

Conditions at this mine put the locomotive to a really severe test. The haul is 3000 ft. long, starting underground and including a troublesome grade. These conditions did not, however, prevent the outfit from giving so good an account of itself that later the company ordered another of the same make. Both are now being used—and used hard—every day.

Both locomotives are busy nearly all of every day, but neither of them has ever shown any sign of weakening under "punishment." For about two years the upkeep has averaged scarcely more than $1 per month for each locomotive. When it came to recruiting competent operators, the officials found their troubles already settled for them by the locomotive builders themselves. The modern gasoline-haulage unit is operated and controlled in practically the same manner as is a motor truck—even the owner of a pleasure car would soon "get on to it."

With a big field of experienced truck and auto men to draw from, the Central Fairmont Coal Co. has had no trouble in locating operators of ability, men who can not only drive the locomotives forward and backward under load, but who can give them intelligent care whenever it is necessary.

Bearing in mind that each of this company's locomotives is in use nearly all day, and that they both pull heavy loads against stiff grades, the officials feel that their gasoline bills are exceedingly reasonable. Seven gallons per locomotive per day covers this item—a mere trifle compared with the cost of feed for enough mules to move the same tonnage.

The coke people, too, are "taking stock" of their haulage facilities and are finding animal power costly and unprofitable. The manager of the Southern Connellsville Coke Co. found in ten months' experience that his gasoline locomotive could make its 4000-ft. haul four times an hour. That means a round trip of more than a mile and a half every 15 minutes—32 trips each eight-hour day.

Loads at this mine average 400 bushels of coal. Figuring that the locomotive hauls more than 12,000 bushels per day for nearly 25 miles, and then covers an equal distance with strings of "empties" on the return trip, the consumption of gasoline and oil seems low indeed—5 gal. of gasoline and 1 qt. of lubricating oil. As may be judged from the illustration (Fig. 1), this outfit has few grades to contend with. Although the trip begins in the mine, no trouble is encountered with exhaust fumes—the owners finding that the locomotive operates about as satisfactorily there as on the surface.

The H. C. Frick Coke Co. is another large concern whose experiments with internal-combustion haulage have shown good results. At one of its plants—at Bute, in Fayette County, Pennsylvania—one gasoline locomotive of the friction-disk type has replaced eight mules and their drivers.

Following and profiting by the experiences of these operators, some of the strip-mining companies are already "dipping into" gasoline haulage with equally good results—though in their case the conditions are so different as to make the change even more striking.

For a "daylight" mine to adopt gasoline haulage, buying fuel at market prices, is a notable admission of the efficiency of the gasoline locomotive. A number of the large stripping companies are, of course, using steam locomotives that burn coal produced on the

spot; and it is hardly to be expected that any company would deliberately turn to gasoline machines unless convinced that the latter offered greater economies in operation.

The reasonable conclusion appears to be that, as capable men are taken by the draft, their place in the mines must be filled by better mechanical facilities in the form of digging, loading and conveying equipment.

If loyalty to the nation that has given them their chance does not alone impel those who remain to stay on the job and work all the harder, perhaps the mere "motive of gain"—an extra ply or two in the pay envelope—may help to turn the trick. But if neither of these alone suffices, no doubt a resourceful administration will find some other way.

One can scarcely believe that the great minds of a nation that has done the apparently impossible in many other directions will allow anything to seriously interfere with the production of a great war essential.

The Nerves of the Mine

By L. B. Gawthrop
Philadelphia, Penn.

Of all uses to which the invisible force of electricity has been put by man, perhaps the most useful, the most important and the most far-reaching in its results is the transmission of intelligence. Efficient as electric power distribution may be, other means may be found to take its place should necessity require. There are no substitutes for the telephone, the telegraph, the wireless and the electric signaling system.

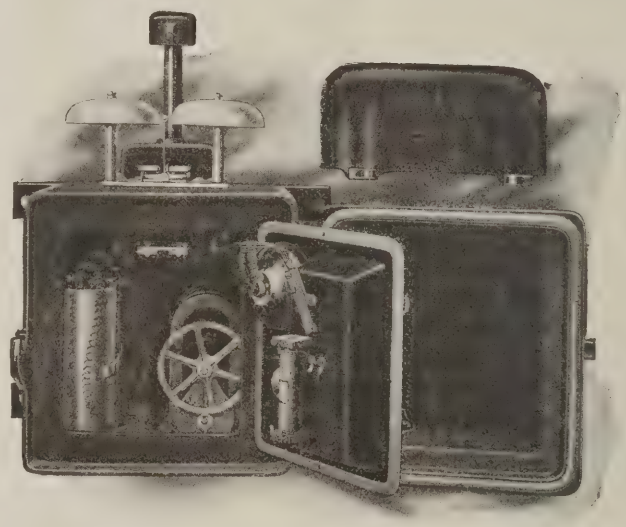
In practically all modern industrial plants the telephone and the electric signal play an important and a highly utilitarian rôle. In some instances the executive in his office may not only secure telephone connections with the heads of his various departments, but by means of instruments, such as electrical revolution counters and the like, may have actual communication with various important machines themselves and is thus enabled to know definitely at any time exactly what each unit is doing.

The coal mine is in many respects as intricate an establishment as many factories or other industrial institutions; and in the mine, also, the electrical transmission of intelligence is highly important to the smooth running of the organization, to the production of a vital national necessity, and in not a few instances to the protection of property or the preservation of life itself.

It is needless to say that signaling devices and telephones are worse than useless unless they are reliable. In any system of intelligence-transmission as intricate and complicated as that employed in a big mine, each unit and each element must be absolutely dependable. In this class of apparatus the Electric Service Supplies Co., of Philadelphia, Penn., has specialized for years and now has a line of equipment that it is satisfied is highly efficient and reliable for the purpose intended. Its mine telephones, electric signal switches and mine signal push buttons are built "on honor," of the best materials obtainable for the purpose and after designs the utility of which has been proved thoroughly in extensive practical use.

A good intelligence-transmission system in a coal mine might rightly be called the nerves of the organization. Such a system is vitally essential to maximum production, since it is through it that orders and directions are conveyed to the most remote as well as the more adjacent parts of the operation. This is accomplished quicker and more certainly and accurately by electricity than by any other means.

Giving orders quickly and intelligently naturally involves the use of the telephone, but other signaling may be done with bells and buzzers or incandescent lamps provided with their proper respective control equipments. The telephone is particularly useful to the superintendent or other official who desires to keep in close touch with all parts of the operation. This service it performs admirably, since when, we will say, the superintendent wishes to give the mine foreman certain instructions, he merely rings up, gets his man, has a few minutes talk with him and hangs up. A great saving of time has been accomplished. In addition, the executive originating the order has the assurance



EFFICIENT ELECTRIC MINE TELEPHONE

that his message has been given to the proper person exactly as he wished it given, since he spoke to the man himself just as surely as if he had conversed with him face to face.

The same applies with equal emphasis to the mine foreman or electrician who may wish to get in touch with the superintendent or any other person about the mine. The advantages enjoyed by the officials through the use of the telephone are as great in proportion as those accruing to the superintendent or other executive responsible for the operation of the entire plant.

Great as are the advantages of the electric transmission of intelligence, exemplified most forcibly by the telephone, it is in times of emergency that its full value is most significant. A failure of the mine fan, a suspension of power, in fact any emergency affecting the safety of either life or property, demonstrates the true value of the ability to rapidly and accurately transmit orders and instructions. These are the occasions when a mine telephone is invaluable; in ordinary day to day operation it does much to insure the production of maximum output, which in these days is a vital necessity.

Specializing in the Mine

By J. APPLETON and J. SOMERS
Ironton, Ohio

SYNOPSIS—*There was a time when a miner was a skilled workman and performed all the operations necessary in coal production. Times have changed, and the miner today is almost exclusively a wielder of the shovel. Specialization and concentration of operation have done much to boost output when output is badly needed.*

THE serious problem which at this time confronts the entire coal industry is that of mining sufficient fuel for future requirements. This must be accomplished in the face of an unprecedented labor situation and the impossibility of getting enough needed new equipment promptly, owing to manufacturing conditions brought about by the demands of the war.

Every new application and development which will accomplish something toward this end should be carefully considered, and this article is prepared with the hope that it may be of some service to coal operators in solving the problem now before them.

Best results are obtained from labor and equipment when the work is so divided that both men and machinery are operating without interruption due to any one or more parts that perform the cycle of operations being delayed. In the ordinary method of coal mining sufficient attention is not paid to this point, with the result that both labor and machinery stand idle when they might be operating to advantage.

In manufacturing operations, maximum output and reduced costs are obtained by specializing the work each man does. Both he and his equipment keep on working continually at the particular job laid out for them and are not kept waiting by the other operations which are necessary to complete the finished product.



LOCOMOTIVE IN A ROOM

Let us see how this plan works out when applied to coal mines. There was a day when the miner cut his coal with a hand pick and also had all the rest of the various operations to do pertaining to coal production.

The cutting machine eliminated the pickman, and the coal miner became a coal loader. This was a decided step forward and increased the amount of coal per capita. But it did not go far enough, because the coal miner still had other duties to perform in addition to loading coal, such as timbering, shooting and sometimes laying the track.

Under the present system each miner is assigned to a particular place in the mine, and if he does not work the place remains idle. He is paid by the car for the amount of coal he loads, the other work he does being included in this price. If a man changes places he may have to do a lot of preliminary work which really be-



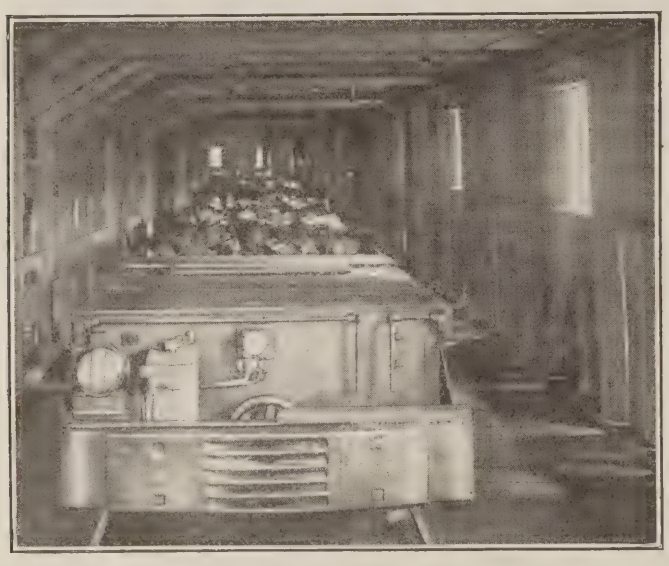
LOCOMOTIVE AND CARS ON ROTARY-DUMP TIPPLE

longed to his predecessor before he can start loading the coal which is the basis of his day's pay; and this he naturally objects to, as it reduces his remuneration for that day.

To make this clearer, let us consider the longwall method of mining, in which the men are not assigned regularly to any particular place but are assigned each day to any portion of the face where there is coal ready to load. For obvious reasons the longwall method of mining cannot be generally adopted, but its good features if applied to the room-and-pillar method would produce far better results than are now secured.

To explain in detail what is meant, let us consider the method used at the Bailey Coal Co. mines at Toler, Ky., where Lawrence Farrell has worked out a system which is believed to be unique.

Instead of having the loaders take up a large part of their time each morning preparing their places and the coal for loading, which means that cars and storage-



A TRIP IN THE TIPPLE

battery locomotives remain idle until this work is done and the coal can be loaded, this preliminary work is done by a few extra men who specialize on this class of operations and therefore become expert in their performance. Details of the system Mr. Farrell has so successfully worked out are as follows:

All the work of bringing down the coal is done at night. The coal is first cut; then the track is laid. A man with an electric drill follows the tracklayer, boring the necessary holes, and a shotfirer follows. Under this arrangement all the tools the coal loaders need are a pick and a shovel, which they can easily carry around from place to place. In the morning, at starting time, each loader is assigned to some working place where the coal is loose and ready to load, care being taken to concentrate the men available so that gathering and hauling of the coal may be done with efficiency and at a minimum expense.

In this way the cars and locomotives are put into operation as soon as the men start work instead of remaining idle several hours until the coal is made ready to load. This also applies to the tipple men and others who have nothing to do until coal is actually being hauled.

How many mines are there where it is 9 o'clock or later before the hauling of coal can be commenced, the cars and locomotives during this time remaining idle and nonproductive? To accomplish the results outlined above at the Bailey mine, only two extra men are required; and as they do nothing else, they become expert at this work. Proficiency, especially in drilling and shooting, means much.



LOCOMOTIVE AND TRIP IN A HEADING

Eliminating this special work means that the class of labor now procurable can be used to advantage. Loading coal only is done by these green men, who could not be used for drilling and shooting. Consequently, the maximum efficiency is secured from the labor available.

The cost of the extra men doing the drilling and shooting, also the powder used, is not charged against the loaders. It has been found that the increased amount of coal obtained more than offsets this expense. Also, by relieving the loaders of this work, the men are much more satisfied. They stay at the mine instead of quitting for a slight pretext, as they did under the old method.

At the Toler mine 25 mine cars designed by Captain Bailey are employed, the special feature being the large capacity of the car with minimum height. This has been accomplished by making the car overhang the wheels. A capacity of 2½ tons per car is obtained with a car 10 ft. long and 32 in. in height, this being the same



BORING A SHORT HOLE IN THE FACE

dimensions as the Ironton storage-battery locomotives employed. These cars are shown in the accompanying illustrations.

With only 25 cars and two storage-battery locomotives, 450 tons of coal per day are handled over a haul which is unfavorable, the length being 2800 ft. and the entire distance having a grade against the load, in some places reaching 5 per cent. The amount of coal loaded per man is high, averaging about 20 tons per man. The mine cars are dumped eight times per day.

With labor specialized and concentrated in this way, and supplemented by up-to-date methods of gathering and hauling by means of storage battery locomotives much can be accomplished towards meeting the present serious situation; and we hope this article may be the means of some coal operators investigating what has been accomplished with this method and the equipment employed in this mine. The method is just as practical and possible in other operations.

Minecdotes

A Slight Mixing of Words

The mechanical engineer had been having his troubles. The mines were working full time and full handed, and consequently turning out a record tonnage. Repairs were accordingly heavy, and when something broke a duplicate part had either to be made in the shop or purchased and delivered in record time.

The company operated several distinct plants, some of which were miles from the office. When a gear failed on, we will say, a picking table, it meant that the engineer must either ride horseback several weary miles, take a passenger train if convenient, run his chances of getting a ride on a "shifter," or walk. The important thing was to get to the disabled machine, collect the necessary data and get a night-letter off via the order clerk as quickly as possible regardless of personal convenience or inconvenience.

One day, after being called to one of the remotest operations to measure up and order a pinion, the mechanical engineer took up with the superintendent the question of the latter's making his own measurements for gears when occasion demanded. He assured the superintendent that it was needless to bother whether a gear was of the involute, cycloidal or radial flank contour. It was necessary, however, to state the material of which the gear was made (cast iron, steel casting, steel forging, rawhide, brass, bronze, fiber or cloth), the method of manufacture (cut or cast), outside diameter, number of teeth, width of face, diameter of bore, size of keyway or keyways if any, set screwing if any, length of hub, and the position of hub with respect to the center line of the gear face—that is, most hubs were set central and extended as far on one side of the wheel as on the other, while some hubs extended farther on one side than the other, or extended on one side only. The engineer explained also that pinions were sometimes shrouded, and in such a case it would be necessary to state the width of the working face (most easily secure by measuring the face of the gear with which the pinion meshed), the total width of the pinion tooth, the total width of the pinion over the shroud or shrouds, and state whether the shrouds were "full" or "half," one end or both.

The superintendent was much interested, as the mechanical engineer was speaking a language that he only imperfectly understood. He knew well what the face of a room meant, but the face of a gear was another matter. Involute, cycloidal and radial flank did not particularly interest him—they were out-and-out "highbrow," and non-essentials anyway. But he had to know all about shrouding. The engineer accordingly spent some time—several minutes in fact—in explaining the theory and practice of this method of strengthening gear teeth. He impressed upon the superintendent's mind that shrouding was practically always either "half" or "full," and on either or both ends. He finally made everything clear, and after counting the ties for four or five weary miles got a cold supper and a "call down" from Mrs. Engineer for being "so awfully late."

A week or so later, as the engineer was preparing to leave the office one evening, the telephone rang. The superintendent was on the wire. The pinion on the belt conveyor had broken. He had another, but thought it would be wise to keep one spare on hand. He had measured the piece and would give him the figures. The engineer got his notebook; he had obtained the measurements for that pinion a year or two before and carefully preserved them in a card index, as he had all other data of similar nature, but he wanted the superintendent to gain confidence in himself. So when he had his notebook and pencil ready he told the superintendent to "shoot."

Slowly and carefully the superintendent gave his figures, the engineer replying "Yes," "Uh-uh," "Are you sure of that?" "All right," etc. The pinion was of cast iron, it was so many inches in outside diameter, had 15 teeth, the working face was 4 in., the bore was $2\frac{13}{16}$ in., the keyway was $\frac{3}{8} \times \frac{3}{4}$ in., the total length was $5\frac{1}{2}$ inches.

"Is that all?" queried the engineer.

"Why ye—No. It's got ah—er—ah—Well, I know what it is, but I've forgot what you called it. As I remember what you told me this pinion has a complete suit of grave clothes on each side!"

In due time the superintendent got his pinion—*full shrouded* both ends.

Maximum Efficiency from Mine Cars

To a large extent maximum efficiency in coal-mine operation depends upon the facility with which the mine cars can be operated, says "Graphite Mine Car Lubricants," an exceedingly informative sixteen-page booklet compiled by the United States Graphite Co., of Saginaw, Mich., for gratuitous distribution. Therefore, to prevent delay and expense from undue wear and tear and to insure quick and easy handling it is necessary that mine cars be well lubricated. . . . Graphite grease is peculiarly adapted to this class of service, and if of the right sort will furnish lubrication of a superior degree and at the same time remove many of the objectionable features encountered in the use of oils and other greases, among them that of excessive labor cost.

Steel Mine Ties

By G. A. RICHARDSON
Philadelphia, Penn.

SYNOPSIS—*At a time when maximum production is highly desirable, steel ties possess many advantages over wooden ones. Although slightly higher in first cost, the steel tie is more efficient, especially in low coal beds; lasts longer; can be laid quicker and much more easily. The miners themselves prefer the steel ties because their use enables them to earn more.*

HOW can we save labor? How can we increase production? These two questions, important at all times, have become doubly so at the present; and we all know that coal-operating officials are finding themselves at their wits' ends to keep pace with increased demands on the one hand and a big reduction in their working forces on the other. Hence, when it is stated that the use of steel mine ties will increase production, save labor and reduce operating costs (a statement which has been made many times before), it should come home with particular force. Even if operating costs were not reduced or were made slightly greater, the first two parts of the statement justify a thorough investigation, while the complete statement expresses the cardinal aims of all business men.

The steel mine tie is no longer an experiment. It has been used successfully and for a long enough time to establish its superiority over the wooden tie, which it is rapidly replacing. As far back as 1910, one maker of steel ties put out 50,000. Sales of the Slick steel mine tie, an improved type which made its appearance on the market at the beginning of 1915, were 400 per cent. greater in 1916 than in 1915; and though further big increases have been seriously hindered by the difficulties experienced in obtaining the necessary steel, the mere statement that nearly 300,000 of this one type were sold in one section alone in 1917 gives a good idea of the demand which exists.

At the present time there are several well-known types of steel mine ties on the market. Of these, it is my intention to speak more specifically of the type known as the Slick steel mine tie, because I am firmly convinced that it possesses special features of design which make it by far the best for all-around use. Patented Jan. 19, 1915, this tie embodies improvements made as a result of a thorough study of then-existing types and their advantages and disadvantages.

In taking up the question of the actual advantages gained by the use of steel ties, the fundamental points on which these are based are as follows: (1) Size and weight; steel ties are smaller in size and lighter in weight than wooden ties for the same class of service. (2) Life; steel ties will give much longer service. (3) They are easily and quickly installed or taken out, due to special features of design.

Other points than these might be mentioned, but they would be more properly classified as subdivisions of the above, and in fact the three fundamental ones are so closely dependent on each other that it is difficult to separate them entirely. They will be brought out as the subject is developed.

Let us consider first of all the advantages of steel ties as compared with wooden ties from the standpoint of size and weight. A medium-weight Slick mine tie for 36-in. gage, complete with fastenings, will weigh about 10 lb., whereas a 3 x 4-in. wooden tie will weigh from 14 to 16 lb., depending on the kind of wood. A light-weight Slick tie for this same gage weighs only 5 lb. These savings in themselves, though important, would not warrant any unusual consideration were it not for the size and shape of the ties.

Steel mine ties are compact and have a shallow section; this latter fact makes it possible to materially modify track-laying practice. Owing to the thickness, which is only ½ in. for the light and medium-weight ties, it is possible to space them much farther apart than could be done with wood ties, because the rail between ties is supported by the floor. The actual distances of spacing will of course vary with the mine and the conditions encountered. In a large mine in Westmoreland County, Penn., one of a group that has used over 50,000 steel ties in the last two years, it is stated that wooden ties are spaced as close as 18 in., while the usual practice with steel ties is to place one at each joint and enough in between to make one tie to about

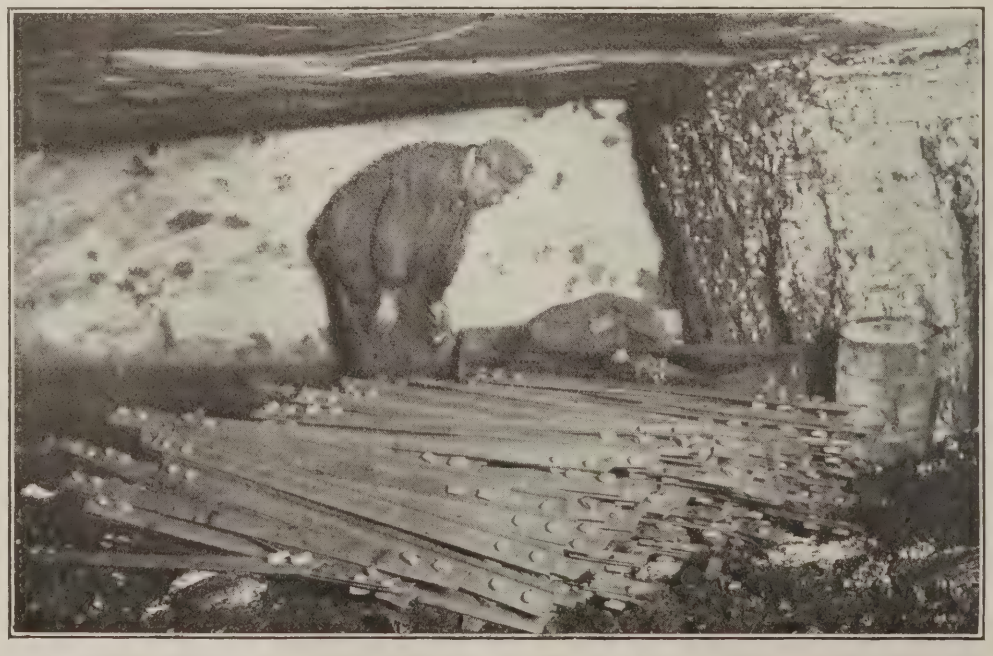


FIG. 1. PILE OF STEEL TIES, SHOWING SMALL SPACE OCCUPIED



FIG. 2. TRACK WITH BOTH STEEL AND WOOD TIES

every 10 ft. If wooden ties are not spaced fairly close together the rails are apt to break because of lack of support. This particular group of mines uses medium (No. 2 Slick) ties for the most part, with 20-lb. rail at 40-in. gage for all but heavy hauling.

At another large group of mines in Indiana County where the light-weight ties are used with 16-lb. rails for all but heavy service, the usual spacing is three steel ties per 15-ft. length of rail as compared with at least five wooden ties.

It can be seen from these two examples that it is possible to reduce the weight of a track section materially; in fact, to such an extent that two men can readily lift and carry a 15-ft. section of track with 16-lb. rails. This ability to move the track readily is of the greatest importance in mining.

Another advantage which results from the extreme lightness and compactness of the steel mine ties is the fact that a miner can readily pick up as many as half a dozen and carry them under his arm to the place where he wants to use them. This means that he does not have to waste time waiting for an assistant to come and help him. He can go ahead when he gets ready, and in practice does so. Some idea of the small amount of space taken up by these steel ties can be gained from Fig. 1, which shows a pile of 360 such ties stored at the side of a main entry in a 3½-ft. coal bed. A comparison of the size of the pile with that of the spike keg in the rear, or the stooping man, clearly illustrates what it has been my endeavor to bring out. This picture was taken the latter part of June of this year.

Probably one of the best known arguments which have been made in favor of steel mine ties is that regarding the increased headroom which can be gained by their use. Owing to the fact that their depth is so slight, a gain of fully 2½ in. can be made. What this additional headroom means where the beds are thin is only too evident to the practical mining man. Primarily, it allows of the use of larger mine cars and heavier loading, and eliminates the necessity of cutting channels for wooden ties. It should not be overlooked, however, that even a few extra inches will frequently facilitate loading, especially in cramped places, and thereby increase production. In many mines with medium or low coal beds, where wooden ties have been laid on the room floor, it has been impossible to introduce a mining machine into the room on account of the height of the machine. With steel ties and the greater clearance thus afforded, the same mining machines can be used. This alone is sufficient to recommend the use of the steel tie in such locations.

Where wooden ties are used in thin beds, it is almost invariably necessary to cut channels for them in the floor in order to gain the needed clearance. It is here that a marked gain or loss in production can be made. A miner working in a 3½-ft. bed made the statement that where it was necessary for him to use wooden ties and cut the channels for them it took nearly two hours to put in 30 ft. of track. With steel ties the job could be done in five minutes. Now, in this particular seam the average loading rate is four to five cars of 1½ tons capacity each in two hours; hence the miner and his helper can make a material increase in the amount of coal sent out. When this is multiplied many times, according to the number of miners working, it becomes an important consideration.

Fig. 2 was taken in a 3½-ft. coal bed in Indiana County, and brings out clearly several points. In the first place, the comparative space taken up by wooden and steel ties when in place is clearly shown. A shortage in the supply of steel ties here necessitated using some wooden ones. This is not good practice, because the wooden ties are so much the thicker that unless a great deal of work is done a humpy track results. One such hump shows clearly in the picture.

Fig. 3, taken in another room in the same mine, shows an actual installation of track laid on steel ties as it appears under normal working conditions. Steel ties are so thin that they do not ordinarily show up clearly in a photograph.

The life of ties is naturally a factor of considerable importance, especially where an increased first cost is necessary. This is, however, a factor that is highly indeterminate and it is useless to give exact figures. There are so many things that enter into consideration, all of which have an important bearing, that no general rule can be given except to the effect that steel ties will unquestionably give better service under almost all conditions than wooden ones, and cost less per year.

As a rule the natural tendency is to think of life of ties in terms of the comparative lengths of time which they will stand up under normal conditions of service, and this is the right method in the case of ordinary track where it is perfectly possible for even wooden ties to last many years. The average condition met with in the mine is not a normal, but an abnormal, one. Not only are ties exposed to excessive moisture in many cases, but mine operation necessitates that a large part

of track laid must be taken up and moved quite frequently. It is here that the serviceability of the steel tie begins to come out most prominently. Wooden ties must be spiked, and frequent spiking shortens their life markedly. Notching to receive the rail has a similar effect. Even where the tie is not cut the statement is made that it can seldom be used more than twice, giving an average life in many cases of barely more than three to four months. Steel ties, on the other hand, will last indefinitely, and while they will rust to a certain extent this does not seem to interfere with their usefulness. They are being used continuously where there is excessive wetness.

Another reason why steel ties have a longer life than wooden ones is the fact that they are so compact that the miner will pick them up and move them, whereas he will allow the more bulky tie to lie in place.

A third fundamental advantage of steel ties is that they can be easily and quickly installed and removed, due to special features of design. As already mentioned, size and weight have a great deal to do in giving this advantage, but the special design outweighs even these. The miner wants something which can be easily and quickly put down with a minimum of effort. This has been secured through the elimination of spikes, also the necessity of setting the track to gage.

This has been accomplished by the use of flanged buttons in the case of the Slick tie. These buttons, which have been made amply large to stand the wear and tear of rough service, are so placed that they give the exact gage of the track automatically when the rails are placed for fastening. The buttons themselves are so made that they can be turned with comparative ease by means of an ordinary adjustable or solid wrench. They hold securely in any position by the friction of the rivet which keeps them in place. A single quarter turn is all that is necessary.

It can be readily seen that a tie which is self-contained and requires no extra fastenings is a big help down in the mine, eliminating many of the hindrances and wastes due to lost parts. When it is considered further that no adjusting to gage is necessary, that a few seconds are ample to fasten the track securely in place, and that the only accessory, the wrench, is easily carried, the advantages are apparent.

In many mines wrenches are never used at all, the buttons being knocked into place by means of a hammer or hatchet. This is not good practice and is not recommended, but nevertheless a large user of the light-weight ties made the statement that it is followed almost universally in his group of mines and there has been no complaint. This speaks well for the ruggedness of the ties.

When desired splice sections can be furnished, but the ordinary practice in the case of the lighter-weight ties is to do without splices of any kind. The grip of the buttons is so secure that the placing of one or two ties at each joint, the number depending on the size of tie employed, answers all purposes quite satisfactorily.

Steel ties are popular with miners in robbing pillars because of the ease with which they can be put in place and carried away. No spike bar is needed in taking the rails up, and the joints can be knocked loose. This means that the track can be readily moved while the roof is coming down, and this results not only in a saving of rails but of ties as well. Too often where rails spiked on wooden ties are used the entire track is lost.

In both room and entry work the last 15 ft. of track must be taken up each time the face is cut. Where wooden ties are used the miner does not like to go to the trouble of spiking the rails down, with the result that his car is apt to go off the track. He and his helper are then likely to get disgusted and go home for the day, and production is lowered just that much. The rails can be readily and quickly fastened down when steel ties are used.

A convenient method of extending track in rooms when steel ties are used is as follows: The mine track may be prolonged to the face workings by laying a pair of loose rails on their sides, projecting from the tie-supported track. Each loose rail fits along the inner side of each extreme track rail, with the head of each loose rail outward and the web approximately horizontal, so that the loose rail rests upon the side of its head and the edge of its flange. The head of the loose rail fits between the head and flange of the upright track rail, and the clamping buttons fit between



FIG. 3. TRACK LAID WITH STEEL TIES

the head and flange of the loose rail, thereby holding it in place. This latter position, while it allows the loose rail to be slid forward and backward, prevents it from accidentally getting out of position. The loose rails are easily applied to the assembled track and may be extended, as desired, to the working face by sliding the rails lengthwise until their ends reach the face workings. No fastenings or special fixtures are necessary, as the extension rails are held in place by the button fastenings in conjunction with the upright rail. The mine-car wheels run on these extension rails on their flanges, which are supported by the rail webs.

There is no question that taken all in all miners favor the steel tie in preference to wooden ones, and it is an actual fact that labor discontent and troubles have arisen over this very question. Where both kinds of ties are used it is customary to give out the steel ties for use in the low coal, with the result that the other men feel that they are being discriminated against. Perhaps the best evidence of the liking which the miners have for the steel ties is the statement that where the supply of these ties is limited a pile left lying loose will rapidly disappear, each man taking and hiding as many as he can for his own use.

The question of cost is always an important one.

The miners that I have spoken with seemed to feel that the reason steel ties were not furnished was that they cost more than wooden ones. This may be true in some cases, although the operating officials stated emphatically that this was not the reason, saying that it was simply due to the fact that they could not secure such ties as fast as they would like under existing conditions. It is true that steel ties do cost more than the wooden ones, but first cost is a small part of the expense in any mine. If increased life, increased production, a saving in equipment, etc., result, it is negligible.

Another thing that must not be overlooked is the fact that while the miner is not paid for the time he employs in laying and taking up track, he is then not only decreasing his actual production but by virtue of this fact is increasing the overhead that must be charged against each ton of coal produced.

As stated in the beginning, the very fact that sales of steel ties continue large and are on the increase shows conclusively that they are meeting requirements. It must not be forgotten, also, that wooden ties are constantly becoming more and more difficult to secure and are rapidly approaching steel ties from the standpoint of cost. Many mines—not all small ones either—are going over to steel ties entirely, and this includes ties for switches as well as straight track.

Peat Deposits of the United States

According to the United States Geological Survey, Department of the Interior, the commercial development of the vast peat deposits in the United States would materially relieve our present shortage of fuel. Although peat has never been largely used as fuel in this country because of our abundant supply of coal, which can be more readily prepared for consumption and in normal times more cheaply brought to the consumer, it has long been used in Europe, where 15,000,000 to 20,000,000 tons are consumed annually in generating heat and power.

The attempts made in this country to manufacture peat fuel on a commercial scale have not been successful, but the failure appears to have been due not to a lack of market for the product but to the lack of sufficient capital, to the inexperience of the operators, and to preventable engineering errors. It is said that air-dried machine peat, which is but little inferior in calorific value to many grades of lignite coal, can be produced at a cost ranging from 75c. to $2.50 a ton, the exact figure depending on the size and the efficiency of the plant; and it is believed that in some parts of the country it could successfully compete with other fuels for both domestic and industrial use. It burns with little smoke and ash, and wherever it has been used in this country it has proved very satisfactory and has found ready sale as fast as it has been produced.

The wide interest felt in the larger use of peat in the United States is expressed in recent messages from the governors of Maine and Massachusetts to the legislatures of those states, recommending an investigation of the local deposits of peat and its possible use to relieve the present shortage of fuel.

The lack of other fuel in many European countries is now being supplied in part by an increased use of peat. According to United States Commerce reports 216 peat machines were in operation in Norway in 1917, compared with 55 in 1916 and 36 in 1914. Among these were two automatic machines, each costing $13,400, having a daily capacity of 30 to 40 tons of fuel, and requiring only two men for its operation.

Peat consumed in a properly designed gas producer yields gas of good quality and in abundant quantity in comparison with the yield from coal, as well as many valuable byproducts. This is perhaps the most effective utilization of peat fuel for generating heat and power, because peat that is to be used in this way does not need to be so carefully prepared nor so thoroughly dried as peat that is to be consumed under steam boilers.

Specific information with regard to the use of peat in gas-producing plants and for other purposes is given in a bulletin prepared under the supervision of the United States Geological Survey but published as Bulletin 16 of the Bureau of Mines, from which copies of it may be obtained.

Coal Age Index

The indexes to *Coal Age* are furnished free to all who ask for them. The index for the first half of 1918 will be ready for distribution next week, and a copy can be had by addressing a post card to the Subscription Department of *Coal Age*.

Ideas and Suggestions

THE coal-mining industry is confronted this year with the task of producing more coal than was mined in any other year of its existence. It must do big things in the way of production if the exacting demands of our war machine are to be satisfied. To win the conflict in which we are now engaged American plants must turn out more guns, more ammunition, more ships, more airplanes, more clothing—in fact, more of everything. In the final analysis this means more coal, for without fuel industry must cease to function. The relative value of little things to the larger undertaking of winning the war cannot be overlooked, and in no industry is this statement more true than in coal mining. Sadly depleted of man power, with equipment and machinery on the verge of breakdown because there is no letup for repairs, many coal-mining plants have been enabled to work day after day only by the ingenuity of their engineers. To assist the entire industry by the interchange of ideas that will lead to greater and more efficient coal production is the basic idea underlying the "Ideas and Suggestions" department of *Coal Age*. Therefore, if you know of a plan or of a device that proved its worth in time of need, write it up for the aid of others who may at this moment be in need of it. If you have a suggestion to make which will lead to more steady and more result-producing work on the part of the mine workers, make it directly to the industry through the columns of this journal. Diagrams, photographs and sketches that help put the idea over should accompany all manuscripts. Aside from enabling you to do your part in assisting the industry, is the fact that *Coal Age* pays liberally for all ideas and suggestions suitable for publication.

Electrical Labor-Saving Devices in Coal Mining

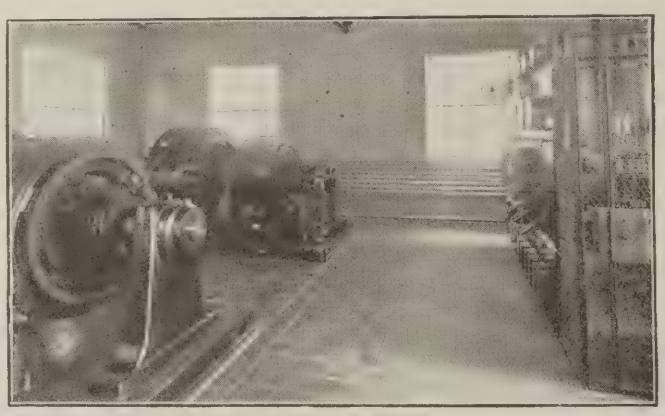
By GRAHAM BRIGHT
East Pittsburgh, Penn.

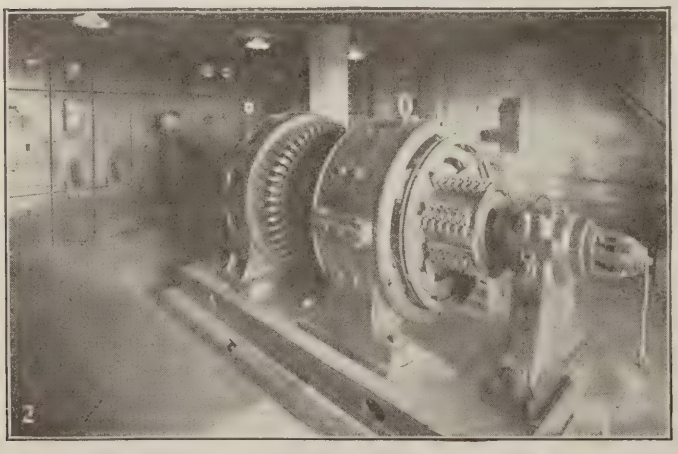
SYNOPSIS—*If coal production is to be maintained, all labor-saving devices available must be employed in mining. It is noticeable that practically all such devices now in use are electrically driven. It would appear that as men become scarcer machines must take their place. Greatest efficiency will be attained when a few experienced men operating machines supplant the large number of more or less ignorant and inexperienced miners usually employed.*

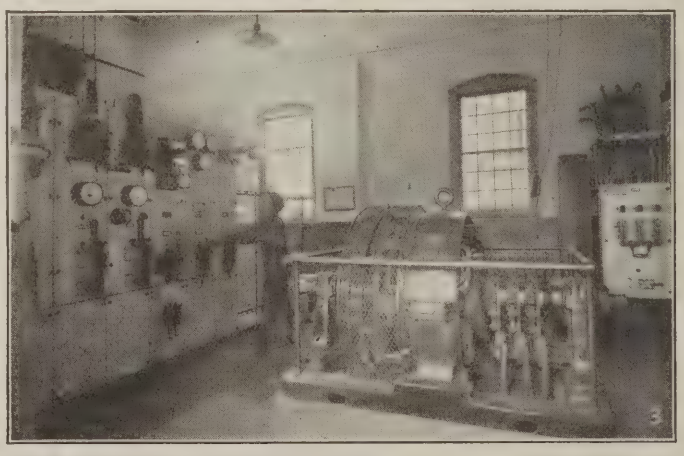
THE great increase in the demand for coal, coupled with a decrease in the supply of workmen and an increase in the cost of labor, makes it imperative that in order to keep up the production of coal labor-saving devices must be utilized to their fullest extent. It is true that many mining companies have installed considerable labor-saving equipment during the recent past, but the acute conditions brought about by the war make it necessary to leave no stone unturned to increase production. Although many labor-saving devices are more or less of a mechanical nature, a large proportion of them depend upon electric power for their operation. Since all mines use more or less power, there is a considerable field in the power department to install labor-saving devices. Where steam power alone is employed, some economies can be effected by the use of stokers, coal- and ash-handling equipment, feed-water heaters and purifiers. However, to effect real economy —not only to save labor but to cut down the cost of producing power—the steam should be replaced by the electric distribution with current either generated in an isolated plant or else purchased from a central-station company.

Where central-station power is available it often shows much greater economy both in regard to the amount of labor employed and the cost, when compared to an isolated electric plant. An isolated electric plant will effect some saving in labor, owing to the higher economy of electrical apparatus when compared with steam. The greatest economy, however, is often obtained only with the use of central-station power. I might cite one case of a mine in Alabama which is operated entirely by steam. Water is obtained from a river pumping plant, necessitating a separate boiler plant. The boiler plants alone are operated by the following labor: Main boiler plant, 6 day firemen, 1 day foreman, 4 night firemen, 1 night foreman, 6 ash rustlers; river boiler plant, 1 day fireman and 1 night fireman.

By the use of central-station power all of this labor could be dispensed with. Under present conditions the cost of labor at the boiler plants alone would be as great as the entire power bill, if central-station energy at ordinary rates were used. Central-station power has a further distinct advantage in increasing the output of a mine. The principal business of a coal-mining company is to mine and ship coal, and the operating force is generally selected with this end in view. The efficient production of electric power is a business by







FIGS. 1 TO 3. SUBSTATION EQUIPMENT INSTALLED AT COAL MINES
Fig. 1—Two 200-kw. synchronous motor generators, capable of supplying mine with capacity of 2000 to 3000 tons per day. Fig. 2—Mine substation with 200-kw. motor-generator set. Fig. 3—Synchronous converter of 500-kw. capacity

itself—entirely different from that of mining coal. As it is practically impossible to obtain men expert in both fields, a mine can be operated much more efficiently if all the time of the operating force can be devoted to the production and shipment of coal.

With purchased power most of the motors outside of the mine can be of the alternating-current type, receiving their power from static transformers, which in turn do not require any attention. Direct-current power for haulage and cutting is obtained from motor-generators or converters, which require only an occasional inspection.

Fig. 1 shows a substation equipped with two 200-kw. synchronous motor-generators capable of supplying power for a mine having a capacity of 2000 to 3000 tons per day. Fig. 2 shows a substation located inside of a mine equipped with one 200-kw. motor-generator set. Power is received from a cable installed in a borehole from the surface. Fig. 3 shows a synchronous converter of 500-kw. capacity. This equipment will require much less attention than a steam plant of the same capacity.

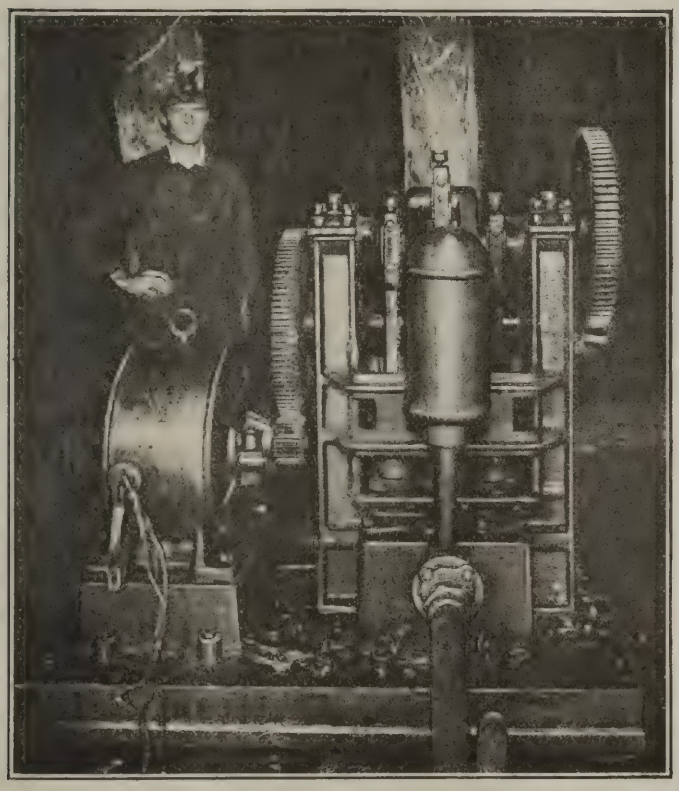


FIG. 4. GOULDS MOTOR-DRIVEN TRIPLEX PUMP

Practically all coal mines have to pump more or less water. The amount handled ranges from little or none in some of the drift mines of the bituminous field to several times the weight of the coal output at some of the anthracite operations. Where steam or compressed air is used for driving mine pumps, inefficient operation takes place.

Steam- or air-driven pumps require considerably more attention than motor-driven machines, and their poor efficiency, coupled with the pipe-line losses, means that more steam must be generated and more coal burned under the boilers, entailing not only more cost but more labor than when motor-driven pumps of similar capacity are employed.

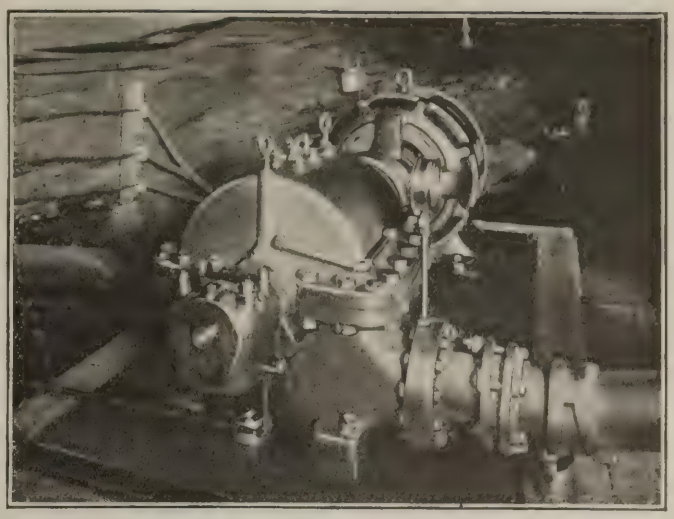


FIG. 5. GOULDS MOTOR-DRIVEN CENTRIFUGAL PUMP

Motor-driven pumps may be operated by either direct- or alternating-current motors and may be of the reciprocating or centrifugal type. Fig. 4 shows a Goulds motor-driven triplex pump, and Fig. 5 shows a Goulds motor-driven centrifugal pump, both located in mines. These motor-driven pumps do not require starters, but can be directly connected to the power system. If power should go off and come on again, the pump will start up without requiring attention. These pumps are sometimes used in connection with a float switch which automatically starts and stops the pump at the proper time.

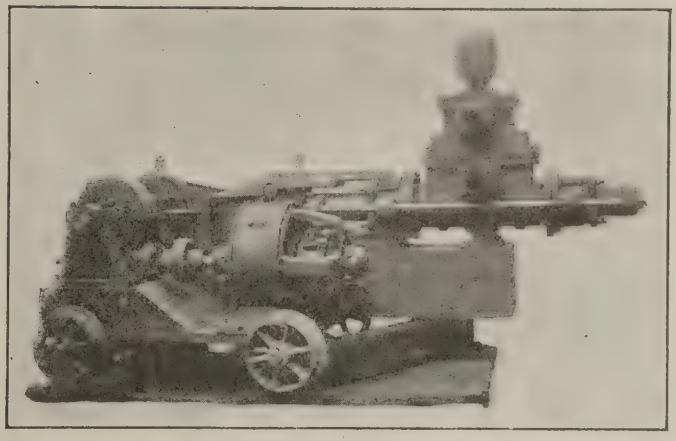


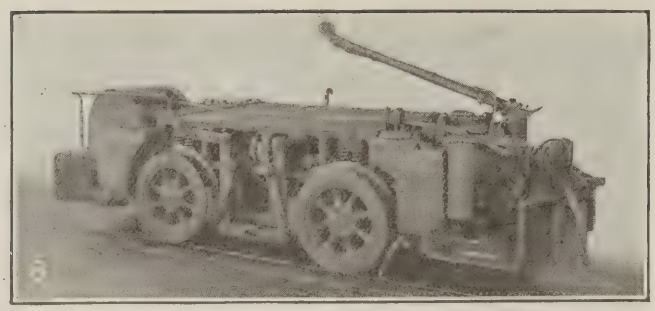
FIG. 6. PORTABLE MOTOR-DRIVEN PUMP

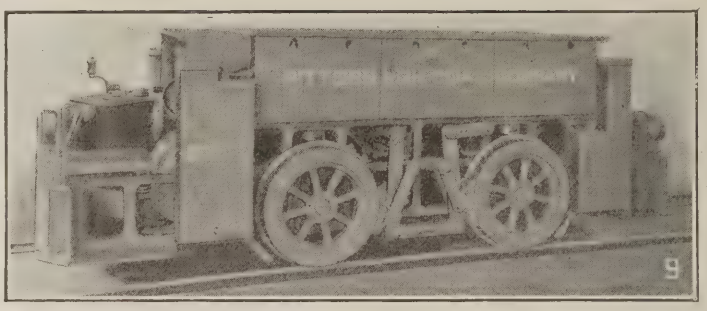
Fig. 6 shows a portable motor-driven pump which can be moved quickly to any part of the mine. This could not be done readily with a steam- or air-driven pump.

It is of course desirable that the ventilating system of a mine be thoroughly reliable, and there are many records showing steam fans in continuous operation



FIG. 7. FANHOUSE OF LEHIGH VALLEY COAL CO.







FIGS. 8 TO 10. THREE TYPES OF LOCOMOTIVES USED IN MINES
Fig. 8—Reel-type locomotive. Fig. 9—Storage-battery locomotive.
Fig. 10—A 35-ton three-motor locomotive

for long periods of time. Since the power required for ventilation is often a fairly large percentage of the total amount required at a mine, a fan should necessarily be economical in its use of power. An electric motor will in most cases be more reliable as well as more efficient than a steam engine. Fig. 7 shows a fanhouse of the Lehigh Valley Coal Co. The fan is driven by a 30-hp. motor and is controlled from a substation 1½ miles away.

It may be said safely that in the haulage system of a mine one of the most striking economies is obtained both in amount of labor involved and the expense of transportation by substituting electric power for animal or some forms of mechanical haulage. For gathering service, either the trolley type of locomotive with a reel or the storage-battery machine is rapidly replacing animals. One locomotive will replace two to four mules or horses, and since each animal not only requires a driver, but attendance when in the stable, a saving in labor will arise from its substitution. Fig. 8 illustrates a reel type of locomotive while Fig. 9 shows a storage-battery machine. For main haulage there is no comparison between the locomotive and animal haulage. This arises from the great distances traversed and the speed necessary. The capacity of locomotives for main haulage is becoming larger each year, until greater capacity can only be obtained by using two locomotives in tandem. Fig. 10 shows one of the 35-ton three-motor locomotives used in the Berwind-White mines at Windber, Penn. This is the largest locomotive operating inside of a mine in this country. The maximum length of haul is here close to 20,000 feet.

When vertical shafts or steep slopes occur, the coal must be brought up them by means of a hoist. The substitution of electrically driven hoists will effect a saving both in labor and cost of operation. A rather notable example of what can be accomplished by changing a hoist from steam operation is shown in a paper presented before the American Institute of Mining Engineers at its 1918 February meeting at New York, by R. E. Hobart, mechanical superintendent of the Lehigh Coal and Navigation Co., entitled "Economy of

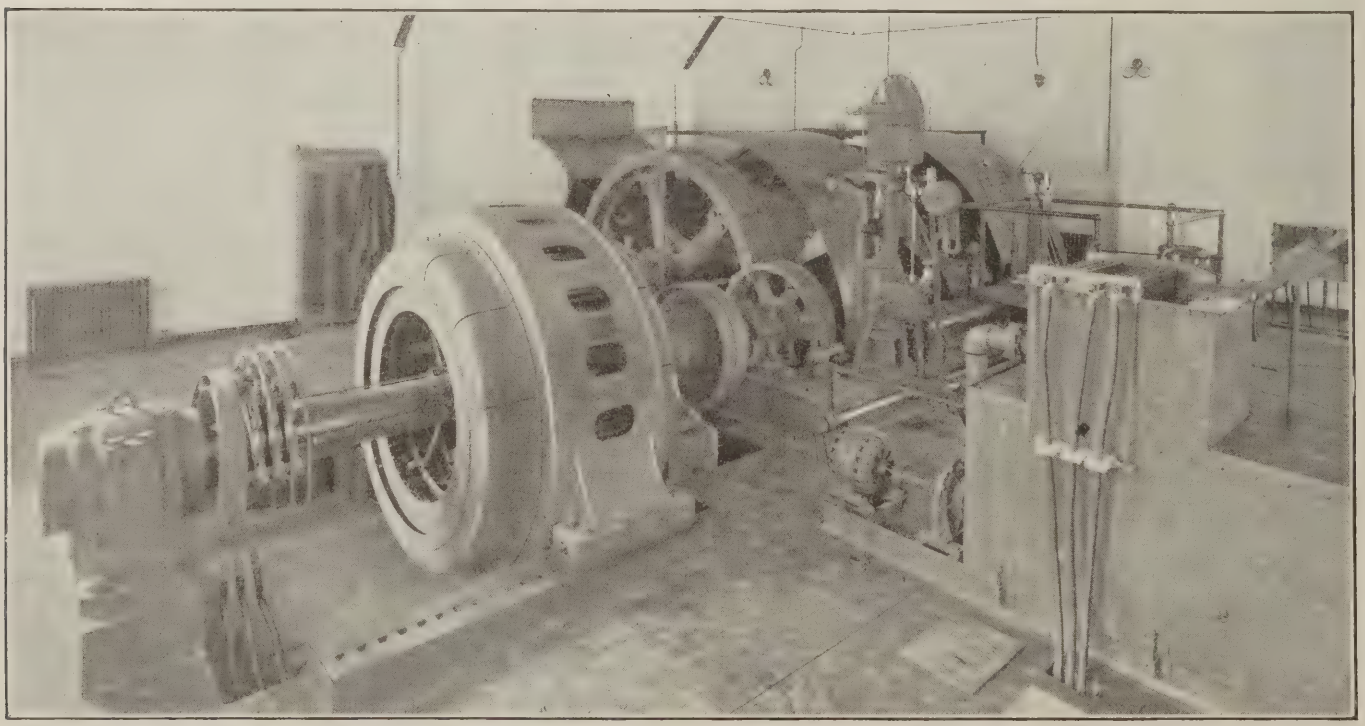


FIG. 11. HOIST OF THE INDUCTION MOTOR TYPE WHICH EFFECTED REMARKABLE ECONOMIES

Electricity Over Steam for Power Purposes in and About Mines." This paper shows that some remarkable economies were obtained, the results being based on operation of a year's duration. Fig. 11 shows the hoist in question, which is of the induction-motor type, having a continuous rating of 750 hp. with a capacity of 50 per cent. overload continuously. The mechanical parts of the hoist were furnished by the Vulcan Iron Works, of Wilkes-Barre, Penn., and the electrical equipment by the Westinghouse Electric and Manufacturing Company.

A great saving in labor inside of the mine can be effected by the use of small hoists of the winch type. These machines will take care of hoisting and lowering cars over steep grades where they cannot be economically handled by other means. The hoists are so simple that any miner, even though inexperienced, can operate them.

Where large hoists are involved and heavy peaks are objectionable, a direct-current motor, receiving its power from a flywheel motor-generator set should be employed. The largest hoist in America is of this type, and is illustrated in Fig. 12. This hoist is located in a large copper mine in the West. Two other machines for which the electrical equipment is a duplicate of the former have been installed recently. The hoist motor has a capacity of 2000 hp., continuously.

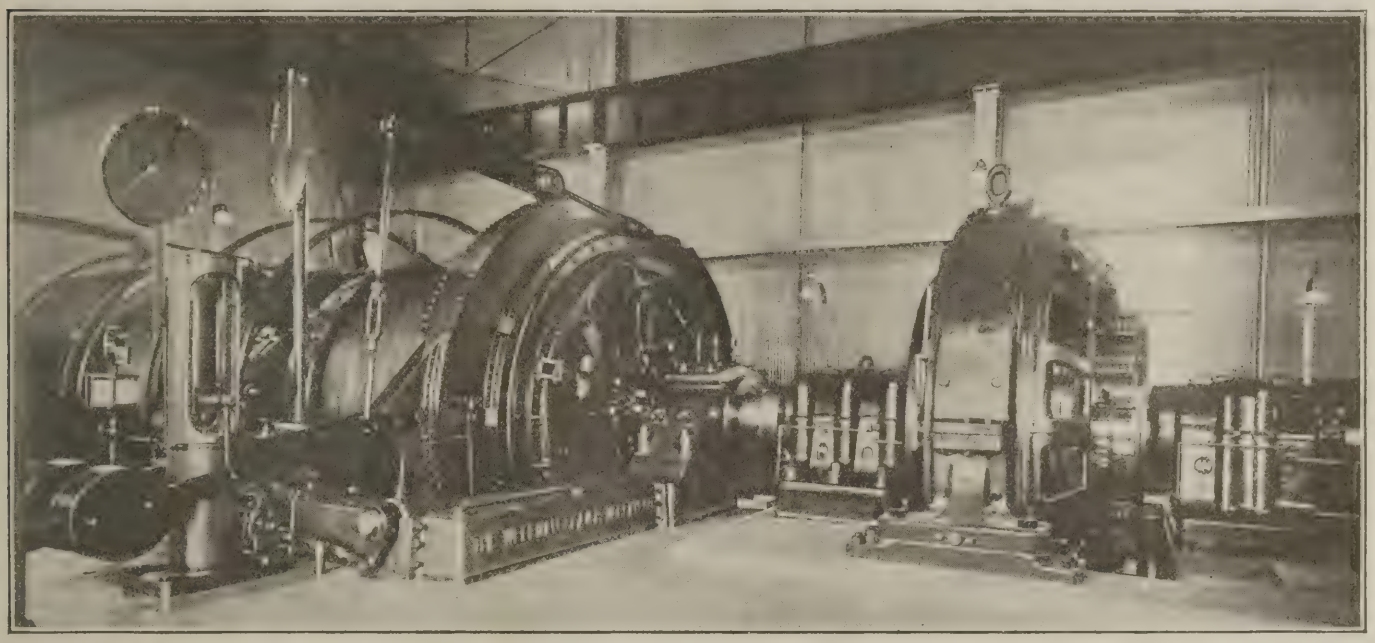


FIG. 12. DIRECT-CURRENT MOTOR DRIVES THIS HOIST, SAID TO BE THE LARGEST IN AMERICA

The greatest apparent saving in labor about a mine can be effected in connection with the actual digging of the coal itself. The use of coal cutters and loaders will greatly decrease the number of men required. Different conditions of roof, bottom, etc., often determine the type of machine best adapted to the work. The air puncher was a great improvement over the ordinary pick method of undercutting, and resulted in a considerable saving of men. The breast, longwall and shortwall chain-cutting machines, however, are the greatest labor-saving devices about a mine. One mining machine will easily do the work of from 20 to 25 miners and requires only two men to operate. Fig. 13 shows a shortwall cutting machine built by the Jeffrey Co. It is a compact piece of apparatus and will operate in low coal.

A suitable loading machine should effect a considerable saving in labor. This machine may be made fairly light and portable, and only requires that the coal be loaded on the front end.

A complete description of a machine that mines and loads coal without the aid of explosives was given in *Coal Age* of April 13, 1918. This machine should show the greatest labor saving of any device about a mine.

A new machine called a scoop hoist is being tried out in both anthracite and bituminous fields. It is especially adapted to low coal, and some bottom is taken up to enable a car to be brought up to the mouth of the room with the top of the car about level with the room floor. A V-shaped scoop is pulled into the room by means of a tail rope, and when pulled out drags a certain amount of coal with it. The scoop is pulled over a sort of gang plank and deposits the coal in the car. When pulling coal out the scoop really works something like a snow plow pulled backward. A small reversing motor is required, and the device should replace several loaders.

One of the greatest advantages to be obtained by the use of the foregoing devices is that instead of a large number of unskilled men working in the mine there will be a comparatively few experienced men who realize the dangers of mining and will exercise the care necessary to prevent accidents and explosions.

The mine telephone has proved a great labor-saving device. When trouble occurs, and a telephone is available, machinery can be set in motion at once to right the difficulty. The superintendent, mineboss and electricians can keep in touch with various parts of the mine, so that the efficiency of operation can be kept at its highest.

After the coal leaves the mines there is still a large field in which labor can be saved in its handling. Most of the large users of coal have good facilities for taking care of it when received by cars or boats. Until recently the docking facilities on our seaboards have been

inadequate, not only entailing the use of considerable labor but causing needless delays. Some large and expensive coal docks have recently been put into commission on the eastern coast of the United States, and the saving effected in labor and time has been great. This subject has been quite fully covered in an interesting article published in *Coal Age* of May 18, 1918, by C. L. Packard, of the General Electric Co., entitled "New Methods of Hauling Coal Electrically."

New ways and means are being constantly devised to facilitate the handling of coal from the face in the mine to the ultimate consumers. It is significant that

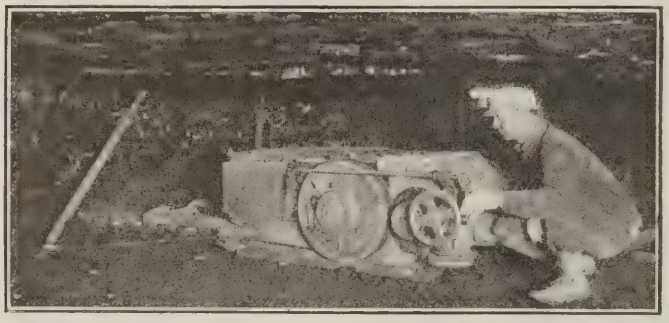


FIG. 13. JEFFREY SHORTWALL CUTTING MACHINE

in practically all cases these new methods utilize electric power in some form or other to accomplish a saving in labor, which at the same time leads to a considerable saving in expense.

It is strongly suggested that the operator keep a more accurate record of the time lost by men and the costs of operation. In no other way will the advantages and economy of electrically driven mechanical equipment be as readily apparent. The large manufacturers of electrical equipment are always ready to help the operator in making a study of his special conditions, including tests of his entire plant and securing the data necessary to enable a complete report to be made, analyzing the conditions in detail, and showing the economies and savings effected by the use of electrical equipment.

Haulage and Loading Equipment

By E. M. Mackie
Syracuse, N. Y.

It may safely be said that in most mines more coal can be cut than there are facilities for taking out, also that the labor entailed in removing the coal is much greater than that expended in the actual cutting. This means that any device or arrangement that will make easier the loading and hauling of the coal will result in a great reduction of time and labor.

When the loaded cars have been delivered to the entries, their haulage, even for miles, is a comparatively simple proposition, but the getting of empty cars placed and loaded, and loaded cars removed from rooms and back-reaches, also the delivery and loading of coal from low rooms, is a far greater problem than the straightway haulage in the entries. Because of the conditions of service any apparatus used in this work must be readily portable, simple, efficient and as nearly foolproof as possible.

The application of electrically operated haulage engines or hoists to this class of coal-mine operations has now passed the experimental stage. The Pneumelectric Machine Co., of Syracuse, N. Y., has successfully developed a line of haulage devices that is well worthy of consideration, in connection with interior haulage and loading problems.

The following brief description of various pieces of such equipment and their application may be helpful to mine men, especially in these days when labor is scarce and sorely needed in the coal fields.

The single drum haulage engine or room hoist is a handy little machine that has been called the greatest saver of man power in a mine. Weighing approximately 950 lb., with no rope on the drum, and occupying a space of only 28 x 38 in. and 26 in. in height, there are but few locations in which this amount of space is not available.

Its capacity may be stated as being 1500 lb. rope pull at a speed of 100 ft. per minute, and this may be ap-



FIG. 1. THIS SINGLE-DRUM ROOM HOIST SAVES CONSIDERABLE MAN POWER

plied to any kind of haulage within the capacity of the machine. Maximum drum space will accommodate 900 ft. of ⅜-in. steel cable. A view of this hoist is shown in Fig. 1.

This hoist may be mounted on a truck as a portable unit. A diagram of the application of such a mounting is shown in Fig. 2. This machine may also be provided with two drums instead of one. It can readily be seen that with this type, cars loaded or empty, on variable grades, may be easily handled and are always under control.

Quite recently this type of hoist has taken a prominent part in the development of methods for hauling

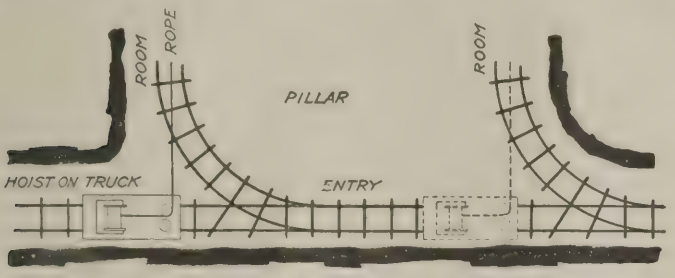


FIG. 2. DIAGRAM OF HOIST MOUNTING

and loading coal from rooms to entries or headings in the anthracite fields. In this work two systems are being used and developed. One is known as the pan delivery system, and the other as the scraper loader system.

In the pan delivery system the coal is loaded on the pan at the face, by hand, and then hauled to the entry or heading to be dumped into a car. After dumping, the pan is hauled back to the face; the forward and backward haulage is accomplished by a double-drum hoist.

In the scraper loader system the scraper is hauled along the face, gathering a scoop load of coal, which it then conveys to and dumps into a car in the entry or heading. After dumping, the scraper is hauled back to the face. With this system hand loading is eliminated.

Besides the aforementioned haulage devices, there is another effective piece of apparatus designed for mounting on a locomotive, its dimensions being such that when so mounted it does not extend beyond the overall dimensions of the locomotive framing. This device is known as a gathering attachment, and its use on a locomotive provides it with a "long arm" by means of which it is able to reach out and gather in cars from locations that without the help of the gathering attachment could not be served by this machine.

Another member of the same family is the capstan. This is a rugged and foolproof haulage device, capable of quickly saving its cost wherever there is a hard pull needed. It weighs only 450 lb. and can be put in a space of only 24 x 30 in. This device is well known to many readers. It is essentially a cathead or vertical winch equipped with suitable driving apparatus.

The old hee-haw mule for a long time took care of the interior haulage problem, and where he could not be used man power took his place. But today men are scarce and we need old hee-haw above ground behind our boys at the front, so the mines now have to depend on mechanical mules. Fortunately, these have been developed to suit the exigencies of mine service, and every day sees them being adapted to new uses.

Legal Department

AVOIDANCE OF ILLINOIS WORKMEN'S COMPENSATION ACT—In order that an employing coal operator can avoid liability to pay compensation for an injury under the Illinois Workmen's Compensation Act, he has the burden of proving, not only that the Industrial Board had been notified that he elected not to be bound by the act, but also that the injured employee had received a copy of such notice, or that the notice had been duly posted as required by the law. (Illinois Supreme Court, Barnes vs. Illinois Fuel Co., 119 Northeastern Reporter, 48.)

COMPUTING AWARDS UNDER MICHIGAN LIABILITY ACT—Deceased had been employed by defendant coal company for several years, excepting a short interval within the last year preceding his accidental death, which occurred in the course of his employment. Held, that an award against the company in favor of the surviving widow should be computed on the basis of the decedent's average daily wage earned after his reinstatement, and not on the lower wages earned by him within the year but before the strike. (Michigan Supreme Court, Brown vs. Central West Coal Co., 166 Northwestern Reporter, 850.)

ACCIDENT AND DISEASE AS CONCURRING CAUSES OF DEATH—If accidental physical injury concurs to hasten an employee's death, a previously diseased condition of his body will not relieve his employer from liability for payment of an award to the employee's dependent relatives under the Indiana Workmen's Compensation Act. Hence, where the immediate cause of a miner's death, through rupture of his aorta, was a strain in moving coal, his dependents are entitled to an award notwithstanding the fact that a diseased condition of the aorta may have been a concurring cause. (Indiana Appellate Court, Indian Creek Coal and Mining Co. vs. Calvert, 119 Northeastern Reporter, 519.)

CONTROL OVER INTRASTATE RAILWAY PRACTICES—Interpreting statutes of Nebraska, the Supreme Court of that state decided in the recent case of Rivett Lumber and Coal Co. vs. Chicago & Northwestern Railway Co., 167 Northwestern Reporter, 570, that where there is attempted discrimination between persons and associations by a railway company, and one is not allowed reasonable and equal terms, service, facilities and accommodations, the courts have jurisdiction to grant redress; but that where the question raised is whether a community or locality is properly served by the railroad company, as where the company refuses to construct side tracks or switches to serve industries, such question should be presented to the State Railway Commission for determination.

MINE OWNER'S LIABILITY CONCERNING MINE FOREMAN'S NEGLIGENCE—The business of making or directing excavations for overcasts in the roof of haulways or air courses in a West Virginia coal mine as the operations progress, for properly ventilating the mine, and of making the places of work safe, is by the laws of the state devolved upon the statutory mine foreman, and his negligence in the performance of these duties, unless he is authorized by the mine owner to represent him in other ways incompatible with his statutory duties, as in the employment and discharge of miners, can not be imputed to the owner and render him liable for personal injuries sustained through such negligence. Authority of the mine foreman to represent the mine owner beyond his statutory duties must be proved either by express authority given, or by such open, apparent and notorious acts and conduct on the part of the mine foreman that it is evident they must have been known to the owner of the mine, and approved by him. Proof of one or two isolated instances is not sufficient to establish authority by implication. (West Virginia Supreme Court of Appeals, Strother vs. United States Coal and Coke Co., 95 Southeastern Reporter, 806.)

The Emergency and Clean Coal

By G. H. ELMORE
Philadelphia, Penn.

SYNOPSIS—*An increase in the quality of output is as essential as an increase in output. The older washeries were an aggregation of mechanical equipment, heavy, cumbersome, and at best somewhat disappointing in operation. More modern machines have been devised that are smaller, lighter, are controlled automatically, and give a much more uniform product.*

THE bituminous operator who appreciates the present situation, who is called upon for maximum production, who knows full well the prices he must pay for everything in the line of mining equipment and all materials that enter into plant construction, who knows the scarcity of labor and its high wage, will doubtless shrink at the thought of entering on any elaborate plan of plant construction, the object of which is solely to improve the quality of his coal.

The history of last season's production has in it several things other than coal that are black. Leaving out the story of the failure of the railroads, cold homes, and industries without fuel, perhaps the one consideration that impressed the average user of bituminous coal the most was the poor quality of the product furnished to him. *Coal Age* has repeatedly and in a forceful way called to the attention of the bituminous operators the necessity of remedying this condition. The arguments used need not be repeated here.

Economically and morally, it is a crime to ship dirty coal. By dirty coal I mean coal that contains more impurities than can reasonably be expected to be removed from it. There are certain well-known methods of preparing dirty coal for the market. When these are employed, they produce results that are satisfactory both to the consumer and to the Government.

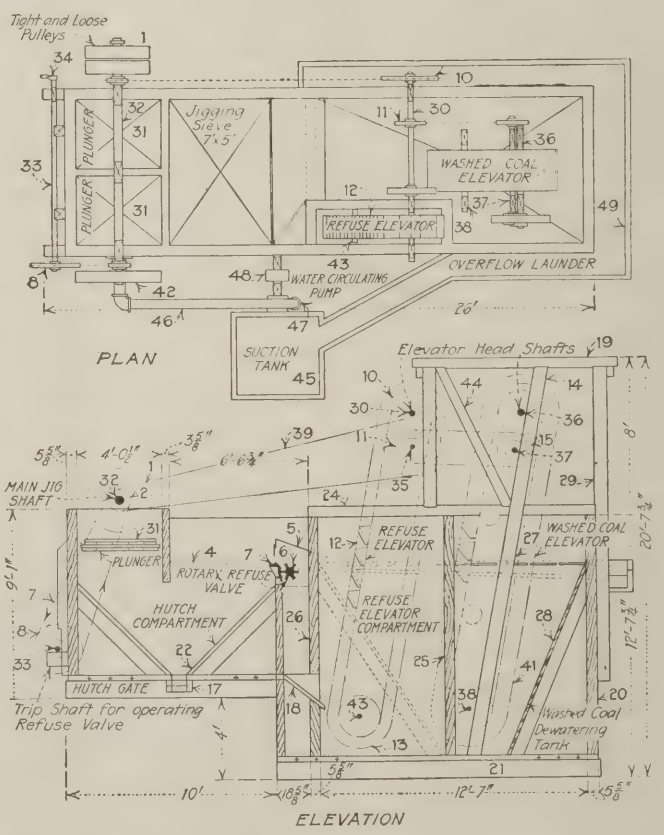
I cannot believe that the operators who, last season, shipped trainloads of waste material did so through choice, but that in a situation of bewildering stress it was more or less the force of circumstances that compelled such shipment. Since then there has been time for reflection, time to take stock of all questions entering into the problem, and it must be true that the moral sense of the bituminous coal operators of this country will prevent them from repeating the practices so prevalent last season. In the last analysis, it is the moral questions involved in these great issues that shape their course.

All laws of conduct are founded on questions of right and wrong. Economic and other considerations take second place. There can be no doubt nor argument on the question of right and wrong involved in shipping and selling as coal material that is not coal, and which could, with reasonable care and expenditure, have been eliminated. If this practice is continued during the coming season, it should be regarded by both the people and the Government as a crime.

What then, under present conditions, can the operator be properly expected to do to right this matter? There are many reasons why the operator cannot be asked to incur large expeditures for elaborate plant construction. The Government's need for the construction materials that would be required and the great scarcity of labor are in themselves sufficient causes for this, but the real reason lies in the fact that such expenditure and elaboration are not necessary. For it will be here shown that with an exceedingly simple plant, which can be erected and put in commission at moderate cost, these much-desired results can be obtained.

It will be understood that what is here outlined pertains chiefly to the production of bituminous coal for fuel purposes and has no relation to the preparation of coal for metallurgical use, such as blast-furnace coke, etc. The whole discussion is further simplified by the fact that only the slack and the nut need be considered. When these two sizes are removed, the remaining product can easily be hand-picked.

Under the present stress for maximum production, there frequently may be found sources whereby considerable tonnage can be secured other than from the



FIGS. 1 AND 2. PLAN AND CROSS-SECTION OF A COAL-WASHING JIG

regular run-of-mine, such as clearing up of old dumps made in the days when coal was cheap and when much good fuel was consigned to them, the cleaning up of old workings, or even the handling of certain portions of the bed that have heretofore always been discarded. Any or all of these may become sources of

considerable revenue and production. In many cases they can be treated in the same plant with run-of-mine, slack or nut, combined making a good market product.

The modern coal-washing plant is a decidedly different affair from its predecessor. As in everything else pertaining to coal mining, the last few years have

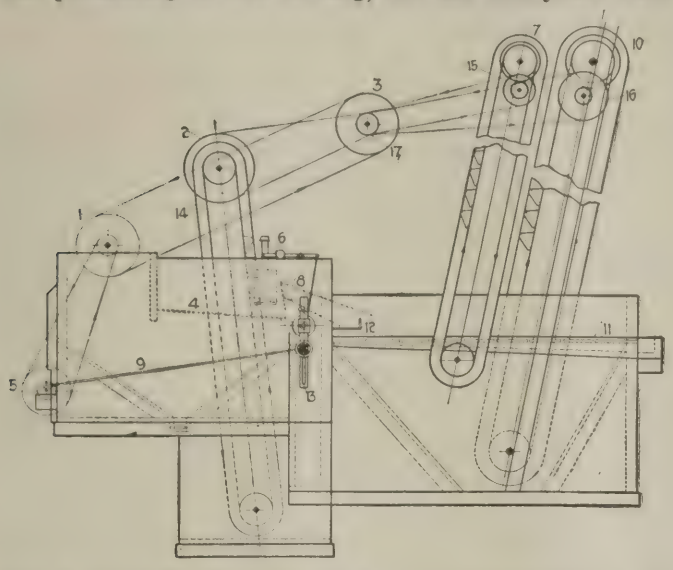


FIG. 3. SIDE ELEVATION OF A TWO-COMPARTMENT JIG

wrought marvelous changes in the practical application of this art. It was not long ago that the operator who contemplated building a coal-washing plant took on a real burden—more or less a nightmare, a vision of sprockets, chains, drags, elevators, belts, pulleys and shafts, to say nothing of leaking tanks, slop and mire; and all in such bewildering confusion that frequently it was difficult to crawl through it. But this was only the beginning. The first cost of such a plant was great, and the upkeep was still greater.

Contrasted with this, the modern coal-washing plant is an orderly, simple, highly efficient piece of construction. It is probably a fact that it does not contain over one-third the amount of machinery formerly used for handling a given tonnage. This is principally due to the fact that the flow sheet has been much simplified, the unit capacity of the machines tripled, and automatic appliances provided which guarantee highly efficient operation and uniform results. The suggestions that follow are designed to meet the emergency brought on by the war. They involve a still greater simplification, but without reduction in efficiency; and while the application is not universal, it will apply to a large majority of the operations where a better preparation of the slack and nut is demanded.

Let us assume that the problem is to wash 50 to 60 tons of slack coal per hour. Figs. 1 and 2 show a plan and cross-section of a jig with its refuse and washed coal elevator and its water circulation pump all in a self-contained unit, driven by one belt applied to a pulley on the main jig shaft. This machine has a jigging sieve 7 ft. wide and 5 ft. long. The jigging stroke is provided by two plungers acting in unison, and the refuse is removed by the automatic jig control later described.

It will be noticed that the whole apparatus, which has a capacity as stated above, is housed in a single tank construction. The jig tank, the washed coal dewatering tank and the refuse elevator compartment are all one structure, made of 2 x 6-in. lumber surfaced on all four sides and spiked down flatwise with all the corners and intersections alternately overlapping, and with two strands of candle wicking between each layer. These strands are placed both in the horizontal and vertical joints. That portion of the tank in which the jigging machinery is placed is further braced by heavy rods extending down through the tank construction, and across from side to side through the hutch in both directions, making a rigid, durable, leak-proof jig tank. The iron work alone on this jigging machine weighs about 13,500 lb. This does not include the weight of the elevators or the circulating pump.

The place occupied by this entire unit is so small that the building which covers it is correspondingly inexpensive, particularly as this building does not have to support the weight of any transmission equipment. The size of the dewatering tank for the washed coal, combined with the manner in which the water is removed from this tank for re-use by the overflow launder extending entirely round its outside, insures good settling effect of the fine coal and water for re-use in the jigging machine that carries little fine coal in suspension. The re-use of this water lessens the demand for a fresh supply to be added continuously to the circulating system. The amount of fresh water required is equal to the moisture in the wet coal and wet refuse as it leaves the plant.

These products, as they come from the dewatering elevators, will carry from 15 to 20 per cent. more moisture than did the raw coal when it entered the jigging machine. Hence, when, say, 40 tons per hour of raw coal is going through this plant, there will be consumed from 6 to 8 tons of fresh water, depending on the amount of moisture in the raw coal; or from

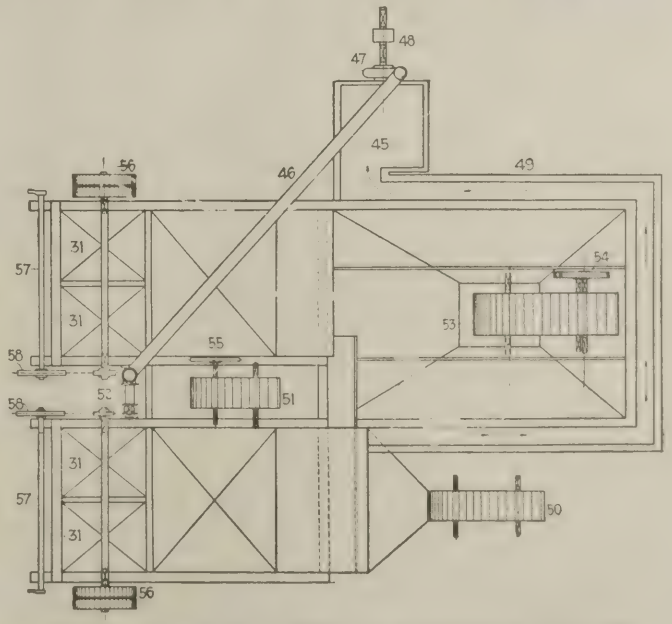


FIG. 4. PLAN OF A TWO-COMPARTMENT JIGGING MACHINE

25 to 33 gal. of water per minute. This amount of water can be provided at almost any mine without serious difficulty or expense. In many cases this equipment can be set up close alongside the tipple, allowing the slack from the screens to shoot directly into the raw-coal feed bin placed just behind and above the jig-

ging machine. Where the screens are too low to permit this, a short drag or belt conveyor will carry the slack on an incline and discharge it into the feed bin.

The equipment can be so set that the refuse and the washed coal elevator will discharge into bins over the main track, or the refuse can be taken to a convenient dump by a small car or other means.

The point to be emphasized is this: Here is a highly efficient automatically controlled coal-washing plant, having a capacity of from 400 to 500 tons of slack coal per day of eight hours. It is fitted with heavy and durable equipment, both in the jigging machine and in the elevators. This plant, even under present conditions, can be erected and put into commission at a comparatively small expense, can be operated by one man, yet its building requires the minimum of labor.

Let us now assume that the problem is to handle from 50 to 60 tons each of slack and nut coal. Figs. 3 and 4 show the plan and elevation of such a unit.

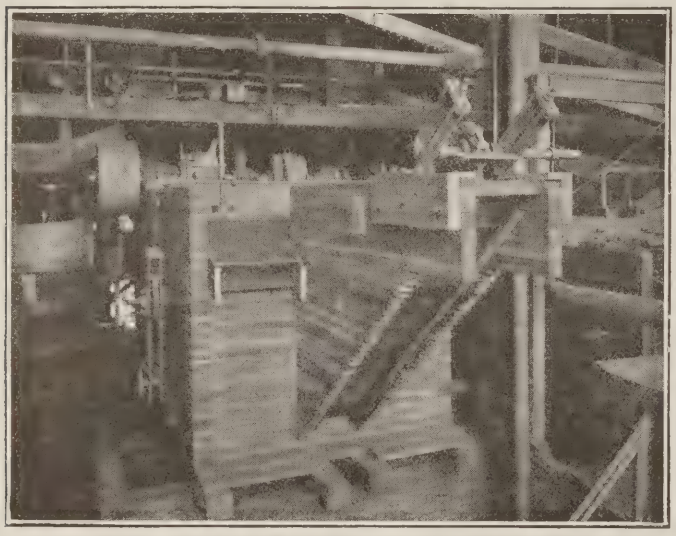


FIG. 5. COAL JIG TANK DURING CONSTRUCTION

The plan shows a two-compartment jigging machine, each compartment of which can be operated separately from the other, with a compartment between them containing the common refuse elevator serving both sides and discharging to the rear of the machine. The slack is taken care of in the same manner as provided in the first problem, by the dewatering washed-coal elevator set in the large washed-coal tank, the overflow from which provides the circulating water for jigging purposes, as mentioned above.

The nut coal, after passing with the water beyond the overflow of the jig, runs down over a perforated screen covering the entire width of the jig. Here it is dewatered and passes directly into the washed coal nut elevator, by which it is discharged into the washed coal nut bin over the railroad track. This elevator, because the coal is already dewatered, is not provided with perforated cups. It travels at about twice the speed of the washed coal slack elevator.

The water which passes through the overflow screen from the nut jig falls directly on the steel plate underneath, as shown. From here it is discharged into the cross-launder, which carries it into the slack dewatering tank, mingling with the water and coal coming from the slack jig. It will be noticed that any fines that may come over with the nut coal will go through the screen and into the slack coal, where they belong. In this manner, therefore, the nut coal is thoroughly rinsed and all fines are removed from it before it reaches the nut coal elevator.

This plant, although having twice the capacity outlined in the first problem, because it is built double, can be placed quite similarly; and inasmuch as the transmission equipment rests on timbers, which themselves are supported on the tank construction and all the equipment is driven from a single main shaft resting on these timbers, the plant maintains its unit construction and unit drive as before. It is, however, entirely flexible, each side having independent operation if desired, and each automatically controlled, insofar as the removal of the refuse is concerned.

Let the third problem be to handle from 100 to 120 tons of slack only per hour. The construction would be the same as indicated in Figs. 3 and 4, except that the washed coal elevator tank would extend entirely across the front of the two jigging machines. The washed coal elevator would have sufficient capacity for handling both sides of the machine, and the nut coal elevator would be omitted.

It is obvious that other sizes than those mentioned can be handled on the two constructions as shown, such as the nut size only on the first or on both sides of the second construction.

To illustrate more clearly the form of tank construction used, reference is made to Fig. 5, which shows only the tank of one of these jigging machines as it is being constructed in a large anthracite coal breaker in Pennsylvania. The view is taken from above, and the different layers which form the walls and partitions as they are spiked together flatwise are clearly revealed.

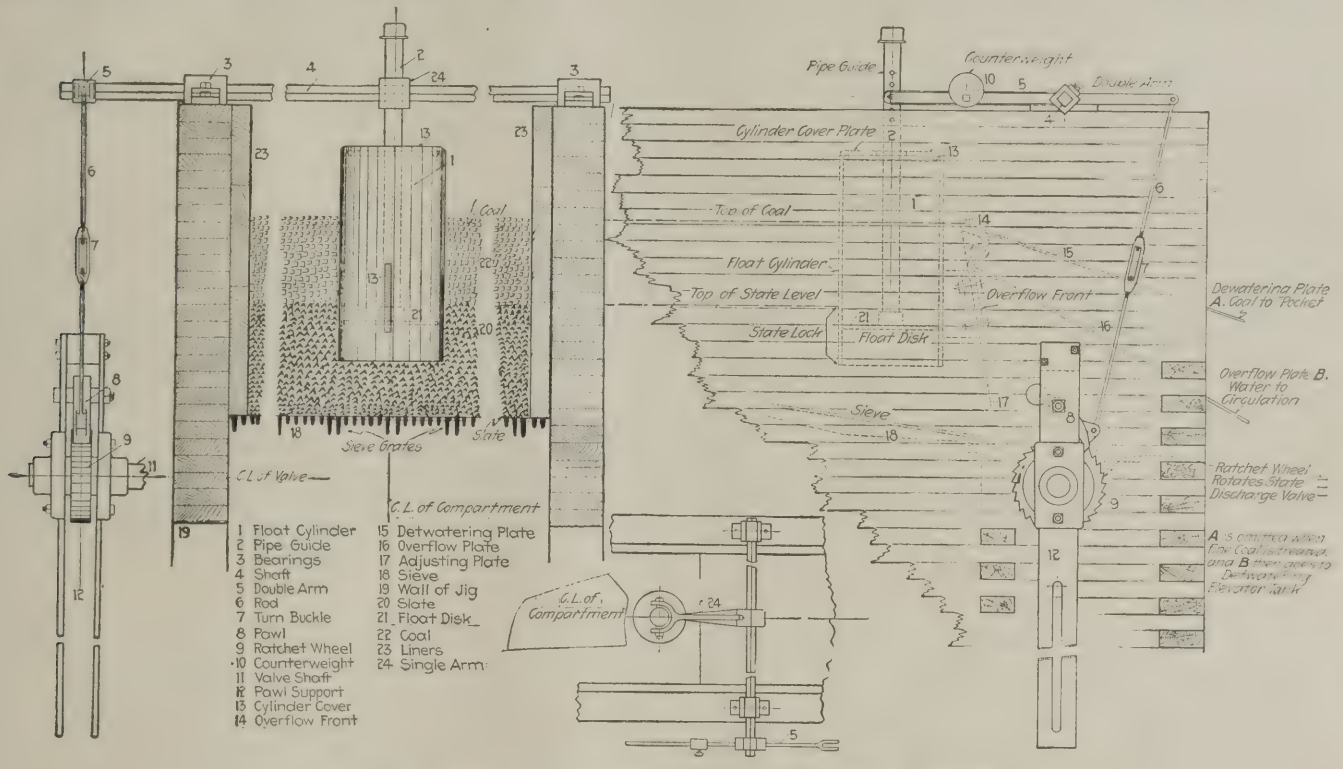
The history of the development of the automatic control for jigging machines would make interesting reading for one interested in the jigging art. It has taken fully a dozen years to bring it to its present simplified and highly efficient form. Beginning as a rather complicated, electrically controlled device, it is now built as shown in Figs. 6, 7 and 8.

Fig. 6 shows the section transversely across the jigging compartment, just behind the overflow plate 14, and directly through the float cylinder 1. Fig. 7 is the side elevation of the jig, showing that portion of the tank and equipment where the overflow plate, the automatic control device and the mechanism for actuating the refuse valve are located. Fig. 8 shows a plan of the jigging compartment.

To the overflow front casting 14 is bolted the float cylinder 1. This is 10 in. in inside diameter and about 24 in. high, open at both ends. The bottom end is placed at a distance from the jigging sieve of 3 or 4 in. below the level of the top of the layer of slate which it is desired to maintain on the jigging sieve. By slate, reference, of course, is made to all the refuse material that it may be desired to remove from the coal. On top of the layer of slate will accumulate the layer of clean coal, to a height and thickness up to the top of the overflow front 14, where the clean coal with the water used in jigging will overflow onto the plate 15. For treating slack this is made solid, but for jigging nut or coarser sizes is perforated, allowing the water to go through and accumulate on plate 16.

Inside the float cylinder is the flat cast-iron disk 21, carried at the lower end of the pipe guide 2. Attached to this pipe guide is the arm 24, which at the other end is fixed to the square shaft bar 4, carried in the bearings 3. At the end of this shaft, which extends out over the wall of the jigging machine, is the double arm 5. One side of this arm carries the counterweight 10 and the other end is connected with the rod 6, in such manner that it can lift the pawl 8. This pawl is a part of an oscillating mechanism mounted on the shaft 11, which forms the stem of the rotating valve for drawing off the refuse. This valve extends entirely across the width of the jigging bed, which in this particular machine is 7 ft. wide.

The construction of this valve is shown at 6 in Fig. 2. The refuse comes through the opening below the adjusting plate 17 and lies against the flights of this



FIGS. 6, 7 AND 8. DETAILS OF THE JIG CONTROL DEVICE

rotating feeder type of valve. As this valve rotates, the refuse is withdrawn from the jigging sieve and falls on a sloping board in the compartment underneath, whence it runs by gravity to the refuse elevator or other drag equipment for removing it from the jigging tank. The constant oscillating motion of the arm 12 is given by the crank and connecting-rod as shown in Figs. 1 and 2, the crank being driven from the main jig shaft by suitable sprockets and chain. Keyed to the valve stem 11 is the ratchet wheel 9.

It is evident that when the pawl is down and the arm 12 is oscillating, the ratchet wheel 9 is rotated in the direction of the arrow as shown, and that when the pawl 8 is raised and not allowed to mesh with the teeth, no rotation of this ratchet will take place, inasmuch as the bars 12 simply ride on the shaft 11 and are not keyed to it.

The automatic control of the rotation of the refuse valve is therefore entirely a matter of permitting the pawl to engage the teeth and rotate the valve whenever the level of the slate or refuse on the jigging sieve has reached the point determined as maintaining the proper thickness of this bed of slate, and conversely to stop the rotation of the valve and hence the withdrawal of refuse whenever the level of the top of the bed of refuse has been lowered to the desired point. This is readily accomplished by the equipment shown and in the following manner:

As the refuse accumulates on the jigging sieve, it will find its way up into the float cylinder 1 from the bottom end and will impinge on the bottom side of the float disk 21. At each stroke of the jigging plungers this float disk will receive a corresponding impact from the refuse as it is driven upward from below, and the whole structure of the float disk, the pipe guide, the arm and counterweight will have an upward and downward movement with a few degrees of angular rotation of the shaft 4. This upward and downward movement is conveyed to the pawl 8, which really oscillates on the bolt holding it in position between the arms 12. By adjusting the counterweight 10 to properly balance the effect of the upward pressure of the slate on the bottom of the float disk, an equilibrium is quickly produced by which this float disk is maintained at a certain level in the jigging bed. Whenever additional slate comes on the jig, the float disk will be raised within the cylinder, and this will lower the connecting rod 6 and permit the pawl to engage the teeth of the ratchet 9, instantly rotating the valve and removing the refuse through the orifice 17.

This lowers the level of the refuse in the jigging sieve and permits the float disk to sink to a lower level, when the pawl will again be lifted to a height not permitting it to engage the teeth of the ratchet, and the withdrawal of refuse will be instantly stopped. When nothing but clean coal comes on the jigging machine, or when the feed is entirely stopped, the pawl will

accordingly be entirely disengaged and no refuse will be removed. This condition is not temporary in nature, but will continue no matter how long the jigging machine is run.

It is remarkable how accurately this simple device controls the level of the top of the refuse bed in the jig. No matter how the rate of feed may vary, either in tonnage or quality, the level of the top of this slate bed is maintained almost at a given point throughout the entire shift, making it impossible for clean coal to find its way through the orifice 17, or for the refuse to accumulate in the jigging sieve high enough to go over the overflow plate at 14. Thus uniform products of clean coal and clean refuse are guaranteed. With the former methods of operating jigging machines these products depended entirely upon close attention given by the jig operator.

Formerly the jig operator's only method of determining the conditions in the jigging bed—that is, of knowing how high the slate level had accumulated—was either to run his arm down into the bed of coal and find the top of the level of the slate, or to use some device like a bottle on the end of a broom stick and by practice learn to determine this level by the "feel" as he lowered this bottle through the coal as the machine was being operated.

More frequently neither of these tests was faithfully practiced, and the regulation of the machine, insofar as the refuse removal is concerned, was controlled by his observation of the two products coming from it. Whenever slate was noticed coming with the coal, more refuse was withdrawn. Whenever coal was noticed coming with the slate, less refuse was withdrawn, and hence the adjustment of the machine was sometimes permitted to become entirely wrong before steps were taken to make it right.

With the automatic device, as here illustrated, the adjustment is kept correct all the time. The level of the slate bed is maintained where it should be throughout the entire shift, and this without the attention of an operator. This device is now in operation on hundreds of coal jigging machines, handling both bituminous and anthracite coal, and has proved its utility beyond the shadow of a doubt.



COAL CONVERSATION

Overheard Between Two Carloads of Coal in a Railroad Yard



A "Coal Age" subscriber has forwarded the following contribution, with the explanation that one whose ears are attuned to catch the conversation of inanimate things could have overheard the dialogue, which took place between two carloads of coal in a certain railroad yard not so many nights ago. We believe that Pennsy and Micky have uncovered a few truths that should be made evident to each miner and each operator. Every ton of coal loaded into a car should be loaded on honor.

"Hello, Pennsy, where are you going?"

"Don't know," answered the carload of coal addressed. "Where are you bound for, Micky?"

"Oh, I'm to help a lot of our boys get to France," and the load of coal in the P. Mc.K. & Y. car shifted proudly.

"Is that so?"

"Yes, sir."

"Did you pass all your examinations?"

"I sure did. I've been inspected, found O. K., and now I'm going over."

"So that's what makes you so bright and cheery, eh?"

"Yes, sir. I certainly am glad. But what makes you look so glum and downhearted, Pennsy? Are you sick?"

"No, I'm not sick. I'm just as strong and healthy as you are, but I've been rejected; and it's no fault of mine." What sounded suspiciously like a groan came from the direction of Pennsy.

"Well, then, what is the matter?"

"You know," answered Pennsy, "there's a kind of binder or band in me in my natural condition, and I'm sure I can't help that."

"Why, that shouldn't matter," responded Micky. "The same thing is true of me."

"No, it can't be the same," said Pennsy, "or they would have condemned you, too. They turned me down the first thing. How did you pass if the binder is in you?" he inquired curiously.

"Oh, it isn't in me now," answered Micky. "Before I was loaded into the car every bit of binder was picked out of me. I feel so much lighter now, and I know I'll burn much better. You see," continued Micky, after a pause, "that binder is a bad thing. It gets into the grate bars and clogs the grate, and it hinders the firemen from getting up steam. If Uncle Sam wants to get the Kaiser," wound up Micky, enthusiastically, "it is going to take the best that's in us."

"I wonder why they didn't treat me the same way," said Pennsy plaintively.

"Well, I'll tell you some of the reasons," answered Micky, waxing loquacious. "In the first place," he began, "the miner is trying to make all the money he can, and he's discovered that the more weight the more money——"

"Why don't the boss stop them?" interrupted Pennsy.

"Well, he is somewhat excusable," said Micky.

"How do you make that out?"

"You see," replied Micky, "if the boss says anything, the miner goes to another mine to work; so the operator says, 'Don't be too strict,' because he, too, is after the money. The more weight the more money," and Micky chuckled. "Another thing," began Micky; "the men are being rushed to make a large production, and of course the miners are not particular. In goes the binder, and you are condemned."

"Well, then," asked Pennsy, "why don't Uncle Sam get after those fellows? They certainly are not true to him."

"He is getting after them, but not strong enough. You see, Pennsy, Uncle Sam is asking the people to conserve food and substitute other things, so I think these fellows are trying to make dirt take the place of coal. Here comes the engine," he broke off, "and I guess we will have to part."

"Good luck to you, old man, you're going where you'll be honored; but as for me—say," he whispered, "I'm not alone in this. There's another load of coal that came from a stripping mine. You ought to see that."

Increased Production by Use of Modern Mining Machinery

BY MINER RAYMOND
Tiffin, Ohio

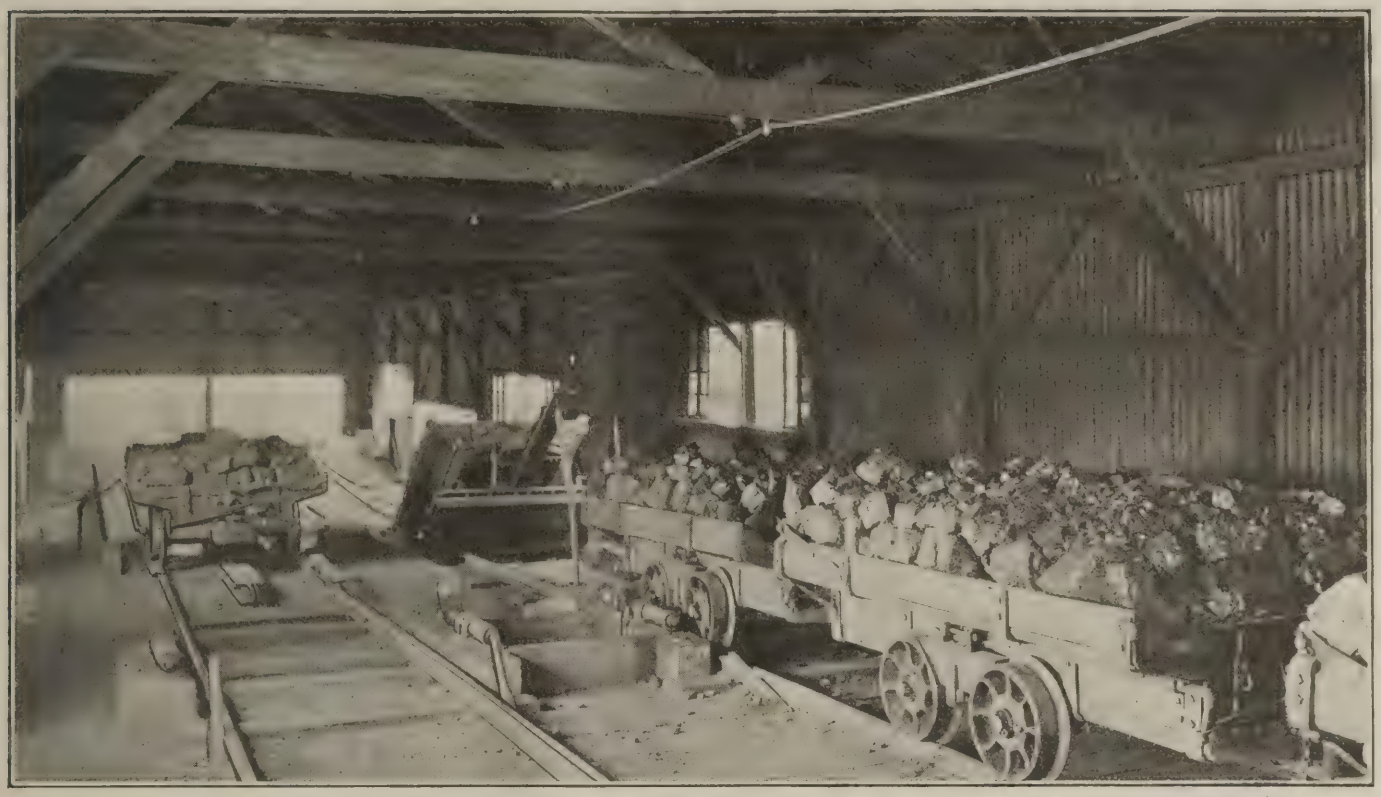


FIG. 1. LABOR-SAVING DEVICES AT TIPPLE—AUTOMATIC STOPS AND CROSS-OVER DUMPS

THIS article offers an opportunity for serving our country by giving some actual facts to prove that the installation of modern tipple equipment is of vital necessity to coal production, by assuring a greater coal tonnage with fewer laborers. The coal situation is one that materially affects every phase of our national life. The humble householder stores a few tons of coal so that his youngsters can warm their shins around the old "base-burner" before going to school on a cold winter's morning, and the question is equally absorbing to the United States Government, which must provide thousands upon thousands of tons for the bunkers of our ships whether they be the magnificent fighting vessels of our navy or the new cargo vessels whose keels first moved down the ways on the Fourth of July.

With this universal interest in mind, and facing the absolute necessity for a production of 75,000,000 tons of coal over last year's tonnage, and with over 100,000 miners who may be taken for military service, it hardly seems necessary to point out to coal operators that their patriotic duty is to raise the efficiency of all phases of coal production to the highest degree. Any neglected opportunity to raise productive efficiency by the installation of modern tipple equipment is an unpatriotic act no less than if the operators knowingly refused an opportunity to contribute of their means to the financial part of the Government war program, as expressed in Liberty Bonds and War Savings Stamps.

But there is another phase of the question which should not be overlooked in discussing matters of this sort. The increase of efficiency of production in a coal tipple yields benefit not only to our nation in its time of need, but also to the operator himself. It is almost beyond question that every mine owner, manager or tipple superintendent is interested in anything that would yield him profit, especially when the benefit is a direct contribution to the war plan; but still there seem to exist a few to whom proofs are necessary even when the benefits are so seemingly self-evident. In one case in which a plant owner was shown how the installation of a simple device could reduce his unloading costs by using only one man part of the time instead of two men all the time, he refused to purchase the equipment on the ground that he would not know what to do with the one man's time when the unloading device was idle Such a statement is hardly believable at a time when labor is so scarce in all lines of business, but it actually happened in June, 1918.

Taking the question from the selfish standpoint, with the knowledge that the selfish standpoint in this instance is of marked benefit to the national need, we find further excuse for adopting this program when the Government itself places a premium on prepared coal. Even before war times came upon us, the expressions of satisfaction over the increased efficiency of modern tipple equipment were so numerous that even a hasty collection of them

could easily make this number of *Coal Age* resemble a booklet of patent medicine testimonials. Analyzing such a collection would readily lead to the reduction of all methods of increasing tipple efficiency into three groups.

The first is the reduction in the actual cost of production by delivering the same tonnage with fewer men. Among many such examples there are found two which are typical. One of these is where an elaborate system of trackage was replaced by simple trip-handling equipment, including automatic stops and cross-over dumps, Fig. 1. Coincident with the starting of this new equipment five men were removed from the payroll. This was prior to 1916, and today these men could be put to work in another part of the company's property. In another case a single long flight conveyor costing less than $10,000 performs the work of six men who formerly cost the company, at the very least, $6000. The item of $6000 a year would pay the interest, upkeep and power consumed on an installation costing many times $10,000.

The second means of increased efficiency is the production of a larger quantity of coal at the same operative cost. Cases of this kind are perhaps the most numerous of any. There are many coal companies which, for years, worked a seam of good quality with their entire tipple equipment consisting of a simple dump, a set of bar screens and a couple of loading chutes. I know of one case where an installation of this kind was replaced with a complete modern equipment, including shaker screens and loading booms for the egg and lump. One hundred tons a day was the output of the old plant, while the new installation took care of more than 250 tons per day, with the same number of men in the tipple, and the coal produced commanded a greater market price. There was also a minimizing of breakage in the soft coal and a consequent increase in percentage of lump secured from mine-run.

This last part of the advantage gained in this particular case properly belongs to the third item of increased tipple efficiency, which mainly relates to the production of a higher quality from the same origin and with the same, or decreased, operating costs. It is invariably true that the better mechanical equipment shows results whose direct influence in high market standing yields fancy returns on investments and operating costs. This statement is made by a man who has visited and analyzed a large number of coal installations and has been familiar with the history of the trade for a good many years. One tipple superintendent who has been in the game for years, in speaking of his new tipple which replaced an antiquated structure, said of his tipple machinery, "With the use of it we are better able to prepare our product than ever before, with a minimum amount of labor."

One advantage of modern tipple equipment in the production of bituminous coal is the marked reduction of breakage, which is a direct result of the efforts of tipple designers along this line. At every stage of progress of coal through the tipple it has been the aim of competent engineers to avoid dropping coal; one of their most notable improvements was the introduction of the loading boom (Fig. 2) which carries the lump or egg into the car and avoids the fall which was an indispensable feature of the old-time curved loading chute. One mine owner writes: "We have been worrying for years over the breakage of block coal from the original chute. The loading boom wipes out any drop . . . there is absolutely no breakage."

These three roads to tipple efficiency are closely interwoven at every stage of tipple operation, and it might be of interest to follow briefly a hypothetical path of the coal through its various stages from the mine opening to the railway track. This is merely an imaginary case, but it is based on individual features

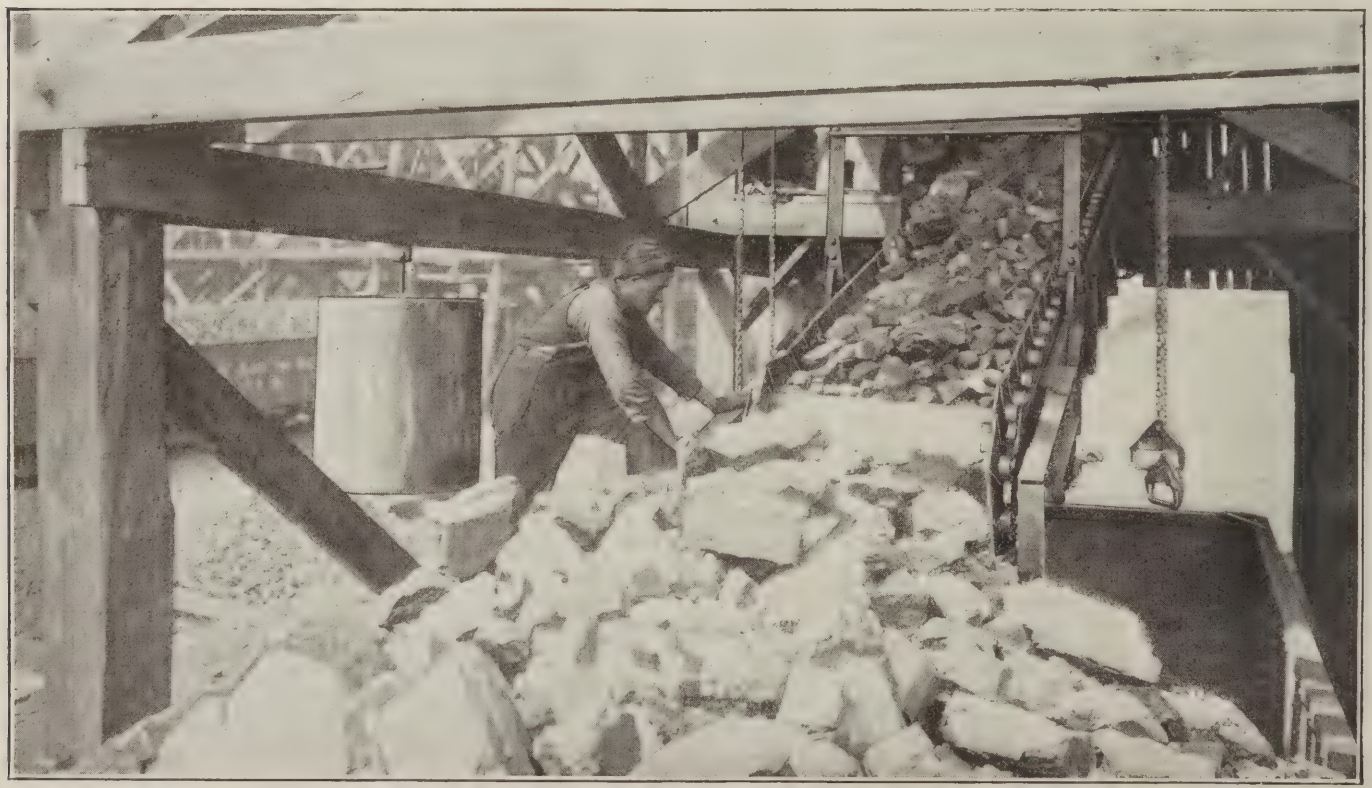


FIG. 2. BREAKAGE OF COAL AVOIDED BY LOADING RAILROAD CARS WITH LOADING BOOM



FIG. 3. CONVEYOR FROM MINE TO TIPPLE

common to many operations. Let us suppose that the mouth of the drift is high up on the hillside, with the railway passing at some distance away in the valley below. Beginning at the drift mouth, we find today that electric locomotives have replaced the old-time animal power.

At the dumphouse, at the top of the incline, there is a tripmaker and feeder with steel car haul and grades handling cars in quantities and at a speed impossible to even a large crew of huskies. A modern cross-over dump discharges the coal into the hopper, from which we find that the coal is no longer taken down a double-track incline to the tipple, but a modern retarding conveyor takes the load from the dump hopper and carries it down the hillside almost without attention, Fig. 3. In this one point—in the travel of the coal down the hill by the modern retarding conveyor—labor costs have frequently been more than cut in two. Of course, there are slopes too steep for retarding conveyors, but wherever they have been found practical they have dispensed with at least one man at each terminal.

In the tipple itself we find the retarding conveyor ceaselessly discharging its load into the hopper, from which an automatic feeder gives the screens a constant and steady flow. With the retarding conveyor there is no uncoupling or dumping of cars at this point and no laborious pushing the filled cars over the dump or pulling the empties out of the way. From here on, the shaking screens carefully remove all of the slack so that none is now carried over into the cars with the lump, as was formerly the case with the old bar screens. The coal is cleanly sized and breakage minimized by the careful design of screen slots and careful engineering in the driving mechanism, which assures a steady forward movement. The lump and egg travel to the cars over the loading booms, the advantages of which previously have been suggested, and before they pass down the incline into the cars all impurities can be easily and quickly removed on the picking table.

There are a thousand and one modifications of tipple design. These, of course, have marked differences from the outline noted. However, it is hoped that this will serve to suggest a few of the many points in modern coal tipple equipment which, taken together, constitute machinery's contribution toward the production of more coal and better coal with fewer laborers—a valuable contribution not only to the success of the operator himself, but also to the higher and better cause, in support of which a million of our boys from every walk of life have crossed the seas to fight.

Coal Carbonization

By M. Meredith
Liverpool, England

The war has thrown many burdens upon gas engineers, not only on account of the great shortage of labor, but also by reason of the heavy demands for benzol, toluol and other products of prime importance in the manufacture of explosives. The gas engineer, in normal times, has looked upon his coal-carbonizing plant merely as a means of turning out the highest yield of gas possible per ton of coal treated; and whereas he has received considerable sums for his tar and oils, these have been mere incidentals in the one important business of gas production.

At the present time, while a high gas yield is of prime importance in order to meet the demands for gas for various purposes (which have multiplied and are still increasing owing to war conditions), yet many established practices have had to give way in order to obtain the required quantities of byproducts. High gas yields have been associated with low tar yields, for the tars have been degraded by high temperature, in order to convert them into gas of a permanent character.

At the Macclesfield gas works, as a result of careful and progressive experiments, and now of considerable extended commercial use, it has been found possible to increase the gas yield per ton of coal carbonized and at the same time obtain largely increased yields of tar and ammoniacal liquor. The latter is an important matter from an agricultural point of view, as artificial fertilizers are urgently needed. This result, the importance of which cannot be overestimated, has been attained by injecting steam into the base of the continuously operating vertical retorts, so that blue water gas is generated there. This high temperature gas, rising through the incandescent and also the partially heated coal, not only proves efficacious in removing the last traces of gas from the coal, but also distills or washes out the tarry matter contained in the semi-carbonized fuel before the tar has been subjected to the extreme temperatures which degrade it by destructive distillation.

The following comparative figures are illustrative of some remarkable results which call for further attention and study:

	Average for Year Ended Mar. 31, 1915	Test on Aug. 13, 1917
Gas made per ton treated	12,049 cu. ft.	15,477 cu. ft.
Calorific value—gross per ton treated	530 B.t.u.	508 B.t.u.
Coke per ton treated	13.6 cwt.	13.36 cwt.
Ammoniacal liquor per ton treated	25.3 gal.	32.68 gal.
Tar per ton treated	10.9 gal.	16.61 gal.

No deterioration in the retorts has been noticed as the result of steaming, and scurfing has been reduced to a minimum.

DEPARTMENT OF HUMAN INTEREST

Plan Your Town as Carefully as You Would Your Plant

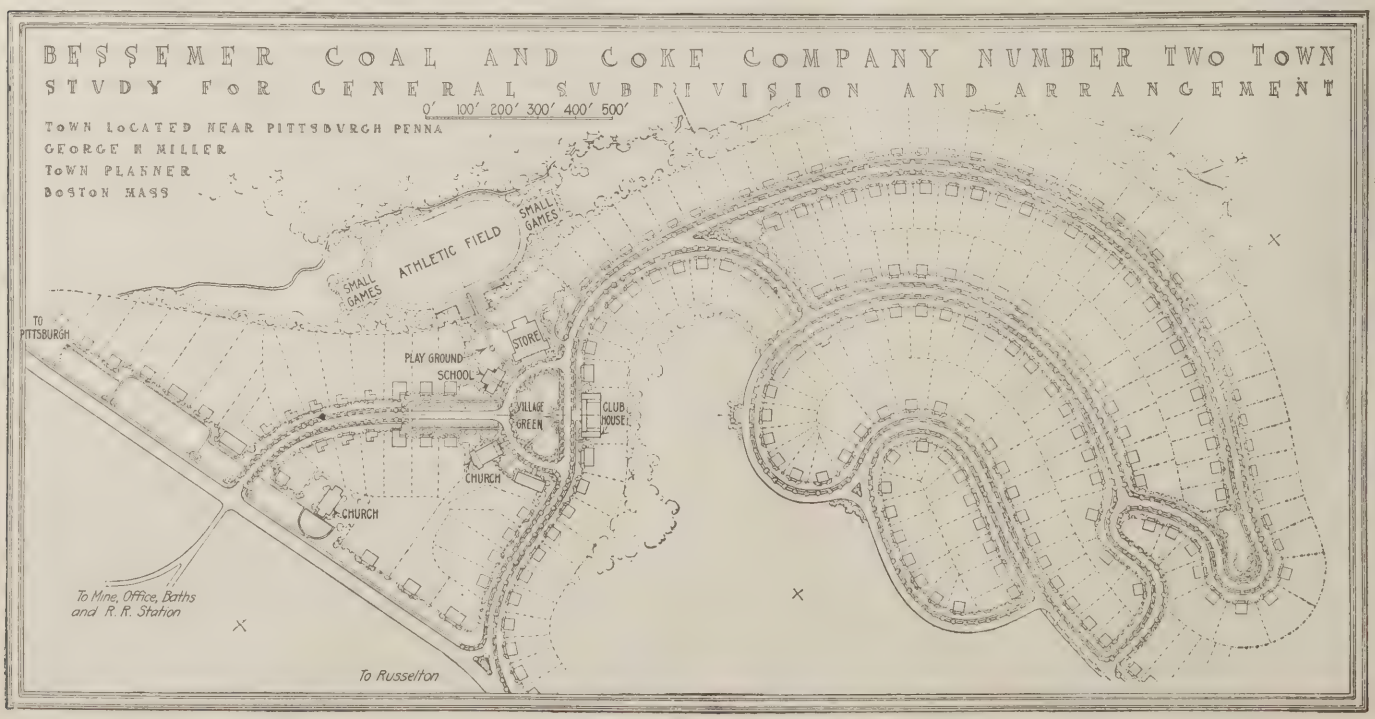
BY GEORGE H. MILLER
Town Planner, 6 Beacon St., Boston, Mass

Most mine owners decide for themselves how much money they will spend on a mining town, and in most cases that sum is just sufficient to cover the cost of the least number and least expensive sort of houses, the necessary water-supply and a type of outside toilets that will suffice. These, and possibly a company store, are constructed as quickly as possible in straight rows on the nearest available drained land, the mine is put into operation, coal is turned into cash and you have a mining town.

As time goes on and the mine pays, there often arises justification for the erection of a church. The owner listens to the representations of his resident officials and workmen, or himself begins to take a sentimental pride in the source of his income, and it is not unusual to see the church erected, and possibly a school, or both. Many are the club-houses now being built as afterthoughts, in old mining towns throughout the country, and here and there a hotel, playground and sidewalks, shade trees and groups of shrubbery are being added that were never dreamed of when the town was first built. Often, also, many additional houses are required for which sites are hard to find, and after these various features have gradually been developed in this short-sighted manner the eventual final aspect of the town as a whole is one of heterogeneous confusion and disorder—for things, architectural, mechanical and horticultural which are designed for domestic use invariably express the guiding motive by which they are planned.

To eliminate the wasted time, energy and cost of construction, use and maintenance resulting from this method of procedure and to gain greater economy, utility, convenience, safety and beauty in mining towns, it is becoming common-sense practice to study in advance some of the reasonable possibilities which the future may present. It is becoming customary to engage town planners who make a specialty of this work. They are asked to offer suggestions and advice based on their years of training, observation and experience, and to devote their faculties and talents to studying out these problems with some degree of nicety and foresight.

The town planner does not try to dictate what the town shall contain at the start; he does not try to influence the amount of initial financial outlay. He may be an idealist, but if he knows his business he is primarily an economist. He takes the conditions as he finds them and is guided by the wishes of the owner. His motive is to apply his experience and art to producing the best immediate and future results out of the crude material given him. The value of the town planner's service is in saving the misdirected efforts of the owner, his engineers and other officials, and in producing a more efficient town without increasing costs. There are plenty of examples even of the smallest mining villages which prove that such service is needed and succeeds.



A VILLAGE LAID OUT TO FIT BOTH NATURE AND THE NEEDS OF THE INHABITANTS



TOPOGRAPHICAL MAP SHOWING HOW GENTLY GRADED SITES WERE CHOSEN FOR ROADS AND HOUSES

The town planner customarily inspects the property, confers with the owner and helps to select the site of the town. Then he outlines the necessary surveys and how they shall be gathered, probably by the company engineers. Over the survey the town planner makes notes of his observations in the field and then prepares a study for general subdivision and arrangement of the town. The study is accompanied by a report completely defining all ideas represented therein, and with sketches showing the character of all cottages and other buildings and directions pertaining to their construction are submitted to the owner for criticism and suggestions, often at the outset being sufficient for execution under the oversight of the company superintendent or engineers. The cost of such studies is usually about one per cent. of estimated cost of construction, or from five to ten dollars per acre of land included in the study, the amount being definitely agreed upon at the preliminary visit of inspection. Detailed construction plans may be furnished by the town planner or he may act in advisory capacity only, passing upon all plans and keeping in constant touch with those who take in charge the routine of the detail work.

Buildings in a mining town which are public or quasi public by the nature of their use are the store, church and school, club-house, hotel, and possibly baths and office building, garage and a few better types of residences for officials and skilled men. The club-house as center for social and physical recreation may become the general community house, combining the functions of a hotel, club-house and baths or used in turn as school, church and theater. Some of these buildings may never be necessary, a thing that can be determined with considerable accuracy in advance, but when there is the slightest possibility that they may be called for in the future it is better policy to reserve desirable sites where they may serve their full purposes than be obliged to locate them in inconvenient, out-of-the-way places. It is desirable that most of these buildings be designed in one appropriate simple style of architecture with proper relation to each other, and be grouped in a formal arrangement about a central open space, or public square, thus creating a miniature civic center.

Community spirit may develop and justify outdoor recreation facilities, an athletic field with grandstand, a children's playground with apparatus, or a park comprising a waterfront or a tract of land which either affords views or is more valuable for beauty than for use. Most mining towns being in the mountains the first thing a town planner looks for in studying the general scheme of arrangement is a sufficient area of nearly flat land to be reserved for an athletic field and center of outdoor recreation. If there be only a limited amount of such land and it be appropriated for the first cottages built, just because that is the easiest way, then the idea of an athletic field must either be abandoned for all time or a site graded at considerable expense. The shape assumed by the area of flat land in a location convenient for a town center may suggest curved boundary streets on which cottages or other buildings are very attractive as seen from each other across the green. Flat spaces usually being comparatively low, although not necessarily damp, are often near the railroad or mine works, and therefore when used as a mine center are in the path of travel, and so naturally inviting and easy of access. The improvements at such a location and the activities taking place there can be made picturesque and interesting as seen from the encircling rows of houses situated on the surrounding hillsides.

It is seldom necessary or desirable that streets of a mining town shall be straight, or be arranged in gridiron fashion. When town sites consist of mountainous rolling land the streets should fit the topography with pleasing curves and easy gradients, and afford natural and attractive positions for the houses and other buildings. The streets should accommodate directness of travel and be located and designed for a given amount and kind of travel. Streets of this kind are less expensive to build, to use and maintain.

Two types of houses come under consideration in properly housing unskilled labor. First, there are houses erected solely to fill the needs of men with families, the most desirable kind of men in any village. Such houses should accommodate a single family only. They should be detached, semi-detached or built in groups, according to races of employees that are to be accommodated and according to the nature of the land to be used as a town site. Second, there should be dormitories or barracks for men without families, such buildings to have a mess hall, shower baths and other communal features and a separate and sanitary room for each man, however small and bare it may be. The most modest cottage can be given the aspect of a home if the same amount of thought is devoted to designing its appearance as to reducing its cost. The town planner knows the fundamental principles of cheap cottage design, the things that cost and the things that without extra cost make the cottage more useful, comfortable and attractive.

The modern mining town is built simultaneously with the mine works, and as the mining spreads and the employees increase in number, so also the community expands. In planning a mining town the layout of streets and alleys, the lines of all kinds of conduits and fences, the saving of top-soil surfaces for gardens, the placing of trees and other planting, the arrangement of all visible features, the scheme of a community center, and the location of houses of different types and outhouses, are designed on paper in advance of construction or growth and as one homogeneous and complete, correlated and compact scheme, provision being made in advance for later expansion. This is the procedure that makes physically possible the model mining town.

If We Would Be Safe, All Must Help

By S. D. Otis

Bay Shore, Long Island, N. Y.

In recent years much good work has been done toward making the mines of our country safe. But mine operators can never make their plants safe if the men do not coöperate with them. Mine operators, as well as all other employers of labor, are yearly coming to a fuller realization of the advantage of taking care of their men. They adopt safety devices of all kinds, provide good housing conditions and employ company doctors to safeguard the lives and the health of their miners. But in face of this work on the part of the operator, are the miners doing their share?

In many, many mines, I have seen evidence of the fact that while operators are trying to provide safeguards for their men, the employees ridicule and ignore these precautions and so make them of little value. There are several classes of men who busy themselves in undoing the good work that the mine owner tries to do for the safety of his men. About the worst of these tamperers is the would-be humorist who changes the meaning of warning signs and thus endangers not himself but his fellow workers, whom the signs are meant to warn against injury or death. By changing a few letters, here and there, these sign defacers produce an effect which they consider funny; but, on the other hand, by their action they make the safety signs useless.

I recently saw in a coal mine a good example of the defacing of a sign. The sign originally read thus:

DANGER! DANGER! DO NOT WALK UNDER WIRE

By marking out some letters and marking over others the sign was made to read:

GER MAN DO NOT TALK DER WAR

Clever? Yes, but criminal! The man presumably drew some pleasure from his smartness, but I wonder if that pleasure would in any way compensate him if he should see one of his fellow workers struck down by the electric current from that wire? Every mine has in it warning signs, but the real meanings of nearly all of them have been destroyed by thoughtless, misguided persons.

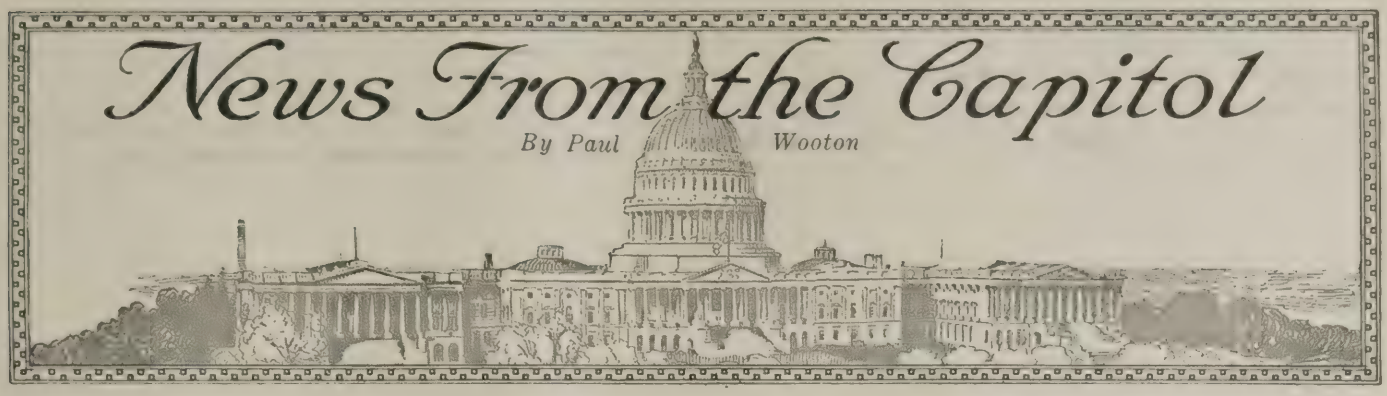
Another mine worker who endangers his own life and the lives of the men who work with him is the one, usually young and reckless, who plays tricks with the electric current in the trolley line. He stands on a board to partially protect himself and touches the trolley wire with a dampened newspaper. Any man he touches with his free hand receives a sharp shock, and the practical joker's happiness is complete. This trick may often do no harm, but there are cases on record where it has had fatal results for both men.

Yearly many men are injured and killed by falling in the way of a moving locomotive or of a trip of cars traveling down grade. Most of these falls are caused by sheer carelessness in crossing tracks. The victim trips on lumps of coal and slate left between the rails or falls when stepping negligently on ties and rails made slippery by the leakage of oil from cars. In mines where modern equipment is used, of course, this wastage of oil does not occur; but where old-fashioned cars are still in service extreme care should be taken to remove the dangers of slipping and of fires resulting from the presence of oil-soaked ties.

Serious fires and explosions occur in the most carefully watched mines because the men do not coöperate with the management in taking the most ordinary precautions. It does not seem possible that in a gassy mine practical mining men provided with electric lamps would carry and use matches, but I have seen the open flame of a match in a dozen dangerously gassy workings.

Any man who is careless in handling explosives should be classed as a dangerous person and not allowed to work with, or near, any kind of explosives. Recent articles in *Coal Age* have taken up in detail the proper methods of using all forms of explosive material, and such materials should be handled in absolutely no other manner than that so set forth. Saddened widows and cripples in every mining town can testify to the importance of using intelligence and care in working with explosives.

Mine operators and mine-operating companies should not cease in their efforts to make their mines safe for their men, but the men themselves can do much to help and much to hinder the good work. They should constantly guard against foolish, life-threatening acts and should make it unpleasant for any man who exposes them to danger.



Government to Operate Coal Barges

Coal-carrying barges are to be operated by the Government between the Alabama coal fields and the Gulf of Mexico. An announcement to that effect has been made officially by the Director General of Railroads. The transportation line in the Alabama coal service is to be operated in conjunction with the freight-carrying lines, which are to be put on the Mississippi River between St. Louis and New Orleans.

Coal already has been transported down the Alabama rivers to the Gulf in considerable quantities, but the opposition of the railroads and the inadequate equipment have retarded the development of water outlets to the Alabama fields. Since the coal can be handled into New Orleans on the same barges that bring it down the river, a large tonnage is expected to move by the new route as soon as regular service starts.

With the assurance which goes with a Government undertaking, Alabama operators will now provide the necessary terminal and handling facilities so that they will not be dependent entirely on railroad cars, the scarcity of which hampered their operations greatly last winter. The Government line will begin operation with existing equipment, but plans already have been drawn for improved barges and tug boats.

To Speed Up Movement of Coal Cars

Sluggish movement of coal cars, both loaded and empty, brought forth a formal order last week from A. H. Smith, regional director of the eastern district of the United States Railroad Administration. In the order, he declared it to be "of vital importance that our efforts be redoubled to secure an improved circulation of coal-loading equipment. This is of such importance that we feel justified in asking you to agitate this vigorously in all operating offices so that we may be able to make a suitable improvement."

No Coal for Use of Country Clubs

Wood apparently will be the popular fuel at country clubs this winter, as a result of an order from the Fuel Administration forbidding the use of other fuels for such places. The order is not absolute, as the Fuel Administration will issue licenses of exception when the state administrator will certify that the fuel can be spared and that it is not against the public interest to grant such a permit. Peat is included with wood as a proper fuel, when neither requires the use of railroad transportation facilities.

Permits Small Shipments of Steel for Essential Civilian Uses

To avoid delays in the filling of small orders of steel urgently required for essential civilian uses, the War Industries Board has decided to permit shipments which are not in excess of five tons without request for priority. This is expected to relieve the coal-mining industry of much annoyance, as a considerable portion of their needs for iron and steel products is in small lots.

Appoints District Representatives

J. D. A. Morrow, on his recent trip to the West, appointed the following district representatives: George D. Kimball, Denver, for Colorado; J. Van Houten, Raton, for New Mexico; W. B. Innes, Great Falls, for Montana; Moroni Heiner, Salt Lake, for Utah and Wyoming. Mr. Heiner will be assisted by A. D. Pierson, of Salt Lake City, who is the assistant district representative for Utah, and by D. H. Pape, of Ogden, who is assistant district representative for Wyoming.

Inspection Leads to Coal Conservation

One week's inspection of power plants at Pittsburgh resulted in the conservation of 81,000 tons of coal, according to a report to the Fuel Administration made by Thomas R. Brown, the administrative engineer for the Pittsburgh district. State administrative engineers have been appointed as follows: H. J. Meyer, Minneapolis, for Minnesota; Henry Adams, Baltimore, for Maryland, and Horace S. Hunt, Jackson, for Michigan.

Weekly Production Statistics

Production figures for the week ended July 6 are as follows: Bituminous coal, 10,259,000 tons; anthracite forwardings, 31,493 cars; beehive coke, 579,000 tons; byproduct coke, 502,666 tons. With the exception of byproduct coke, production in each case shows a marked decrease as compared with the preceding week. This is due almost entirely to the observance of the July 4 holiday.

Quite contrary to expectations, the average production per working day, during the week under review, held up to the high average of the week before. This was made possible by the return of practically all operatives on July 6. In previous years it has been difficult to obtain more than half of the daily average production

on the day following July 4. Anthracite shipments fell off 25 per cent. as compared with the week preceding. This was larger than had been anticipated.

The average production for the five working days of the week at the beehive coke ovens fell off sharply during the week under review. In the principal Pennsylvania producing districts, which had an output during the week of 348,178 tons, 20.6 per cent. of operating capacity was lost due to the shortage of yard labor. Both coal and coke cars were available in quantity. Despite the holiday, the byproduct output continued to forge ahead and now has passed the 500,000-ton mark. The ovens are operating at more than 90 per cent. of maximum capacity under ideal conditions. The principal loss of output was due to repairs to plants, with labor difficulties ranking next.

The figures referred to in the foregoing are estimates made by C. E. Lesher, the geologist in charge of coal statistics for the United States Geological Survey.

Necessity of Conserving Coal

Nothing less than the vivid realization that the coal situation this winter threatens to be more serious than was the case last winter caused the Fuel Administration to take the drastic step of cutting off all fuel from breweries. While the coal supply available for use this winter will be intelligently distributed and no recurrence of the confusion of last winter will take place, the requirements of the war industries are mounting so fast as to make it clear that there is not enough for all.

The work of supplying the domestic consumers is going ahead more rapidly than had been anticipated, and there will be no inconvenience on the part of householders if they practice conservation. The Fuel Administration is being given prompt coöperation by the consumers, who now are reporting their requirements. This information is being tabulated as fast as received and is giving a more intelligent view of the situation.

It was not the cutting off of the fuel from the brewing industry which has caused the concern throughout the country reflected in every mail to Washington, but it is the uncertainty as to how far this policy will extend. Some are anticipating that 50 per cent. of the non-war industries will be down before spring from lack of coal. The Fuel Administration is indulging in no predictions as to what will happen to the non-war industries, but every effort is being made to bring to the attention of the public the necessity of conservation.

The incident which precipitated the brewery order was an announcement from the Railroad Administration that 200 additional carloads of coal could be handled through the New England gateways each day. New England's schedule already is much behind, but so closely was the consumption following after production that it was found necessary to divert supplies destined for non-war industries in order to fill the 200 additional cars each day.

Each industry is to be studied by a committee headed by Clarence M. Woolley, so that curtailment can be made in the most intelligent manner possible. The other members of the committee are Edward Chambers, P. B. Noyes, Theodore F. Whitmarsh, Edwin B. Parker and Edwin F. Gay.

Limits Use of Gas Coal in Northwest

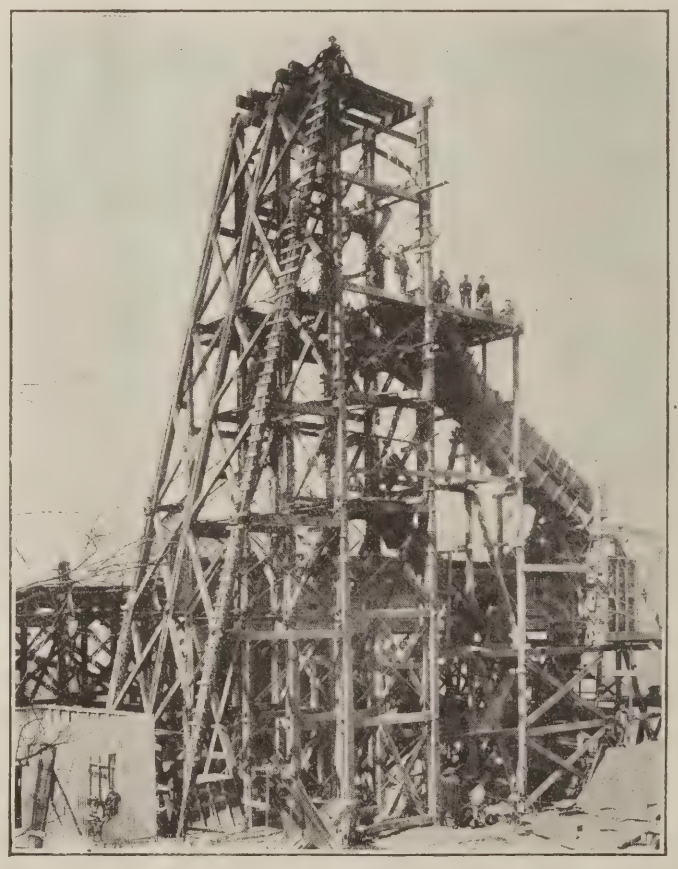
Gas coal moving into the Northwest must be distributed only to manufacturers of gas and to operators of byproduct coke plants. An order to this effect was made necessary on account of the fact that gas coal was being used for other purposes, when the greatest difficulty is being experienced in procuring ample supplies for byproduct coke ovens and gas plants which supply domestic users.

Brief Washington Notes

An entire floor of the new Commercial Bank Building, Washington, D. C., is to be occupied by the National Coal Association. One of the features of the new offices will be the directors' room. It will be large and particularly well furnished.

J. D. A. Morrow, S. L. Yerkes, A. W. Calloway and J. B. Neale, of the production division of the Fuel Administration, attended the operators' meeting at Fairmont, W. Va., to confer with regard to the best manner in which the coal from that section can be distributed.

Evans Woollen, federal fuel administrator for Indiana, is to have charge of the Bureau of State Organizations of the Fuel Administration during the absence of Walter E. Hope, who has been compelled to return temporarily to his office in New York.



HEADFRAME OVER NEW SHAFT OF CONNELLSVILLE BASIN COKE CO., ROCK FORGE, W. VA., BEFORE COMPLETION

The structure is of timber, 95 ft. high, and handles coal into the shaker and breaker of the old tipple in the background. The old tipple still serves the drift mines, but ultimately all the coal will come through the shaft. The shaft is 130 ft. deep, and concrete lined throughout. It is 10 ft. 10 in. by 24 ft. in the clear, with three compartments, two for hoisting and one for air, pipes, etc. The cage guides are bolted to the steel I-beam buntons.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

Provost Marshal General Crowder denied on July 17 that a special order had been issued placing anthracite workers in a deferred classification for purposes of the military draft. In denying a contrary story that had appeared in the Washington press he said that no change had been made. The matter is still left to the discretion of the local boards. He understood that these boards were placing coal miners in deferred classes.

The other news regarding labor seems this week to center around prohibition. Suddenly in the country over national abstinence is being talked by people who have not been given to discussing it hitherto—at least not favorably. The National Coal Association advocates this war measure in a communication to Dr. Garfield. There is no temporizing in its statement; it wants prohibition to be nation-wide; it wants it to be complete and it wants it now. It is the dryest of bone-dry legislation that it would have passed. One feels that in a week we have progressed a whole decade.

PROHIBITION WILL INCREASE NATIONAL WELFARE

This action will so ameliorate the condition of the working population that the workingmen will never cease praising the union for what it has done for them, just as they praise the union for the greater earnings that come from mechanical appliances, for the fatter pay envelope that comes from a depreciated currency and for the greater comforts that come from the inventor's ingenuity. All that ameliorates or even appears to ameliorate the wage earner's lot is credited to the work of the wage earners' tribunes, whether they oppose these ameliorating influences or support them.

But this we must concede: Frank Farrington, big-souled Frank, is out for prohibition. If the measure goes through the mine workers have a right to thank him. How he can come from Streator, Ill., and yet advocate prohibition, passes explanation, but we are told, nevertheless, that he does.

INDEPENDENCE DAY WAS THE ONLY WORKDAY LOST

Undoubtedly prohibition is the nation's best bet in peace or in war, and especially in war. It will add immensely to our production, and therefore to the booty which the people of the nation will yearly divide. Nevertheless one can hardly concede that this year's Independence Day celebrations were so harmful as has been represented. The nation only lost one day's coal. The figures of the United States Geological Survey show that in the other five week days more than an average production of coal was secured. The week's output of bituminous coal was 10,259,000 tons, or 2,052,000 tons per working day. There is little evidence that the drunkenness and abstention from work on July 5 exceeded that on a normal day. If it did, the coal output must have been made good by patriotic miners who tried to make up for the idleness of Independence Day.

James B. Neale, director of production of the United States Fuel Administration, visited northern West Virginia last week and made addresses to the mine workers at Monongah and to the coal operators assembled at the Fairmont Country Club. There was a little note of reprimand in his address to the operators. As we have said before, the operator is being asked for things, possible and impossible; the mine worker for something he can unquestionably provide, namely, 8 hours' work, 6 days a week. However, some of the things the operator thinks he cannot do can be done if he feels sufficiently distressed about the matter to be willing to do the necessary scheming and contriving. Some operators are not any too observant as to the difficulties that confront the mine worker and are a little too close in providing supervision, adequate repair force and adequate supplies.

Attempts are still being made to show that the anthracite operators are trying to reduce the number of their employees. We are told for instance that 11 employees engaged in the construction of a new breaker at Woodward colliery, of the Delaware, Lackawanna and Western Railroad Co., at Edwardsville, were laid off on July 11. With the suspension of these 11 men, we are told, the number of idle men, presumably at Edwardsville, is increased to 103, for 92 were suspended by the company several weeks ago.

The men thus laid off had been asked to work Sunday so as to bring the work to a speedy conclusion. They consented, believing, it is said, that double time would be conceded them. On inquiry they found they were credited only with a day and a half. The men objected and with one of the firemen on the job went to Scranton where, following a conference with the superintendent, they were paid off and discharged.

These men were probably not mine workers. Their discharge, therefore, is not the discharge of a mine employee. If they were mine workers they were demanding something to which their contract did not entitle them. Their idleness would therefore condemn themselves and not the company.

The Central Pennsylvania Coal Producers' Association has been preparing a report on the number of miners, cutters, scrapers and loaders employed in May of this year as compared with the number working in March of last year. The purpose is to make the fact deduced the basis of an appeal for deferred classification of such mine workers as are subject to draft.

WASHWATER CAUSES A STRIKE IN PENNSYLVANIA

The Pittsburgh or western Pennsylvania district has had few, if any, strikes of late, but about July 8, 200 of the mine workers of the Arnold City No. 2 plant of the Pittsburgh Coal Co., located at Arnold City, Fayette County, went on strike to obtain an adequate water supply at the company houses. The company made an agreement last September with the Fayette City Water Co. to supply water, but whenever the water is low the water company shuts off the supply. State police were brought in to maintain order and eventually water barrels arrived. Washday needs being thus provided, the strike came to an end.

The troubles which, in the anthracite region, have doubtless justified the laying off of men are well illustrated at the Tuxhorn bituminous mine in Illinois. Men make it impossible for the employer to retain them. Sometimes they refuse to accept union wages or recognized union working conditions, and then as soon as they are idle they begin to bemoan the lack of patriotism of the men who for good and sufficient reason were compelled to put them out of their employ. In the Illinois instance the men quarreled violently among themselves, the foreigners refusing to allow the negroes dominance in the union. As a result the men refused to work. When at last they decided to get busy the company refused to admit those men to the mine who had been leaders in the near-riot that had occurred. The company will take the matter up with the union and if it is agreed that the men should be reinstated that will be done and the time lost by the men thus reinstated will be paid by the company. There are some men who are such trouble makers that a mine can produce more coal without them than it can with their so-called assistance.

The employees at the mine of the Railroad Mine Supply Co. at Kincaid, near Taylorville, Ill., walked out on July 1 and the mine has been idle ever since. The strikers declare that they walked out because 10 machinists were laid off when they demanded an increase in pay.

Strikes to compel better railroad service have not come entirely to an end in the state of Indiana though they are not as frequent as they used to be. One occurred recently and the details will be found interesting:

Three coal mines, on a branch of the Indianapolis and Vincennes R.R., producing approximately 3600 tons of coal a day, and employing 670 men, were made idle by a change in the schedule of a miner's train. Most of the men employed at these mines reside at Linton. The mines are a part of the Vandalia Coal Co.'s holdings. For a number of years the miners have gone to and from their work at certain hours traveling on the Indianapolis and Vincennes R.R. A few miners who live at Dugger, however, petitioned the railroad for a car to be placed on the switch in the morning and brought back in the evening. After this petition was granted it was necessary to start the miners' train from Linton 15 min. earlier in the morning and to schedule the train to arrive 15 min. later at night. The Linton miners objected to the change and refuse to work until the old schedule is restored.

The coal production of Alabama is steadily increasing, a pleasing outcome of the many appeals recently made to the miners of that state. Men who have been in the trenches, men who are now working for the Government in shipbuilding plants and in other war industries, have visited the Birmingham district and the mining sections of Alabama in large number during the last 15 days. They have addressed the workers and urged them to give the Government the benefit of their full labor, stressing the fact that fuel is one of the most essential elements in the present war crisis. Coal, coke and iron men state that while the mine production is not yet as great as is attainable there is much improvement in the output. The past week saw a larger production of coal than the previous week and the belief is general in the Birmingham district that the mine workers will from henceforth continue their efforts to keep the output at a maximum.

Much Impressed, Rust Men Work on Sundays

Even if the miners work six days a week and the full capacity of the mines is reached it is feared that the production will still be short of requirements. The demand for coal is the heaviest on record and it has been steadily increasing so that now the increase in the demands in the Birmingham district is practically double the increase in the rate of production.

George Gordon Crawford, president of the Tennessee Coal, Iron and Railroad Co., speaking during the week before a meeting of the mining interests of Alabama assembled to discuss coal production under war conditions, reported that this company broke all previous records for production at its mines on Monday and Tuesday of last week. According to Mr. Crawford, 14,000 tons of coal were produced on these days and that is 1500 tons a day above the average production.

The miners and other employees of the W. C. Rust Coal Co., operating the Sligo mines in Etowah County, are putting in seven days a week at the mines. Mr. Rust in reporting the increased production stated:

"Our miners upon learning the general need for coal voluntarily offered to work on Sundays if permitted to do so, hoping thereby to relieve, in a small way, the demand for increased fuel production. The offer was immediately accepted and our mines are now operating at capacity even on Sunday. We are in need of cars to transport the coal thus being mined."

Nation's Coal Men for Prohibition

The bituminous coal industry of the United States has during the war put itself squarely behind the prohibition movement. At least operators, representing 400,000,000 tons output annually, have so placed themselves recently, for the National Coal Association has memorialized the United States Fuel Administration to support measures for immediate nation-wide prohibition. This resolution was transmitted to President Wilson and published for public information July 12.

The operators in the Association are anxious for speedier action than is meditated in the Gore amendment. Why wait till there is an immediate coal famine to put in force the means to relieve it? We know we are going to be short of coal this winter. Let us not wait till winter comes and then at that late hour make belated and therefore inefficient provision against the shortage. All things considered, is not the summer when cars are plentiful the time to cut down drunkenness? When cars are scarce, as in winter, it really does not matter so much. Besides, in winter the stories of the shortage brace the miner; and in summer there is less to brace him, and liquor gets the best of his feeble will—reference being made alone, of course, to those who drink to a degree that interferes with their work.

Operators View the Saloon in a New Light

The mine operators have at times past been indulgent toward the liquor business, some feeling that a saloon brought men to their mining town and that prohibition would stop the flow of foreigners to America. It may be conceded that liquor does attract some men to the town where it is sold. But the operator would be better off without such men, especially in these days of division of labor, when one man's drunkenness muddles the whole mining game; for sober loaders wait on drunken cutters and sober cutters wait on drunken loaders, and both are waiting on drunken scrapers.

With national prohibition all mines will be on the same basis. The measure may conceivably prevent foreigners from coming to America, but surely only the intemperate kind. These we do not want after all. The foreigners we have seem to stay well in West Virginia without their liquor. That state does not regret the sobriety so far as it has gone. Instead it wants more. So the foreigner is not much repelled by prohibition, and if he were he can't leave now; nor can he just now be induced to come. It is more important, therefore, at least at the present juncture, to remove from him all that interferes with his work.

Let us quote at some length what the National Coal Association has to say, for it is grateful news after these years of dubious shifting on this momentous question:

"Regardless of political affiliations of the members of the association, and leaving out of consideration the moral issues involved, and basing its opinion entirely on economic and patriotic grounds, the committee unanimously and unqualifiedly believes that national prohibition for the period of the war is absolutely necessary to make effective this or any other plan for increased coal production. A comparison of the records of production of mines in wet and dry territories furnishes ample proof of the need of prohibition. The various instances cited to you today need not be repeated here, but they typify the experience of operators throughout the entire country."

"Our committee," said Chairman A. R. Hamilton, "is composed of practical operating men, representing all the principal producing districts of the country. They are men of all shades of personal opinion. Some come from wet states, some from dry states and some from states partly wet and partly dry. They all told their stories and presented their figures to show not only the relative efficiency of the mines as between wet and dry states, but the difficulties of working out any practical benefits from drink restriction along the border line between wet and dry territory. The result was a determined and unqualified stand for national prohibition.

"The committee feels that the drinking evil has become so rampant in the mining communities that its complete elimination is fundamentally necessary in the effort to speed up the mines sufficiently to get the 100,000,000 additional tons of coal this country will require this year. It is now up to Congress to make a clean-cut choice between booze for the mining communities and coal for the war and the public."

EDITORIALS

Housing in the Mining Regions

THE draft does not cause houses to be vacated, provided that business continues with pre-war activity. The families still remain, though the boys go to the front, and just as many houses are required to accommodate the percentage of working men who remain. The anthracite region has lost over 18 per cent. of its men since the war began. This represents the net loss. There has been a larger shift of labor than this loss represents. Let us suppose that only 75 per cent. of the force now at the mines represents what was there before the war or has been gathered from nearby homes. Then that 75 per cent. will require practically 100 per cent. of accommodation. The 7 per cent. must have found dwelling quarters for the most part in new houses or in houses previously vacated.

More men will be required to bring the force up to full quota, to make up for the inefficiency of the new men and to correct possibly the slackness of those who find they can secure the income they desire without steady work. To bring them in more and better houses must be built. The outcome will be satisfactory, and more perhaps than we can ever hope for, if the anthracite region can manage to get its full pre-war force by housing the men in dwellings 25 per cent. more numerous than sufficed before the war began.

For this reason the anthracite and bituminous regions alike can look forward to an era of building and improvement despite the high prices, the shortage of labor and the desire to keep expenditures strictly on a war basis. The coal companies moreover have now the money and inclination to make improvements wherever such work will secure and retain labor.

From the Schuylkill district of the anthracite region comes word that the Philadelphia & Reading Coal and Iron Co. at Beaverdale is placing electric lights, water and other conveniences in the houses occupied by its employees. New kitchens and porches have been added to the houses; the surroundings have been beautified. The rent is placed at $7 per month. The city dweller finds such a rate hard even to imagine much less secure. But even in the immediate locality prices like these are unusual. At Mount Carmel nearby houses no larger, better or more convenient are renting at from $12 to $15 per month.

Three other villages of the company are getting generous renovation. Concrete walks now being built make traveling easy, the windows of the dwellings are being enlarged, and electric lights and a water-supply in every house bring the village up to date. No longer do ten families "tote" their pails to a faucet or even a well on the street, as used to be customary in mining villages.

The anthracite companies, anxious to aid war gardens, are placing their land at the disposal of their tenantry and give one and all fertilizer from the colliery stables free; sometimes they even deliver it at the garden site. As a result of these actions and the need for houses, the tenant houses once idle are now occupied. Formerly out of repair and indifferently cared for, they are now homes of happy workingmen. Many new blocks of houses are in contemplation. The war, by accentuating the need for men, is almost sure to set new standards for housing. Neither tradition nor romance will ever nestle in a row of houses of the store-box type of architecture, and no one will ever make a home of any permanence where there is neither tradition nor romance.

Improvement in Illinois Mining

WHILE all interested parties to the proposition of greater recovery of coal in Illinois agree as to the necessity for further action, the steps which should be taken to secure it are not so evident. The chief obstacles now are the adoption of improved systems of mining and a modification of the contract between miners and operators, to enable a greater extraction to be made.

Much individual effort has been made to devise systems of mining which shall improve existing methods. Also state and Federal bureaus plan at an early date a more extended investigation of Illinois mine workings with reference to the cost of production and the percentage of extraction. The claim is made that mines are not opened up in the first place looking to big recovery of coal, and plans are now being formulated to leave larger pillars on the advance of the workings. Also, engineering skill is being sought more and more by operators to assist in planning underground work and to follow up the development along the lines laid out. Furthermore, mechanical appliances are coming rapidly to the front to enable more work to be done with fewer men. To secure greater extraction as well as safety, an entry-driving machine has been devised to permit of reaching the boundaries quickly and encourage a system of retreating rather than of advancing, as at present. Such a machine is now being tried out by one of the prominent coal companies in the southern part of the state.

But the leading suggestions and plans just noted are details. The proper channel for further extensive improvement is the Federal and state coöperative movement which has been working so effectively. The final solution seems to be a line-up of four factors: The state legislature, the mining bureaus, the miners' union and the operators. The freight carriers of the state are also vitally interested; the loss of coal may affect them even more than the operators. The latter can go to other fields and open up new mines, but the usefulness of a railroad may be destroyed in some cases with the exhaustion of coal in its territory. As illustrating the relative importance of coal mining and agriculture in Illinois, we only have to turn to reports for 1916 which note that about 30 per cent. of all freight

carried by the railroads of the state during that year was coal, while farm products are only half as large.

The present, however, would seem to be no time to experiment on new systems, unless they will fit in with existing methods. There is a general shortage of labor and a threatening scarcity of coal, and no interruptions to production would be tolerated. Today any change which would curtail output or cause unrest among miners would not be favorably received; on the other hand, during more normal times, the leading coal interests of Illinois would welcome suggestions which gave promise of relief from present conditions.

Low extraction has been laid at the doors of the mining men of the state, but judging from the numerous examples of fine modern plants throughout Illinois, the suggestion arises that the question of surface protection might be one if not the leading factor in the problem. If some one will explain how to handle the surface, the operators may do the rest.

American vs. British Ideals

AT A TIME when the British are our allies, it seems perhaps importune to call attention to the difference between the business ideals of our respective countries; but seeing that there is a tendency toward certain of these ideals in America, and a tendency toward American ideals in Great Britain, it is perhaps well to consider what they respectively are.

In Great Britain the individual seeks a place in a large commercial house, expecting to live and develop with it and rise slowly and steadily with the advance of the years. The house engaging a man does not take him on trial; it expects to keep him as long as he lives. The manager looks up his antecendents, inquires into his family, studies his record and finally makes the important decision whether to accept him or not. In fact, the selection may antedate by months or years the actual entering of the applicant into the "berth" thus filled.

Recommendations from the distant and interviews with the near precede the employment of a man in any business office. The employer is not hiring a helper, he is buying his services for a lifetime on progressive partial payments. The employee is buying a slowly ascending annuity and paying for it in partial payments of service.

This used to be recognized so fully that it was unlawful to induce workers from one firm to accept service under another. But both employee and employer feel in large manner bound to one another. Theirs is no day-to-day contract. The law may say it is, but custom decrees otherwise; and customs are larger than law.

In Great Britain the employee goes forward in the company with the progress of his years and experience, whereas, with us, leadership does not merely come as a reward of seniority. Nor, it is true, does it solely so come in Great Britain. But in that country, nevertheless, as has been said, men enter a company in early youth and usually remain with it till they retire, climbing in it and with it, giving their lives in its promotion and development, regarding it as the end-all and be-all in their existence. The company feels morally bound to take care of these men. Only in cases of the grossest, most inexcusable negligence or malfeasance is a change made. To drop back in the line of progression is considered clear evidence of incompetence. Men do not shift from company to company. New blood is not sought; old blood is not rejected.

In fact, to express matters in American terms, Great Britain is a country where civil service rules dominate business as they occasionally dominate political service in America. The United States, almost without intending it, is drifting toward the British benign system of seniority and precedence, and away from the American system of the leadership of the fittest.

There are benefits in both systems. On the whole, we prefer the American plan. We believe it has vitalized our industries and that the contrary system has had a discouraging effect on British business. Men never leave a British company. They wait till the undertaker's horse removes those who precede them, and they step into the place thus left vacant—decently, of course, but none the less surely. They regard it as a wrong when a place thus left vacant is filled by any man outside the order of precedence, unless indeed he is related to a senior partner.

We have perhaps altogether too much turnover in our American executives. Too many corporation heads have a disposition to fill vacancies from outsiders they do not know rather than from insiders whom they do know.

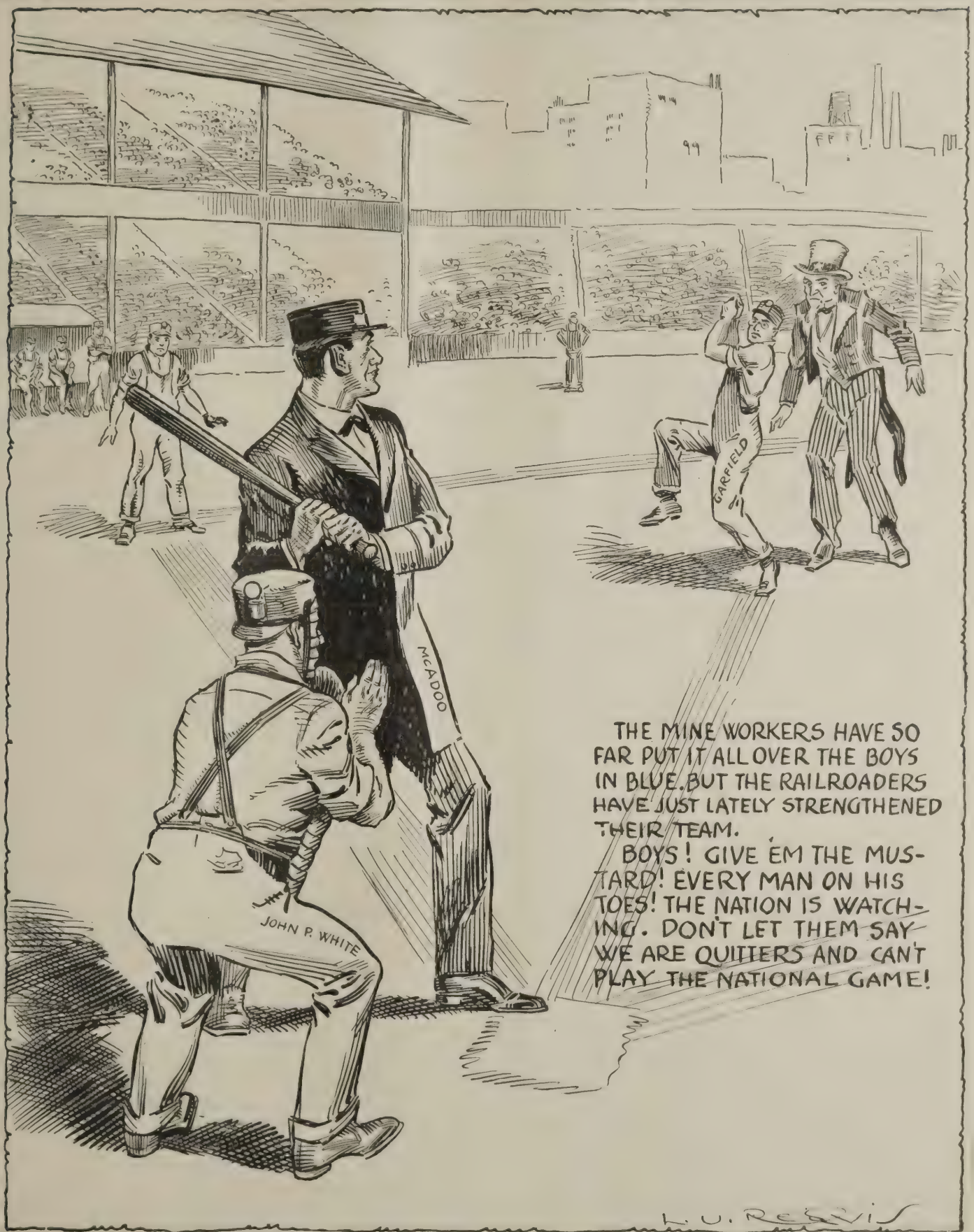
An outstanding quality of a stranger may dazzle a chief executive, so that he will overlook the possibility that many unknown frailties of judgment will detract from the value of the stranger's services. Similar frailties in a subordinate being well known to his employer will condemn that man to his chief and result in his being replaced by a man whose success in securing a job is based as much on what is not known about him as on the qualities he is known to possess.

But with it all there is an advantage in leaving unobstructed the freedom of choice. The rejected always have hope. Some one in control may ultimately be won by certain of the employee's better characteristics and be not too well informed as to the others. Or again, another man may place the qualifications of his subordinates in a different order, and another job may be better tackled by a man of the subordinate's particular qualifications. So there is always hope, and where the hope depends on merit and personal endeavor a struggle for success always seems worth while.

Too much turnover is as bad as not enough. The soil needs stirring every so often that new elements may be brought to help fructify the field. Moreover, elements from outside need to be brought in. If Great Britain were as ready to cashier her business men as she is her statesmen, she might find it would not have altogether a bad effect on the conduct of her business.

If she did not hold in peace times such a beneficent opposition to discharge, the output per man might be increased and the welfare of her populace consequently augmented. The British workman is a competent artisan, but knowing his job is assured him he is a little too much inclined to "lay back in the shafts." The British executive is a well-posted official, but as his "berth" is secure he is a little disposed to "vegetate" and let himself drift in a sea of tradition.

Don't Let Them Take the Pennant



DISCUSSION BY READERS

Mining Equipment

Letter No. 6—Recently, one or two writers, in *Coal Age,* discussing the need of employing the most improved and up-to-date mining equipment, drew attention to the disinclination of coal operators to advertise improvements in their methods and devices used, or to explain the benefits derived from the installation of new types of machinery. It was urged, then, that the coal industry would be greatly benefited by a broader spirit of coöperation that would enable others to profit by our experiences.

Much as I dislike, at this time, to use this reference, it is an established fact that a great deal of the efficiency of German manufacturing methods was acquired because they had a large number of their brainiest men, whose sole duty it was to visit in foreign countries, going to as many of our up-to-date manufacturing plants as possible, where they had an opportunity to observe the latest and best practices employed.

It has been stated that when the war was first started, in 1914, there were nearly fifty of the leading mechanical men and engineers of Germany traveling incognito in the United States, and inspecting our manufacturing plants, raw-material supplies and methods of developing new articles. That they accomplished much for the German Empire goes without saying. It is further proved by the results of high-grade intercourse among the members of the industries having to do with the production of motor vehicles, farm tractors, agricultural machinery and a number of other lines.

Broad-Minded Officials Needed

It is a fact, indeed, though I much regret to say it, that there has been a woeful lack of thorough coöperation and understanding between many of the coal-mining fraternity. This might be classed under the head of business policy or professional jealousy; or it may come from a lack of comprehension as to the advantages to be gained by the right kind of intercourse.

There are a number of companies, however, that are blessed with officials having a broader vision. When such are contemplating making new openings or enlarging their present plant they always make an extended trip through the various coal fields. I have a number of good men in mind who have covered the Illinois, Indiana, Kentucky, Ohio, Virginia, West Virginia and Pennsylvania coal regions, before making a move toward the new work.

A study of the recommendations of these men is convincing proof of the value of their action. It is to be regretted that so many of the higher officials of coal companies are not disposed to allow their operating officials sufficient expense money to permit of their visiting a few of the most up-to-date operations and observing the latest type of equipment in use.

The columns of *Coal Age* perform a powerful function, but the effect can be multiplied many times if proper heed is given to the suggestions and intelligent visiting is done by responsible operating officials.

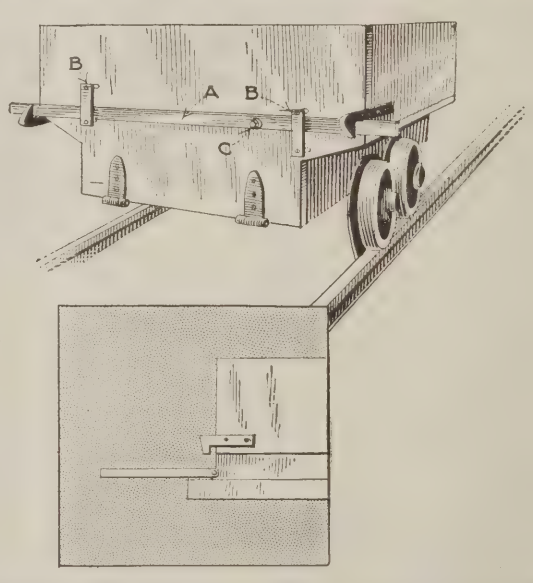
Financial questions are often discussed by the moneyed powers, but with the exception of a few institute meetings, in the different states, and the meetings of the Coal Mining Institute of America, and the American Institute of Mining Engineers, no liberal interchange of ideas is offered to operating officials, who may be called the mechanical producers. They are the men who are definitely responsible for coal production.

I wish to advance the thought that a great deal of good can be accomplished by closer coöperation on the part of worth-while operating officials, and by a greater number of talks, face to face.

Philadelphia, Penn. PATRIOT.

Mine-Car Door

Letter No. 5—In response to the inquiry of V. C. Robbins, *Coal Age,* June 1, p. 1031, kindly allow me to submit the accompanying sketch of an arrangement I would suggest for hanging the end-gate of a mine car that will meet Mr. Robbins' requirements. He states



END-GATE HELD BY PIVOTED BAR AND LATCHES

that the gate must be hung so that coal can be loaded through the end of the car, instead of lifting it over the sides, as the seam is low. Also the gate must be so arranged that the car can be dumped automatically when hoisted on a self-dumping cage.

Referring to the figure, *A* is a dogbar made of heavy bar iron. The length of this bar must be such that its ends will extend from three to four inches beyond the sides of the car. As shown in the figure the bar passes under two heavy iron straps or brackets *B B,* which are long enough to allow the bar to play freely up and down

as required. The bar is pivoted on a heavy bolt *C*, which passes through the end-gate.

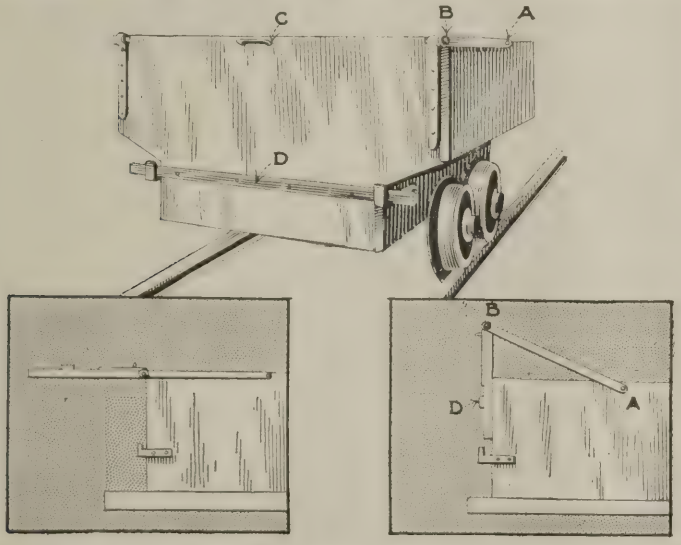
Bolted to the sides of the car are two "dogs" made of strap iron, each having a hook at the end to form latch fastenings for the bar. One of these latches is arranged for a downthrow and the other for an upthrow of the bar. The purpose of pivoting the "dogbar" on one side of the center is so that the downthrow end will be heavier than the upthrow end, which will cause the bar to fall readily into the latches.

The operation of this device is simple. As the car ascends on the cage, the downthrow end of the bar comes in contact with a projecting arm in the shaft and the gate is released, allowing the coal to fall from the car into the chute. Should the car, however, be on the opposite cage, the projecting arm on that side of the shaft must be hinged so that the rising car will pass it readily, but it will trip the dogbar as the cage is lowered for dumping into the chute. Each of these arms must be so arranged that they can be withdrawn if necessary, by moving a lever when the cage is ready to descend the shaft. For this purpose, a simple crank trip will be found most convenient. GEORGE W. RAMSEY.

Molus, Ky.

Letter No. 6—The inclosed rough sketch is submitted, in answer to the inquiry regarding the best arrangement for supporting the end-gate of a mine car, so that the car can be loaded through the end, in a low seam of coal, and still allow the gate to be operated automatically when hoisted on a self-dumping cage.

My plan is to support the end-gate on two long arms that are hinged about the center of the top of the car on each side, as indicated at *A*, in the accompanying



END-GATE HELD BY FIXED BAR AND LATCHES

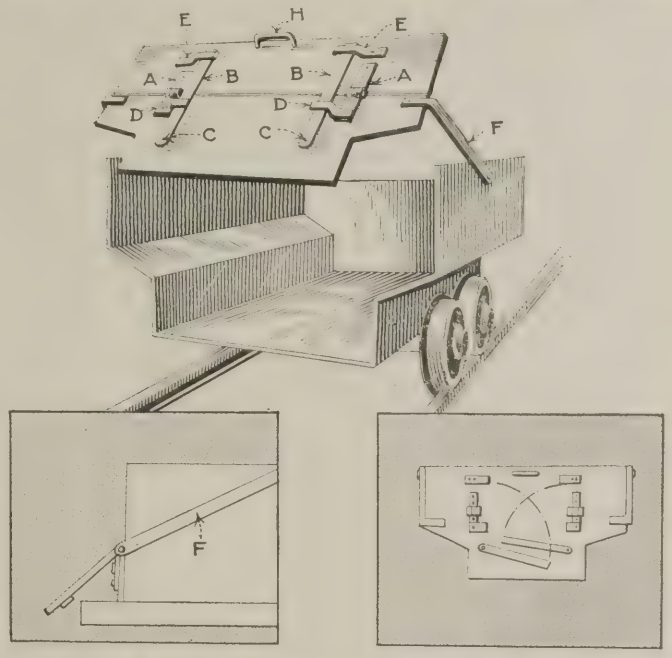
figure. This is the common form of supporting the end-gate of cars used on self-dumping cages. However, my suggestion, now, is to hinge the top of the door to the two ends of these bars at *B*. These hinges must be so arranged as not to permit the door to swing outward far enough to interfere with the grip of the door-lifter, at the top of the shaft, when it engages the hook fastened to the end-gate at *C*. In addition to these hinges, a straight iron bar *D* is bolted firmly to the end-gate, and extends beyond each side so as to drop into the side latches bolted to the body of the car.

No explanation is needed to show the operation, which is very simple. As the car is hoisted to the top of the shaft and the cage allowed to settle back, the hook *C* attached to the end-gate of the car is caught by the door-lifter hanging in the shaft. As the cage sinks to the line of the chute, the door is pulled upward and the coal slides into the chute. J. A. BIER.

Indiana, Penn.

Letter No. 7—I beg to submit the following suggestion in regard to arranging the end-gate of a mine car, so as to permit the coal to be loaded through the end of the car, in a low seam, and provide for the automatic dumping of the car when it is hoisted on a self-dumping cage.

As shown in the accompanying figure, the end-gate is made in two parts, hinged together by two stout hinges



DOUBLE END-GATE SUPPORTED BY SWING BARS

A A. When the car has been loaded these hinges are prevented from bending by two heavy swing bars *B B*, which are pivoted to the lower portion of the end-gate, at *C C*, and further strengthened by passing under two lugs *D D*. When swung into an upright position the bars are held firmly by two spring latches *E E*.

This arrangement will permit the dropping of the upper portion of the end-gate when the car is to be loaded in the mine. When the loading is nearly completed this portion of the end-gate is raised and the two bars swung into position and fastened by the spring latches *E E*, which can be made of any convenient form desired. The two parts of the end-gate now form one rigid whole.

As shown in the side elevation, the end-gate, as a whole, is supported by two long hinges of bar iron *F*, which are pivoted to the sides of the car near the top, about the center of the car. Attached to the top of the end gate is a strong hook *H*, which is engaged by the door-lifter at the top of the shaft when the car is about to be dumped into the chute. I believe no further explanation is needed to make the operation clear.

MATTHEW STAFFORD.

Chase River P. O., B. C., Canada.

Coal Conveyors at the Face

Letter No. 1—Sometime ago an interesting article by Sydney F. Walker appeared in *Coal Age* (Vol. 10, pp. 744, 790), describing the benefits derived from the use of coal conveyors, at the working face. I believe this may be a fit subject for discussion, since there is at present a shortage of labor in all districts as well as an increase in wages, both of which conditions may be greatly helped by the use of face conveyors where they can be installed.

Experience teaches that the conveyor saves, in underground operation, in two ways. It increases the tonnage of coal that can be handled by one man, and decreases the cost of handling per ton. This is certainly something worth accomplishing. The result is apparently due to a couple of causes. The increase of tonnage handled by one man comes from decreasing the amount of time wasted. Formerly a man and his helper had to shovel coal along the face to the roadhead, fill the box, and tram it to the gathering place or the end of his road, and return with another box to repeat the process of loading. This was a great waste of time as compared with the conveyor system.

In the use of the conveyor, the means of taking away the coal is right at the man's back. He does not need to move from his place to load his coal, and the effort required is much less than when loading a box, owing to the small distance through which the coal must be raised. Another small advantage is that the percentage of round coal is generally greater in the conveyor, as the coal is turned over but once. This may be offset, however, in certain instances by the breakage occasioned at the roadhead where the coal is loaded into the cars.

How the Face Conveyor Reduces Cost

The saving in cost of handling appears to be attained through the reduction in labor; but I think this only applies to those coals that are, say under four feet in thickness, or to coals that require to have stone taken down for height in the roadheads. If we suppose a section to contain eight or ten roads, there must be a large sum expended in ripping down this rock to give the required headroom. Perhaps a foot or more of rock must be dropped and then built into packwalls, or disposed of in another way. The conveyor reduces this cost very considerably; but the extent to which that can be done is entirely dependent upon the seam, which brings us to consider the method of working.

Conveyors as we know them today are only adapted to long straight longwall faces. The type of combined conveyor and loader, designed to follow the coal-cutting machine from room to room, has not reached a practical stage of development, as yet. But the conveyor now in use makes it possible to work certain coals, under the machine-longwall system, successfully, that were failures under the hand-longwall system. The main reason for this is the speed of operation; or, in other words, the rapid advance of the face, which overcomes roof troubles that were apparently insurmountable obstacles in handwork.

The conveyor appears most likely to score its greatest success where the coal is relatively low and contains a band of stone that will provide good packs behind the face. Another type of coal that would probably produce equally good results is one where the roof breaks a little distance behind the face and completely fills the wastes, which can be assisted by a proper placing of the timbers. Under these two conditions the possible saving in operating expenses may be very great. Coals that are thicker and have roofs that won't stand the required span, but break short off, causing face falls of stone, lessen the saving, until the point is reached where it is necessary to employ another system.

I do not remember whether Mr. Walker explained that conveyors are not necessary adjuncts to coal cutters in longwall work; although they were, perhaps, first devised as a means of more quickly taking away machine-cut coal. Conveyors have been used successfully in mines where the coal is cut by hand. The use of a coal cutter and conveyor on the same face requires a good stretch of open roof, between the coal and the waste side. This cannot always be accomplished without too great a cost.

Where there is but room for one machine, either a cutter or a conveyor, the cutter will save on the cost of mining, which is generally considered the hardest part of a miner's work, while the conveyor saves on the loading. The ideal conditions are where both machines can be worked together.

Questions Affecting Installation of Conveyors

In conveyor practice, there are two points that require to be considered aside from the machine itself; namely, the manner of paying for the coal, and the attitude of labor toward the introduction of the machine. It is, of course, impossible to know how much coal each miner shovels into a conveyor; and the plan that has given the best satisfaction is to contract a conveyor face to one man. The plan of dividing the coal loaded from one face between the men loading on that face commonly gives rise to the usual squabbles and disputes.

The attitude of the miners is always a factor that cannot be ignored. Prejudice and lack of acquaintance with the system may be so strong that despite obvious advantages the introduction of a conveyor may be for the worse. It is best to introduce the subject slowly, talking it over at every opportunity with the men. Some miners will listen attentively to any new proposal and help it along, but there are others who regard such a move with suspicion.

In closing, let me say that the great field for conveyors is the thinner seams of coal, having a roof that will permit maintaining a considerable length of longwall face, in a straight line. There will generally be a greater output of coal for the same number of miners employed owing to the more rapid advance of the working face. This will require a greater number of mine cars and other equipment in proportion. It is important to remember, also, that a much larger quantity of coal will have to be handled on a single road, starting from the end of the conveyor where the coal is dumped into the cars. Unless ample provision is made to prevent congestion of loaded and empty cars on this road, the advantage to be derived from the installation of the conveyor will be lost through unavoidable delays.

Sydney, N. S. Mining Engineer.

Sealing Off Fire On Intake

Letter No. 3—From my experience with mine fires, I would say no two of them are ever alike. The character of the fire will depend on the material and amount of air with which it is fed. Sometimes these sources of feeding are very ample and there is produced such a violent sweep of flame in the entries that approach to the seat of the fire is most difficult and dangerous. At other times the presence of gas is the chief danger to be encountered.

In order to hermetically seal off a fire that has gotten sufficient headway to demand such a proceeding, I would attempt to build a 9-in. brick wall in each heading, outside from the fire and as close to it as practicable. I would build both stoppings at the same time and carry them to a height of 4 or 5 ft. At that point, I would cease work on the return stopping until the one on the intake has been completed, after which work on the return stopping should be rushed to completion.

In order to safeguard the men performing the work, I would make an opening in a stopping, a short distance back, sufficient to permit men to pass to and fro, as occasion might demand. This would also allow of the regulation of the air current, reducing the quantity of air passing over the fire but allowing sufficient air to reach the men performing the work of building the stoppings.

It is impossible to give an intelligent answer to the questions asked in regard to the condition of the air behind the stoppings when the stopping in the intake is closed first, or when closing the return first. The condition of the air behind these stoppings, in any case, will depend on too many variable elements, making an answer to these questions mere conjecture.

Allow me to suggest that greater safety might result from building the stoppings in a manner that will permit of their final closing simultaneously, by means of an iron door backed with asbestos. R. W. LIGHTBURN.

Perryopolis, Penn.

Letter No. 4—The question asked in *Coal Age*, June 22, p. 1173, is well worthy of discussion, especially in regard to the order of building the stoppings required to isolate a fire that has gained much headway.

On the first question, let me say that if I was in charge of a mine in which a fire occurred under the conditions mentioned in this inquiry, I would get together the necessary materials as quickly as possible and start and build my first stopping on the return entry, having previously opened a stopping outby from the fire, in order to short-circuit a portion of the air and not permit the entire current to reach the fire.

Having completed the stopping on the return airway, I would wait a short time, to allow the space behind this stopping to fill with the smoke and gases generated by the fire. I would then build the second stopping on the intake airway, as near to the seat of the fire as practicable. When building this stopping, I would carry a brattice along one rib of the entry, to conduct the air current forward to where the men are to work and allow it to return to the crosscut previously opened. This will give the men good air while performing the work. When this stopping has been built and closed, it will not be long before the extinctive gases produced will smother the fire.

Referring to the second question, permit me to say that should the intake stopping be built and closed first, the pure air lying between this stopping and the fire would shortly become charged with the gas generated in the heading and with carbon monoxide, which will be produced by the fire owing to the limited air supply, and an explosion is very apt to follow.

On the other hand, referring to the third question, it is clear that if the return stopping is built and closed first, the fresh air reaching the fire from the intake will probably prevent the formation of an explosive mixture.. Carbon dioxide will be produced by the fire, in this case, instead of carbon monoxide, and the space inside of the fire and behind the return stopping will soon be filled with extinctive gases, which should prevent an explosion taking place. THOMAS JONES.

Chickasaw, Penn.

Interpreting Mining Laws

Letter No. 7—Kindly allow me to refer to the question raised by Charles Martin, *Coal Age*, June 8, p. 1080, regarding what he assumes is vague in respect to ventilation, in the bituminous law of Pennsylvania. It seems to me that the meaning of the law is sufficiently explicit and clear regarding the ventilation of the working places in mines.

As has been pointed out in the reply to this inquiry, the law requires that each working place shall be ventilated in such a manner that it will be safe and healthy for work, which seems to be the determining factor. It would be impossible to comply with this provision of the law if men were compelled to work in an air current that had passed through a gob section in the mine before reaching the men, in the manner mentioned by Mr. Martin.

In regard to the distance apart for driving breakthroughs or crosscuts, the mining law in West Virginia provides that this shall not exceed 80 ft. unless brattice is used to conduct the air forward to the face of the entries. The law further provides that not more than sixty men shall be permitted to work on the same air current, except as permitted by the mine inspector under conditions that, in his judgment, make it impracticable to comply with this requirement of the law.

NO ECONOMY IN DRIVING FAR AHEAD OF THE AIR

Strictly speaking, it is neither economical nor advisable to drive entries more than 80 ft. ahead of the air, except for exploratory purposes, where brattice must be used to conduct the air forward. Unless the price for yardage is excessive, or conditions demand the driving of the entry a greater distance ahead of the air, it will generally be found more economical to drive the crosscuts within the limit specified in the law.

Referring to the question of what is to be understood by "return airway," let me say that I have always considered the return to start from the point where the air current passes through the last crosscut, on a pair of headings or in a particular section of the mine. Some complication may arise when a pair of crossentries have butt headings driven off them. The air from the return butt heading may then, in many

cases, pass into the intake crossentry and continue till it reaches the last crosscut on that entry, where it passes into the return entry. This is the case where the crossentries and the butts are both ventilated by a single current, which is often done in a nongaseous mine. In that case, the total number of men working on the crossentries and the butts must not exceed that specified in the law for a single air split.

In a nongaseous mine, however, the return from the butts should be conducted, by an overcast, directly into the return crossentry. This will provide a separate air split for ventilating the butts and the crossentries, respectively. In no case, however, should an air current that passes through a gob section be permitted to ventilate another live section, as mentioned.

Thomas, W. Va. W. H. NOONE.

The Mining Situation

Letter No. 4—Though I read with much interest Thomas Hogarth's letter, *Coal Age*, June 29, p. 1208, I cannot agree with him on all that he has said with regard to the present situation in coal mining. It must be admitted that the present mine-labor question is a serious one, and that something must be done and done quickly to prevent the scarcity of labor creating great loss in the anthracite field.

Much has been said recently in regard to miners not working full time, and some operators have asked their men to work more than eight hours a day. I want to say that if operators will give a miner all the cars he can load in eight hours, six days in the week, there will be no shortage of coal in the anthracite field the coming winter.

In my opinion, there are enough miners in this field to produce more anthracite than the nation can use. It is my belief that it is not the fault of the men nor the length of the working day, but miners are prevented from demonstrating their full ability to produce coal, because they are unable to get cars when they want them. At least, that has been my observation in this district. When a good miner receives but three cars a day and can produce coal that would fill seven cars he cannot be blamed for working short time and going home when he has loaded the cars given him.

SUGGESTS GIVING DRAFTED MEN SHORTER NOTICE

Where this condition exists, which is by no means exceptional, there is an evident loss of 50 per cent. in the capacity of the mine. Let me repeat what I have stated before, the remedy is not to be found in increasing the number of working hours per day, or in finding more miners for the work. There is, however, I admit, a shortage of drivers, runners and company men; but this can be offset, in many cases, by the adoption of improved mechanical equipment that will take the place of much man power.

It is true that time is lost by young men who are subject to draft quitting the mines, four, five, and six weeks before the time when they expect to leave for camp. The only remedy for this condition would be for the Government to revise their regulations in regard to notifying the men of the time they will be called. A shorter notice, say of a few days only, would cause little inconvenience and would hold the men in the mines to within a short time of their departure for camp.

Regarding the "National-Service Button" that a certain writer suggested should be given to men of draft age to indicate that they are engaged in work essential to the winning of the war, this appeals to me as being practical and necessary, particularly in coal mining. Like everything else, however, the scheme has its disadvantages. Unless properly safeguarded, it would do more harm than good, since there is a class of nonproducers who would drift into the mines, simply to avail themselves of the opportunity thus offered to escape the draft.

On the other hand, there are a large number of young men, who are efficient mine workers and who have no fear of the draft, but rather favor being given the opportunity to go across. I have heard many of this class say that "it is worth dying to see the other side, visit new places, and come in contact with new men." There would be no advantage, but great disadvantage, in replacing this class of good men with men who have no knowledge of mining and applying for work only to escape the draft. Coal is an absolute necessity and the output will fall short of the demand unless good miners can be held at their work in the mines. Let me say to every miner, You will show more patriotism by remaining steadily at your present work than by seeking to join the fighting forces "over there."

LURED BY OFFER OF HIGHER PAY IN OTHER INDUSTRIES

There is another feature affecting the coal situation, however, and it has the effect of drawing many good men away from the mines, when they find that they can make a dollar a day more at other work than mining coal. But, such men show that they love themselves more than they do their country, since they place their own interests before the Nation's needs. Patriotism demands that each man must work where he can do the most good.

In my opinion, the Government should take steps to prevent an employment agent from going into a mining camp or district and offering these inducements to miners working in the mines. It is true, as Mr Hogarth states, that the miner is receiving good wages today; but the price of living has advanced 100 per cent. and some necessities have been advanced 200 per cent. since the war began. Taking these things into consideration, the miner is earning less today than he was two years ago.

It is my belief, also, that Mr. Hogarth has overestimated the number of automobiles owned and run by miners. Such is not the case in the Wyoming valley, where it would be hard to find ten autos that are owned by the many thousands of mine workers in this region. I must also take exception to his statement that 90 per cent. of our miners being foreign-born "many of them cannot read and all they know is what they hear." Let me say that some of the smartest miners in the anthracite region are foreign-born, and, I believe, 95 per cent. of our men working underground can read and write. That is my conviction after working with them for 25 years, in the mines in this region.

Kingston, Penn. FRED B. HICKS.

INQUIRIES OF GENERAL INTEREST

Diffusion of Gases

Kindly explain what takes place in the diffusion of gases and what is its cause. The law of diffusion states that the rate of diffusion varies inversely as the square root of the density of the gas; but that does not explain the cause or the action of the gas in diffusing. It is this action that I am mostly interested in at the present time and hope to have explained. STUDENT.

La Salle, Ill.

The molecules of all matter are assumed to be in a state of constant vibration. The amplitude of the vibration, or the length of the path through which the molecules vibrate, varies with the density of the gas, being longer for a gas of less density and shorter for a gas of greater density. For this reason, when two bodies of gases of different densities are in contact with each other the vibration of their molecules at the plane of contact is not supported; or, in other words, there is a lack of equilibrium in the vibratory motion of the molecules at the point where the gases are in contact with each other. The direct result of this lack of equilibrium is a gradual progression of the molecules of each gas into or among those of the other gas, thus causing the two bodies of gas to intermingle.

Now, it is evident that, since the molecules of the lighter gas vibrate through a greater distance than those of the heavier gas, a larger volume of the lighter gas will pass over into the heavier one, and a relatively lesser volume of the heavier gas will pass over into the lighter one. The ratio of these interchanging volumes will be greater as the difference between the densities of the two gases is greater. For example, the specific gravity of marsh gas (CH_4) referred to air being 0.559, its rate of diffusion $\frac{1}{\sqrt{0.559}} = 1.3375$. In like manner the specific gravity of carbon dioxide (CO_2) referred to air being 1.529, its rate of diffusion is $\frac{1}{\sqrt{1.529}} = 0.8087$. The specific gravity of carbon monoxide is 0.967 and its rate of diffusion is, therefore, $\frac{1}{\sqrt{0.967}} = 1.0169$.

From these examples of the rates of diffusion of different gases it should be evident that the greater the difference between the densities of two gases the greater, likewise, will be the difference between the volumes passing over in each case; and again, this greater difference in the interchanging volumes of the two gases creates more quickly a uniform density of the mixture, and produces a quicker saturation and equilibrium of the molecules, because the heavier gas is made lighter and the lighter gas heavier more rapidly than when the interchanging volumes of the gases are more nearly equal.

Diffusion ceases when saturation takes place, and this occurs only when the mixture has attained a uniform density throughout. The aggregate of the molecular vibrations in the mixed gases is such that there is a complete balance of the reacting forces, and there is no longer any tendency to progression of the molecules.

Squibs vs. Electric Fuse

For many years I have been using the ordinary miners' squib for blasting coal. There is a squib known as the "Red Spitter." I would like to learn the opinion of *Coal Age* readers in regard to the question of which is the safest to use, the squib or the electric fuse, when blasting coal with black powder or when using permissible powders. Kindly explain what is meant by the electric fuse and how its use is safer than that of the squib. MINER.

Johnstown, Penn.

We shall be glad to have readers of *Coal Age* give their opinions in regard to the relative safety of single- and double-tape fuse, squibs, electric fuse and electric detonators, for blasting coal, explaining the adaptation and use of each of these means for exploding a charge. In former years shots were quite generally fired with ordinary fuse, and black powder was almost universally used in blasting coal.

Accidents were frequent in the performance of this work, owing to various causes, such as inferior quality of fuse, lack of care in tamping the hole, or inefficient tamping. While time has brought many improvements both in the methods and the devices employed in blasting, the prejudice of miners long accustomed to the use of fuse and squibs has been the chief obstacle in the introduction of electric firing and the use of permissible explosives.

The frank discussion of these methods and appliances, by practical miners, will go far toward emphasizing the danger to be avoided by the use of the more improved means for blasting coal. We will leave this question, therefore, for those who have learned by practical experience where the greatest safety lies in blasting operation. We will suggest, only, that contributors shall not confuse electric fuses with electric detonators, these two types of exploders being radically different in construction and operation.

Electric fuses resemble, in outward appearance at least, electric detonators. Each of these exploders have a cap containing a composition that is readily fired by an electric spark that passes between the wire terminals when the current is generated in the circuit. In the fuse, however, the cap is of heavy paper and contains chemicals that burn as a match; while the detonating cap is of copper and contains a fulminate that is highly explosive, and its detonation causes the explosion of the cartridge or charge.

EXAMINATION QUESTIONS

Mine Foremen's Examination, Carbondale, Penn., Apr. 23, 1918

(Selected Questions)

Ques.—What is meant by the terms "rubbing surface" and "friction," as used in mine ventilation?

Ans.—The term "rubbing surface," as the words imply, denotes the entire surface of the mine or airway, in contact with the air current. This includes the total surface of the top, bottom and sides of the airway.

"Friction" is the resistance developed by the movement of one body upon another with which it is in contact. In mine ventilation, the term refers to the resistance that the rubbing surface of a mine or airway offers to the passage of an air current.

Ques.—What is the minimum quantity of air required by law, for each person employed in the mine?

Ans.—The Anthracite Mine Law of Pennsylvania (Art. 10, Sec. 3) requires a minimum of 200 cu.ft. of air per minute, for each person employed in the mine.

Ques.—What advantage is obtained, in a mine, by having separate splits or districts?

Ans.—Dividing the mine into separate ventilation districts, each having its own air split, enables a better control of the ventilation. The quantity of air passing in each split can then be proportioned to the needs in the several districts. A larger volume of air can be circulated by the same power, and the velocity of the air current at the working face, in each district, is normal. At the same time, fresh air is supplied to each district, and the smoke and gases generated in one section of the mine do not pass through another section, but are conducted at once into the main return airway and pass out of the mine. Should an explosion of gas occur in one district, it is not apt to affect another district.

Ques.—What is the maximum quantity of gunpowder or any other explosive that a coal miner can have at any one time in his working place?

Ans.—Rule 26 (Art. 12) of the Anthracite Mine Law forbids a miner to keep more than 25 lb. of any explosive, unless more is required for his day's work.

Ques.—What is the purpose of safety holes and where should they be made?

Ans.—Rule 43 of the anthracite law requires that safety holes not more than 150 ft. apart and of proper dimensions shall be provided on all haulage roads used as travelingways, when the width of the road is not sufficient to permit persons to pass the cars with safety. These holes must be made on one side of the road only and kept free of all obstructions. Rule 49 requires safety holes to be made at the bottom of all slopes and shafts, in order to enable footmen to seek refuge in case of danger. Safety holes should also be provided wherever a door requires an attendant.

Ques.—How does the power producing ventilation vary as to the quantity produced?

Ans.—The power on the air, in mine ventilation, varies as the cube of the quantity of air circulated. Thus, to double the quantity of air passing in the same airway, will require $2^3 = 8$ times the original power on the air. This does not take into account, however, the change in the efficiency of the ventilator, which may require somewhat more than eight times the power applied to the fan shaft, in order to double the quantity of air passing in the mine.

Ques.—What would you suggest to reduce accidents with mine cars?

Ans.—Strict rules and regulations should be made and enforced regarding the movement of all cars and loaded and empty trips. No cars must be left standing in the mouths of rooms or on side tracks without being properly blocked to prevent their running out onto the main road. A suitable danger signal should be carried on the rear of every loaded and empty trip. Where two drivers are working on the same haul, they should follow each other and not alternate the trips. A reliable signal system should be maintained in use.

Competent trackmen should be employed to keep all roads in good condition, and every requirement of the mining law in respect to proper clearance at the side of haulage roads, refuge holes and other safety appliances should be strictly fulfilled. All cars and trips must be well spragged when descending a grade and a door should never be located at the foot of a grade. Close supervision must be maintained to see that the roads are kept clean and free from any obstruction. All rolling stock must be regularly and carefully inspected. The style of car used should be such that men are not liable to be caught when coupling them. There should be a safe limit to the speed of haulage and such other rules must be adopted as appear to be necessary to reduce the chance of accidents.

Ques.—How would you detect marsh gas (CH_4), blackdamp (CO_2) and whitedamp (CO)?

Ans.—The presence of marsh gas (CH_4), in the mine air, is detected by observing the formation of a cap on the flame of a safety lamp and the action of the flame, which is elongated and increased in size, depending on the proportion of gas present in the air.

Carbon dioxide (CO_2). is detected by the dimness and possible extinction of the lamp flame; also by the effect produced on the human system by this gas, which causes headache, nausea, pains in the back and limbs, when breathed for any length of time. Blackdamp is any varied mixture of carbon dioxide and nitrogen, caused by the depletion of the oxygen of the air, from any cause.

Carbon monoxide or whitedamp (CO) when present in the air is detected by observing its effect on small caged animals such as mice and birds. These little animals are quickly prostrated by the gas, the effect being much more rapid than is produced on the human system. The gas is extremely poisonous, the smallest percentages often proving fatal when breathed.

COAL AND COKE NEWS

Uniontown, Penn.

Trustees in bankruptcy of Josiah V. Thompson, former coal baron, have optioned 5000 acres of "back" coal in Whitely and Franklin townships, Greene County, for an average price of $350 per acre. Steps will shortly be taken looking toward the ultimate consummation by the courts of the gigantic deal. While it was announced that the options were given to Chicago interests, their identity was withheld.

The present deal was made immediately after the completion of the so-called Frick deal, whereby 1100 acres of Greene County coal was sold to the H. C. Frick Coke Co. for $3,700,000. It ranks second in importance to that deal, the total in the present sale approximating $2,000,000. While the consideration is almost $200 per acre less than that secured for the river-front coal, the price is considered equitable by the trustees because of its location. The Franklin and Whitely tracts are far removed from railroads and will be accessible only with difficulty.

For convenience in putting the sale through the court, many tracts were merged into one block to form the 5000-acre tract. Scores of coal landholders are associated with the trustees in bankruptcy in the $2,000,000 deal, and its consummation will dispose of the largest single block of Greene County coal ever transferred in one sale.

Manufacture of coke breeze has been placed under control by the local fuel administration in an interpretation of the new fixed coke-price order issued from Washington. In that order the price of breeze is fixed at one-half the established coke price, whereas in the past breeze from the local field commanded the price for prepared coke. Administrator Byers has ruled that coke breeze screened from the ash dump shall be classed as screen coke where it is free of impurities, but where careless loading is noted the product will be classed merely as breeze. That order creates a premium of $2 for clean breeze and a similar penalty for dirty loading. A rigid inspection will be made of cars loaded with breeze, Mr. Byers announced, to enforce the provisions of the order.

Charleston, W. Va.

The New River District has had no difficulty in securing an adequate supply of cars, and the power furnished has been entirely sufficient for the mines in the district since a vigorous protest was made to Washington. The car supply for the Fairmont district was most auspicious for the first part of last week, there being no less than 2116 cars in the district on Monday, 54 of which were coke cars. This supply was largely in excess of any received for some time, at least for the beginning of the week. The Monongahela road was able also to furnish the mines in Monongalia County a 100 per cent. supply, something extremely rare in that section. With 1792 cars in the Fairmont region Tuesday, a banner day in the district, not a mine was shut down.

Following a recent meeting of the members of the Winding Gulf Association, operators belonging to that association are taking steps to put into effect the suggestion that increased personal supervision would be conducive to increased efficiency in the mines. The great drawback in the Winding Gulf territory seems to be the bad condition of railroad tracks there. The car supply is ample so far as distribution is concerned, but delivery of loads and empties is interfered with because of frequent wrecks attributable to lack of proper maintenance.

Some idea of how production was affected in the Kanawha district by the Fourth of July lay-off may be obtained from the production figures for the district for the week ending July 6, only 147,729 tons being produced as against 195,000 for the previous week. A further idea of the exodus over the Fourth and its effect on the coal industry is shown in the fact that the loss of hours due to labor shortage was 1061 and the loss due to the holiday lay-off was 1200. The car supply was excellent last week and the week previous. Loads shipped out during the first week in July were 14,078 and empties received 12,300. It is understood here that coal operators and lumber operators found it necessary to go to Catlettsburg, Ky., the nearest "wet" point to this part of the state, to bring back their miners.

Fairmont, W. Va.

Operators from twelve and one-half counties in the northern part of West Virginia, belonging to four existing coal associations, met at Fairmont last Friday and in one of the largest assemblages of coal men ever held in Fairmont sanctioned the organization of what is to be called the Northern West Virginia Coal Operators Association, the purpose of such organization being to bring the coal men of the sections covered into a more compact organization, and in order to encourage concert of action in all matters touching the coal industry.

In accordance with the sense of the meeting, C. H. Jenkins, C. H. Tarleton, E. Drennen, D. Howard and S. D. Brady were selected as a committee on organization and were vested with authority to prepare a petition for a charter for the new association. The following districts in the Fairmont region were represented and for each of them a temporary Board of Directors was named, designated as follows:

Fairmont Subdistrict—A. B. Fleming, Jr., A. C. Beeson, J. A. Clark, Jr., G. E. Petticord, C. H. Jenkins. Clarksburg Subdistrict—A Lisle White, D. Howard, J. M. Hoar, C. J. Ryan, V. E. Goecke. Elkins Subdistrict—E. D. Baker, A. G. Wodell, W. J. Williams, A. R. Miller, R. B. Isener. Morgantown Subdistrict—S. D. Brady, C. W. Chapman. Kingwood and Grafton Subdistricts—Two directors to be named. The three directors at large selected were: J. M. Wolf, of Fairmont; J. A. Jenkins, of Clarksburg, and E. Drennen, of Elkins.

A feature of the meeting was the presence of J. D. A. Morrow, one of Dr. Garfield's lieutenants, A. W. Calloway, Director of Bituminous Distribution, and J. B. Neale, Director of Production.

In addition to the foregoing a number of well known railroad and coal men were present, among such being T. L. Lewis, Secretary of the New River Association.

Terre Haute, Ind.

Production of coal by Indiana mines reached a record figure for June, 2,546,452 tons being hoisted as compared to 2,403,263 for May. The June record was made in spite of a shorter month of one day, a pronounced car shortage and some labor difficulty. The car shortage for the month was 11.32 per cent. as against 12.32 per cent. in May. The additional tonnage possible with a full car supply was 416,735. That is to say, had the railroads furnished a full quota of cars, Indiana mines would have produced almost 3,000,000 tons, or at the rate of 36,000,000 tons a year. Supplies in the future, however, are not only dependent upon the rate of production, but also on the extent to which railroad coal is shipped out of the state. So far this year there have been considerable shipments of railroad fuel and screenings to Columbus, Dayton and Toledo, Ohio, and many other eastern points, and there is a possibility that these shipments may be augmented before the season for shipping eastern bituminous coal to the lake ports is ended.

Indiana mines on the Pennsylvania R.R. have suffered the worst from the car shortage, that road failing by 22.92 per cent. to provide an adequate supply of cars. On this system the car shortage has been enlarged by the shifting of cars to Eastern mines to care for lake shipments. Little relief is promised for this month.

Birmingham, Ala.

Of importance in the Birmingham mining district during the last week was the announcement that the recommendations that the Government take over the Warrior River transportation project had been accepted by Secretary McAdoo, and that in the near future facilities would be established which would afford magnificent opportunities for the handling of a large tonnage of coal.

Not less than 200,000 railroad cars will be released in one year if the coal used at Mobile, New Orleans, and other points in this immediate district is handled by way of Warrior River, and this will be a big item for the mining companies too far removed from the river to attempt to avail themselves of its facilities, as the cars released by the river mines will then be diverted to the former for their use.

The Jefferson County Board of Revenue instructed its engineers to start work Tuesday, July 16, to prepare for the construction of four miles of improved highway from the Cahaba coal field to Birmingham. The object desired in the construction of this road is to furnish facilities for the wagon miners of the Cahaba field to transport their coal to Birmingham via auto trucks. The county is merely asked to superintend the work and to furnish engineers, and the miners and civic association have agreed to supply the funds, approximately $20,000. The miners also proposed should the road be completed within the immediate future they would pay a royalty for its use in transporting coal to Birmingham. The county board has not only accepted this proposition, but at a meeting last Saturday it was decided to start the work immediately, the county engineers to direct the work and county convicts to be worked if necessary.

Victoria, B. C.

The problem of western Canada's coal supply for the winter of 1918-19 continues to engage the attention of the public bodies of the chief cities of Manitoba, Saskatchewan, Alberta and, to a slighter extent, of British Columbia. It also is constantly before the operators of these provinces and, generally, is being faced by the latter by concentration of effort toward the increasing of production.

Recently a civic committee of the City of Winnipeg, Manitoba, visited Calgary, Alberta, to go into the matter of the securing of Alberta coal for that large Middle West industrial center of Canada. The members of this organization did not achieve what they set out to do, according to report. They were not satisfied with the cost of the Alberta fuel in Manitoba, where from their statements it retails at between $11.50 and $12 a ton, and they went to Calgary to meet the operators and to ascertain the actual cost of production, in the hope of being able to obtain a clear explanation of what they consider an exorbitant and unwarranted price.

In discussing the information obtained one of the committee members said that it appeared that the coal prices on cars at the mine was $4.95; that the freight to Winnipeg was $4.15; and that approximately $2 had to be charged for administration and cartage. He, therefore, admitted his inability to locate any excessive profit to any individual or individuals in the course of the progress of the coal from the mine to the consumer.

On the whole the committee was dissatisfied with the treatment received, it being stated that the mine owners would not open their accounts to inspection and that they seemed to prefer not to send any coal to Winnipeg rather than to cut prices. The operators also are quoted as having asserted that no dividends were being paid and that, in some instances, money was being lost.

The chief difficulty appears to be as to freight rates and S. C. Oxton, deputy minister of public works for Manitoba, and J. A. McDonald, acting fuel administrator for the Province of Manitoba, were in Edmonton, the capital of Alberta, recently, interviewing the fuel administrators of that province, with a view to discussing the whole situation and endeavoring to devise some means of obtaining a reduction in the freight rates between Alberta and Manitoba.

As the situation stands the leading citizens of Winnipeg as well as other parts of Manitoba prefer the paying of $14 a ton for the anthracite coal of the United States to from $11.50 to $12 a ton for Alberta coal. They are of the opinion that the difference in quality in favor of the imported fuel is so marked that it more than com-

pensates for the difference in price. There is the further point, however, that this winter's developments may make it impossible to get the American coal and the chance of such a contingency, there is no doubt, is creating a feeling of uncertainty and a desire to do everything possible to arrange for a supply from the sister province.

PENNSYLVANIA

Bituminous

Uniontown—Decision to continue the shipment of its entire output of 32,000 tons of coal monthly to the byproduct plant at Youngstown, Ohio, was reached at the annual stockholders meeting here of the Brier Hill Coke Co. The board of directors chosen is composed of J. G. Butler, Jr., George F. Alderdice, W. H. Warren, Thomas McCaffrey, W. B. Phelan and John Allen. Officers elected were Thomas McCaffrey, president; W. H. Warren, vice president; W. B. Phelan, secretary, and N. B. Fulton, treasurer. The company has 470 beehive ovens at Brier Hill, near here, but they have been abandoned since last October, although the plant has been operating steadily at capacity.

Thornburg—The Pittsburg Coal Co. has under agreement of purchase 40 acres of coal about two miles from Thornburg, in Robinson township, at about $800 an acre, or $32,000. The coal is under the tract on which stands the Summit House, and belongs to the owner of that roadhouse.

Kittanning—On July 8 the Furnace Run mine tipple of the Allegheny River Mining Co. was destroyed by fire. The tipple was not only burned but the long retarding conveyor down the hillside was also a total loss. The Kittanning fire department was called and saved the power house and other adjoining buildings. The tipple was equipped with special preparing machinery which will require some time to replace. The loss is estimated at $30,000. The fire is thought to have been of incendiary origin as there was no fire whatever around the tipple over Sunday.

Washington—George H. Thiess recently purchased two tracts of coal lands in this vicinity from the Hemphills. The first tract contains 160.223 acres and is in Independence Township. The consideration was $16 022.30. The second tract, 142.599 acres, in Hopewell Township, was bought for $14,-259.90.

J. O. Scott, of Washington, has disposed of the Pittsburgh coal underlying a tract of 131.55 acres in Donegal Township to John A. Bell, a well known coal operator, of Carnegie. The consideration was $13,155.

The Pittsburgh coal underlying the farm of the late Joseph W. Brownlee in Cross Creek Township was sold recently to John Steel, of Greensburg, for $49,000. The farm contains 194 acres and 89 perches, which makes the average price $252 an acre. The Brownlee farm adjoins the farm of the Patterson heirs. The coal under the latter tract was purchased over a year ago by the Pittsburgh-Southwestern Coal Co. at nearly $300 an acre.

Anthracite

Wilkes-Barre—Officials of the Lehigh Valley Coal Co. are planning for a general revision of the colliery system, with the view of reducing the size of the divisions by creating new ones. The purpose is to enable the division superintendents to give closer supervision to their collieries, now that there is such a strong demand for increased production. Information is fairly reliable that the Lackawanna division will be split in two, with the present superintendent, George P. Gallagher, retained in charge of all collieries on the west side of the river. The newly created division on the east side of the Susquehanna will come under the superintendency of Sheldon R. Jones, former inside superintendent of the lower end of the Wyoming division. R. A. Jones, of West Pittston, will be made the division engineer of the newly created district.

Blakely—Thirteen men were burned in an explosion of gas in the Lackawanna colliery of the Delaware & Hudson Co. on July 10, when the floor of the chamber in which they were working caved and the gas from the vein below came in contact with the naked lights of the men. The explosion resulted.

Freeland—The officials of the Harleigh Brookwood Coal Co., which is the company name for the Madeira Hill Co., in Luzerne County, Pennsylvania, held a booster meeting in Hazleton this week. All the company executives in the anthracite field were present at the meeting and dinner. On Saturday morning a fire of unknown origin completely destroyed the Harleigh Brookwood breaker structure and adjoining buildings, causing a heavy loss. This will mean a loss of about 800 tons daily. It is too early to state what plans will be used to keep the output of this mine on the go. The G. B. Markle Co. has a large plant nearby.

Hazleton—Lehigh Valley Coal Co. officials from all the divisions in this part of the state recently held a dinner and production meeting at Hazleton. This was followed by the announcement that in order to further aid in getting out coal the operating management of the company's holdings would be concentrated into smaller divisions, each with its distinctive operating department, including superintendent and mining engineer. Another dinner was given later in the week by General Manager Chase to the higher officials of the company at his Glen Summit home.

WEST VIRGINIA

Williamson—With the organization of a $50,000 company, the incorporators of the Dempsey Coal Co. plan, as soon as the usual formalities can be complied with and machinery installed, to mine coal on an extensive scale at Armor in Mingo County. Those principally interested in the company are Thomas A. Shewey and James Brumfield, of Armor; Lewis Dempsey, of Inez, Ky.; Floyd Brewer, of Warfield, Ky., and J. C. Haley, of Roanoke, Va.

Welch—Former Senator W. W. Whyte, of Welch, W. Va., is one of the leading spirits in the formation of the Tacoma Collieries Co., which has been incorporated as a West Virginia corporation with a capital of $50,000, although the company's operation will be at Tacoma, Va. In addition to Senator Whyte the incorporators are J. Logan Hill, Joe Zeglin, Louis Setany and Frank A. Olasz, all of Welch.

Welch—Impetus has been given the coal industry in McDowell County by a number of new operations, the latest entry in that field being the Browns Creek Coal Co., which with a capital stock of $100,000 has been organized by J. R. Greenwalt and associates.

Charleston—The Gauley Mountain Coal Co., of which R. H. Morris is general manager, is building half a hundred new houses at its Gauley River plant.

Greendale—Approximately $15,000 will be expended in necessary additions and improvements by the Greendale Mining Co. at its plant here.

Greenberry—With a view to increasing its output, The Miller Coal Co. is driving new openings at its plant at this place.

Hartland—R. M. French & Co. have made such progress with the construction of a plant at Hartland on the Coal & Coke Ry. that the company will soon be able to begin producing coal.

Under the direction of W. S. Wood, general manager, the Middle Creek Coal Co. is developing its property near Hartland in the No. 5 block.

Philippi—The Ford Run Franklin Coal and Coke Corporation is among the new companies just formed with a capital stock of $1,000,000. Lee J. Sandridge and others organized the new company, which will develop coal property on an extensive scale near here.

Morgantown—An addition to other companies in the Monongalia field is the Little Falls Fuel Co., which has been organized with a capital of $100,000. This company was organized by J. A. Aronson and others.

Logan—Coal lands will be developed in Logan County by the Donald Coal Co., as soon as plans are matured by Fred Haslip and his associates, who organized the company, which has an authorized capital stock of $50,000.

Morgantown—Prof. A. C. Callen reports that the total enrollment of students in the short coal-mining course, at the University of West Virginia, Morgantown, at the present time is 21, which is by far the largest attendance in this class in the history of the school.

OHIO

Marion—A pile of coal containing more than 100,000 tons, which was stored by the Erie R.R., is on fire, and strenuous efforts have been made to extinguish it. The cause is supposed to be spontaneous combustion.

INDIANA

New Albany—A committee of miners from Knox County has filed a petition with the Public Service Commission, asking for a larger supply of cars and better distribution, claiming that the poor supply and distribution are resulting in their losing 21.5 per cent. of their working time. This condition appears to be true of most of the southern Indiana section.

Terre Haute—Samuel R. Artman, chairman of the Industrial Board of Indiana, following a conference with William E. Stewart, of Terre Haute, Ind., has announced the appointment of Mr. Stewart as state mine inspector, to succeed Michael Scollard, recently resigned. Mr. Stewart is now president of District 11, United Mine Workers of America. The salary of the position, which is under the industrial board, is $2000 a year.

KENTUCKY

Middlesboro—The Lunch (Ky.) mines of the United States Coal and Coke Co. recently set a record for eastern Kentucky, if not a state record, when 59 railroad hoppers, of 55 tons capacity each, were loaded out in a period of ten hours. The company has made numerous improvements and will shortly have a maximum capacity of 12,000 tons daily. Two thousand new houses have been erected for miners.

Barbourville—The mines of W. H. Boggs have been sold at public auction to Byron Campbell, of Rossland, who with Robert Ridnor will operate the property.

Hazard—The Storm King Coal Co., with offices and mines at Jeff, Ky., has been reorganized, the present officers being F. E. Hadley, president; H. H. Coupler, vice-president, and L. E. Yoder, secretary and treasurer. The company is putting in new equipment and improvements to increase the output from 500 tons to 750 tons daily, and is erecting 25 new miner's homes.

ILLINOIS

Freeburg—The Mulberry Hill mine here has been sold for $190,000 to Iowa parties connected with the St. Clair Coal and Mining Co., of St. Louis.

Edwardsville—E. C. Donk, vice president of the Donk Bros. Coal and Coke Co., of St. Louis, announces that the company will start work about Aug. 1 on a new mine one mile south of Edwardsville, intended to have a capacity of 5000 tons a day, which will be 2000 tons a day more than is produced by each of the four large mines now in operation in the southern part of Madison County. The company has acquired a large field south and east of Edwardsville. The contract for the shaft has been let. Mr. Donk estimated that about three months will be needed to sink the shaft to the vein which is to be mined.

Carlinville—Machinery and lumber have been ordered for the local coal mine that Carlinville business men are promoting, which is to be opened just south of the city. C. G. McIntosh, head of the company, announces that coal rights under the property of Anna Stoddard have been acquired.

Foreign News

Winnipeg, Man.—Controller Wallace and Aldermen Queen and Heaps, appointed a committee of investigation into the ability of the western coal fields to supply the demands of Winnipeg, report that in 1916, the total of the coal produced in Alberta was 2,172,801 tons, and in 1917, 2,125,000 tons, while according to Chief Inspector Sterling, fuel controller for Alberta, the production for 1918 is estimated at 3,225,000 tons. The committee is of opinion that this should be sufficient to meet these requirements of the three prairie provinces, provided there is continuous production at the mines; but production can only continue so long as orders are received from dealers and consumers, as there are no facilities at the mines for storing coal. The report, therefore, emphasizes the necessity of ordering coal at once by all able to do so. Regarding the labor situation, the committee found, generally speaking, an ample supply of men available for the time of the year, and believe that as soon as harvest is over the labor supply will be sufficient to meet requirements. As to the relative value of western and anthracite coal, the committee found it difficult to arrive at any conclusion. While it was admitted by all that the heating value of Alberta coal was not as great as anthracite, estimates as to the difference varied from 25 to 75 per cent.

Toronto, Ont.—Experimental work to determine the economic possibility of manufacturing peat briquettes as a substitute for coal, for which an appropriation of $100,000 was made by the Ontario Legislature, has been unavoidably postponed until next year. Two machines of a new design for the manufacturing of peat fuel were ordered by the Ontario Department of Mines early in the spring to be put in operation at the peat bog near Holland Landing. Owing to inability to secure the necessary material, the manufacturer has been unable to supply the machines, which cannot be delivered in time to enable operations to be begun this season. Some experiments on a small scale in the drying of peat with gas engines are in progress near Cochrane.

in northern Ontario, but no solution of the main problem as regards the commercial feasibility of furnishing a peat fuel to compete with coal will be possible for at least a year.

Personals

W. H. Moore, formerly safety inspector for the Canadian Western Fuel Co., has been appointed manager of the new Wakesiah mine, now being opened by the same company.

Thomas Taylor, formerly overman at the No. 5 mine, Comox colliery, operated by the Canadian Collieries (D), Ltd., has accepted a position as overman of the Morden mine, at South Wellington, B. C.

R. L. Douglass, sales manager of the Devoy & Kuhn Coal Co., of St. Louis, Mo., has recently been commissioned a captain in the army, quartered at St. Louis, to see that plants with contracts for the War Department get their quota of coal.

J. Jemson, overman of the South Side No. 1 mine, Nanaimo colliery, operated by the Canadian Western Fuel Co., has been appointed safety inspector to succeed W. H Moore in that position, and Robert Laird has been made overman to succeed Mr. Jemson.

Obituary

Henry Vogue, who made and lost a fortune in coal mining at Staunton and Edwardsville, Ill., died at a St. Louis sanitarium July 9, aged 82 years. He had been sick for two months, but had eaten a hearty meal just before he expired. One of the first mines at Staunton, a gin shaft, was put down by Vogue. He at first hoisted the coal by mule-power. He prospered, and in later years sank four shafts in the Staunton field. A quarter of a century ago he was one of the wealthiest men of the district. Then he opened the Henrietta mine at Edwardsville, which was not profitable, and he lost in it all that he had made in the others. This mine was recently reopened by the Beck-White Mining Company.

Industrial News

Rockport, Ky.—The Rockport Coal Co. has filed notice of an increase in its capital from $100,000 to $200,000, to provide for business extensions.

Knoxville, Tenn.—The Standard Jellico Mining Co. has recently filed notice of an increase in its capitalization from $25,000 to $50,000, to provide for expansion.

Elizabethtown, Ill.—A. B. Thomas offers to the lowest bidder a contract for sinking a shaft for the Hillside Mines Coal Co., in Hardin County, to the depth of 150 ft. from the surface.

New Orleans, La.—The local office of the Edison Storage Battery Supply Co. has been moved from 201 Baronne St. to larger and more commodious quarters in the Mason Blanche Building. D. B. Mugan is district sales manager.

Columbus, Ohio—An additional appropriation of $3300 has been made by the Columbus City Council for loading equipment for the Columbus municipal coal yard, bringing the total financing up to $15,800, in preparation for business during the fall and winter.

Winton, Wyo.—The work on the new mine of G. W. Harris, at Winton, Wyo., is progressing rapidly. Contract for the coal tipple has been placed with the Roberts & Schaefer Co., Chicago, which equipment will include a Marcus picking table screen.

Frankfort, Ky.—The Lenox Railway Co., of Frankfort, Ky., was recently incorporated by H. M. Collins and others, and plans to construct 15 miles of railroad in Owsley and Morgan Counties, tapping some rich coal and timber lands and connecting with main-line roads.

Pittsburgh, Penn.—The Pittsburgh Mining Machinery Co., First National Bank Building, has been appointed selling agent for Mancha storage-battery mine locomotives in the Pittsburgh district, covering the eastern Ohio coal fields, northern part of West Virginia, Maryland and bituminous fields of Pennsylvania.

Knoxville, Tenn.—The east Tennessee and southeastern Kentucky bituminous coal fields are steadily increasing production, according to E. R. Clayton, district fuel representative, who in a recent statement showed that during the first week in June 269,000 tons of coal were mined; 286,000 in the second week, and during the third week 300,000 tons.

Jefferson City, Mo.—Wallace Crossley, Missouri Coal Administrator, has issued an order that from now on coal delivered to consumers is to be dumped in streets and alleys where bins and cellars are not so accessible that they can be reached without delay. The purpose is to expedite delivery by avoiding delay to teams, trucks and men. The order applies to all the cities of the state.

New York, N. Y.—The Lehigh Valley Railroad Co. transported a record tonnage of anthracite during June, the total amounting to 1,352,820 tons, an increase of 5615 tons over last June. In the tonnage of domestic sizes carried during the present coal year, April 1 to June 30, the Lehigh Valley carried 2,646,491 tons, approximately 350,000 tons more than was carried by any other road.

New York, N. Y.—Reports of exports of coal from the port of New York during May, 1918, show 4444 tons of anthracite at a value of $30,158; 8117 tons of bituminous valued at $58,118, and 2153 tons of coke valued at $30,868. During May of last year there were exported from this port 16,714 tons of anthracite valued at $133,327, 995 tons of bituminous valued at $7147, and 1900 tons of coke valued at $38,063.

Birmingham, Ala.—The Sloss-Sheffield Steel and Iron Co., will construct 120 Semet-Solvay byproduct ovens in the Birmingham district, with commensurate facilities for taking care of the byproducts, according to an announcement of J. W. McQueen, president of the company, the plant to cost something like $5,000,000. It is stated that the Federal Government has contracted to take the byproducts for use in the manufacture of munitions.

Louisville, Ky.—In compliance with the orders of Fuel Administration, under which southeastern Kentucky is to supply 350,000 tons of coal for shipment into the Lake district, the Harlan district operators will get out 90,000 tons monthly, which will be shipped to the Ore and Coal Exchange at Toledo, Ohio, which will ship ore in and coal out. The Elkhorn district and the Blue Gem district will also make heavy shipments of byproducts coal to the Lake district.

Lexington, Ky.—A number of rumors are floating through eastern Kentucky to the effect that the Louisville & Nashville Railroad Co. has plans for enlarging its terminals at McRoberts and Ravenna, Ky., and that it will double-track its main line between these points in order to facilitate handling shipments of coal from the Elkhorn territory. It is claimed that the work will start this year. The rumors are plausible, as many new mines have gone into the district and the tonnage is very heavy.

Columbus, Ohio—The announcement was made last week that C. F. Mayer, who has been executive secretary of the Ohio Fuel Administration since its start about a year ago, has resigned to take up work in his former position, with the traffic department of the New York Central Lines. He will be succeeded soon by James G. Young, traffic manager of the Columbus Chamber of Commerce, who has also been secretary of the Franklin County Fuel Committee. Mr. Young will hold both positions for the time being.

Newark, N. J.—Plans have been approved for the erection of ten coal pockets with a total capacity of 5000 tons of coal, at Overbrook Hospital, Newark, N. J. They are to be of reinforced concrete and will cost $60,000. The pockets will be connecting receptacles built along the railroad siding at the hospital. A motor conveyor equipment will be installed to permit the rapid moving of coal from any pocket in the event of danger from spontaneous combustion. The system of pockets will be protected by automatic registers that will detect and expose any danger of combustion.

Columbus, Ohio—All of the property of the Sunday Creek Coal Co., which includes leases, land held in fee simple, mining machinery and equipment, will be offered for sale at auction at the Franklin County Court House, Columbus, July 27. The order was issued by Judge Dillon of the Court of Common Pleas. An appraisement of the assets shows a valuation of $2,500,000. John H. Winder has been receiver for several years. John S. Jones, of Columbus, recently completed the purchase of all of the bonds, and the sale is the last step in a complete reorganization.

Toledo, Ohio—A considerable tonnage of coal is flowing from Ohio and West Virginia mines to the Northwest via the lakes, as is shown by the records of loading at the Toledo docks of the Hocking Valley and Toledo & Ohio Central railroads. During the week ending July 13 the Hocking Valley docks loaded 160,000 tons as compared with 157,000 tons the previous week, making a total of 1,495,000 tons for the season. During the same week the Toledo & Ohio Central docks loaded 45,000 tons compared with 61,000 tons the previous week, making a total of 745,000 for the season.

New York, N. Y.—There has been installed in the American Museum of Natural History an exhibit of peat, for the purpose of calling to the attention of the public that what is probably the world's most accessible peat supply is located in the Borough of Queens, between Maspeth and Middle Village. This bog of peat covers an area of about 100 acres, and the peat bed is from 10 to 15 ft. thick. The exhibit includes samples of dried natural peat, dried compressed peat, peat briquettes composed of ground peat mixed with coal dust, and unmixed peat briquettes.

Lexington, Ky.—One of the most important actions taken at a meeting of the Hazard Coal Association held recently was the appointment of a committee consisting of one member from the operating force of each concern, in order to stimulate production. This committee, when named completely, will consist of about 30 men. The plan is to start an educational campaign among the men, showing that they are as important in the winning of the war as the troops in the trenches. Production in the Hazard field has fallen off because of lack of labor and the fact that many miners do not work full time.

St. Louis, Mo.—The St. Louis Fuel Committee, with the approval of Wallace Crossley, Missouri Fuel Administrator, has appointed inspectors to examine coal delivered to consumers with respect to cleanness and weight. Administrator Crossley says that everything possible will be done to secure clean coal and in cases where inspectors have doubts about the weight it will be reweighed. H. G. Martin, assistant superintendent of the Ranken Trade School, has been placed in charge of the investigation of industrial concerns, which are to be reclassified with respect to their importance and efficiency for purposes of fuel conservation.

Fairmont, W. Va.—Charles F. Ice, chief inspector for the twelve and a half counties comprising the Fairmont district, as laid down by the Fuel Administration, has announced four deputy inspectors, effective at once, as follows: C. F. Posten, formerly local inspector of the Elkhorn Coal Corporation, of Fleming, Ky., who will be located at Morgantown. F. F. Robey, formerly tipple foreman and inspector of the Consolidation Coal Co. mine No. 51 at Shinnston, who will be located at Shinnston. U. N. Arnette, formerly general superintendent of the Antler Coal Co. of Fairmont, who will be located at Elkins. C. W. Ferguson, formerly superintendent of the Copen Creek Coal Co. at Bower, W. Va., who will be located at Buckhannon.

St. Louis, Mo.—The Interstate Commerce Commission hearing on the petition of the St. Louis Chamber of Commerce for abolition of the bridge arbitrary of 20c. a ton on coal came to an end at the Jefferson Hotel on the afternoon of July 12. The hearing of testimony occupied three weeks. At the conclusion of the testimony the attorneys for the Terminal Railroad Association and the roads composing it renewed their motion for the dismissal of the petition, on the ground that since it was filed the freight rates have been changed by order of President Wilson, effective June 25, and that therefore the petition does not apply to the present situation. The motion is to be argued before the commission in Washington. It is the belief that a strong case has been made and that St. Louis will get relief from the arbitrary unless technical objections prevail.

Columbus, Ohio—The Ohio Industrial Commission, which has charge of the Ohio Mining Department, has issued a partial statement showing that the coal mined in the Buckeye State for the year 1917 was 41,677,986 tons. This compares favorably with all previous years and is in access of the largest previous production by 5,392,500 tons. The production in Ohio in 1916 was 34,526,552 tons and in 1913, which was the banner year previous to last year, it was 36,285,468 tons. Belmont County as usual is the leader, with 11,156,626 tons. Athens County comes next, with 6,313,619 tons, closely followed by Jefferson County with 5,742,240 tons. Guernsey County produced 4,024,265 tons and Perry County 2,445,114 tons. Hocking County is credited with 2,311,858 tons and Meigs County with 1,267,144 tons. Harrison County had a production of 1,222,561 tons, while Tuscarawas County produced 1,788,800 tons.

MARKET DEPARTMENT

Weekly Review

Prohibition in Mining Districts Would Mean More Coal—Bituminous Production Falls Off on Account of Holiday—Anthracite Situation Serious—Hard Coal Miners Placed in Deferred Draft Classification—Need for Conservation Emphasized.

THE enactment of a law providing for prohibition in coal-mining states would undoubtedly result in the production of more coal. There are many faithful and industrious mine workers, but there are also many who are not applying themselves with the requisite diligence to their important work in these critical times. Weddings, christenings, funerals, feast days, fast days—all furnish opportunities for the pleasure-seeking miner who desires to lay off from work. True, the war spirit has brought about a much better performance on the part of a majority of our miners, but there are still too many whose hearts and hands have failed to respond to the pleas made on behalf of patriotism, democracy, and the country's extreme need for more fuel. The lure of the saloon has resulted in a bending of the elbow—not in the interests of a greater production of fuel, but in the consumption of more liquor.

During the week ended July 6 (the latest statistics available), the production of bituminous coal amounted to 10,259,000 net tons, a considerable falling off in output as compared with the preceding week. This was due to the observance of Independence Day. Contrary to expectations, however, the average production per working day during the week under review maintained the high average of the week before. Naturally, anthracite shipments also fell off in the same week, only 31,493 cars being forwarded, a decrease of 25 per cent. compared with the week preceding.

Owing to the shortage of labor, the production of anthracite is falling below the tonnage counted on by the industry when a distribution program was worked out for the coal year. With added man power, the existing equipment and breaker capacity could get out at least 25 per cent. more coal. Through the loss of 33,000 men in the hard coal regions since the war started, the nation has been deprived of the potential energy sufficient to produce 19,800,000 gross tons of anthracite coal a year.

To prevent a further drain of the already sadly depleted forces in the hard coal regions, Provost Marshal-General Crowder has ruled that all miners and mine workers in these mines be placed in deferred classification in the draft. It is gratifying, indeed, that these workers are to be left undisturbed in this highly essential industry, as their services in the mines are vital to the successful prosecution of the fight against the Hun.

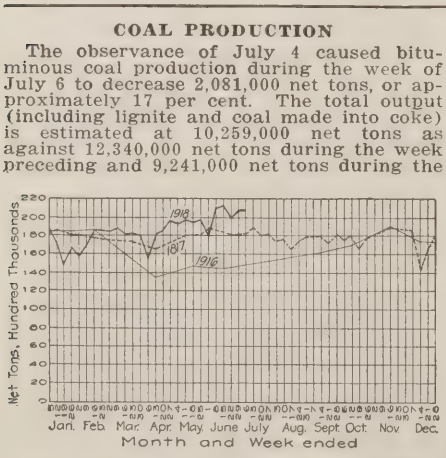
Following closely on the order curtailing the coal supply to brewers to 50 per cent. of their normal requirements, came the announcement that this industry is to receive no coal whatever. The incident which precipitated this order was a statement from the Railroad Administration that 200 additional carloads of coal could be handled through the New England gateways each day. New England's schedule is already far behind, but so closely has consumption followed after production that it was found necessary to divert supplies destined for non-war industries in order to fill the 200 additional cars each day.

While the coal available for use this winter will be intelligently distributed, and no recurrence of the confusion of last winter will take place, the requirements of the war industries are mounting so fast as to make it clear that there will not be enough coal for all. The Fuel Administration is indulging in no predictions as to what will happen to non-war industries, but every effort is being made to bring to the attention of the public the necessity of conserving fuel. Some are anticipating that 50 per cent. of the non-war industries will be forced to suspend before spring from lack of coal.

The work of supplying the domestic consumers with coal is going ahead more rapidly than had been anticipated, and there will be no inconvenience on the part of householders if they practice economy.

COAL PRODUCTION

The observance of July 4 caused bituminous coal production during the week of July 6 to decrease 2,081,000 net tons, or approximately 17 per cent. The total output (including lignite and coal made into coke) is estimated at 10,259,000 net tons as against 12,340,000 net tons during the week preceding and 9,241,000 net tons during the current week of 1917. The average production per working day (five-day week) is estimated at 2,052,000 net tons, slightly lower than the average production per working day during the week of June 29 of 2,057,000 net tons, and 11 per cent. greater than average production per working day during the week of July 6, 1917. Railroad shipments during the week decreased from all districts. Reports from the carriers show shipments from central Pennsylvania decreased 20 per cent.; from western Pennsylvania, 17 per cent.; from district including northeastern Kentucky, high-volatile of southwest Virginia and smokeless fields of West Virginia, 26 per cent.; from Ohio, 13 per cent.; from the district including Illinois, Indiana and western Kentucky, 20 per cent., and from the district including Indiana, Texas and the southwest states, 19 per cent.



Anthracite shipments during the week of July 6 decreased 10,148 carloads, or 25 per cent., the total movement amounting to 31,493 cars.

Beehive Coke—Production of beehive coke in the United States during the week ended July 6 is estimated at 579,000 net tons, a decrease compared with the week preceding of 25,000 net tons, or 4 per cent. The average production per working day is estimated at 97,000 net tons as against 101,000 net tons during the week ended June 29. The principal operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania report production of beehive coke during the week ended July 6 at 348,178 net tons, their plants being operated at 76.7 per cent. of their present capacity as against 77.4 per cent. during the week previous. Slightly greater losses due to insufficient yard labor were reported during the week.

Byproduct Coke—Operating conditions in the byproduct industry changed but slightly during the week ended July 6. The plants were operated at 90.3 per cent. of their present capacity. Out of total losses of 9.7 per cent., 0.8 per cent. was due to shortage of byproduct coal, 2.2 per cent. to labor shortage, 5.2 per cent. to repairs to plants, 0.1 per cent. to "no market" and 1.4 per cent. to all other causes. Improvement was reported during the week from plants in Illinois, Massachusetts, New Jersey and West Virginia. The operators in Illinois and Massachusetts attribute the increased production to repaired plants, in New Jersey to better supply of coal and repaired plants and in West Virginia to repaired plants and other causes. Kentucky was the lone state reporting a decrease in production. The capacity of the plants reporting increased 8163 net tons during the week of July 6, due to the operation of a new plant in Ohio by the American Steel and Wire Co. at Cleveland and the operation of a new plant in Pennsylvania by the Carnegie Steel Co. at Clairton.

CARLOADS OF COAL ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended: June 15	June 22	June 29	July 6
Bituminous shipments, 123 roads.	222,892	212,849	219,625*	180,200†
Anthracite shipments, 9 roads...	41,960	41,170	41,641	31,493

* Revised from last report. † Subject to revision.

BUSINESS OPINIONS

American Wool and Cotton Reporter—Manufacturers are hoping to see lower quotations for wool, and there is some basis for expecting these lower prices. Wool has undoubtedly been accumulating, and if there is to be some trade development which will prevent other countries than the Allies from obtaining a reasonable supply when the war

terminates, the pressure of raw material stock might easily reduce quotations. The radical decline in the price of cotton on the official announcement of the cotton crop prospect was expected. While many thought the decline would continue gradually, the price nevertheless advanced nearly enough to counteract the previous decline.

Bradstreets'—While governmental control looms large in the general situation, and though movements on civilian account tend to narrow at the more important centers, zones close to the surplus crop growing regions report remarkable demand for this stage of the year. Buying of essentials is heavy, and though price-fixing on a lower scale has deterred operations in cotton goods, purchasers are more anxious to put out orders than sellers are to accept them, the newness of price regulations having rendered commission men chary about taking on heavy commitments.

Dry Goods Economist—The chief interest in the textile world shifted from wool to cotton when the announcement was made that the price-fixing committee of the War Industries Board had reached a decision as to what was a fair price of certain grades of cotton goods. The Board tackled only print cloths, sheetings and ducks, leaving other classes of goods for future consideration. In the case of the three classes of weaves "proper" prices were named for goods of standard counts and weights, in the gray—that is, the unbleached and unfinished fabric in the condition in which it left the loom.

Marshall Field & Co.—Wholesale distribution of dry goods for the week is substantially ahead of shipments for the corresponding period a year ago. Road sales for immediate delivery show a good increase over those of last year, while sales for future delivery are slightly under the figure for 1917. Customers have visited the market in about the same numbers as in the same week a year ago. Collections are normal.

Atlantic Seaboard

BOSTON

Volume all-rail gradually mounting toward quota, but deficiency since April 1 not being made up. "Budget" figures have not yet been reached. New England interested in prohibition talk. Railroad reserves creeping up slowly. Hampton Roads situation serious. Cargoes had to be found last week for twelve steamers waiting at the piers. Two hundred cars daily ordered to tidewater from western shipments in high volatile districts. Announcement that Pocahontas and New River contracts cannot be filled is believed soon to be forthcoming. Shipping begins to accumulate at loading ports. Occasionally necessary to divert steamers en route to Baltimore. Dr. Garfield's statement after visiting Hampton Roads causes comment. New England Fuel Administration enlarges organization to prepare for months ahead. Anthracite drops behind the June figures. All-rail movement fair, and demand keeps up for steam sizes.

Bituminous—To the first of the week the movement of bituminous all-rail had increased to such extent over the May average that the trade was much encouraged. As between different requirements, however, shipments are uneven and the situation calls for the closest kind of policing and supervision. "Jobbers," especially those of the mushroom character who have sprung up under "regulation," are having heavy consignments come through; but in cases where deliveries are in their own names without disclosing the ultimate consumer or distributor, the New England Fuel Administration is diverting the coal either to retailers or to industries who are on Preference List No. 1. A lot of this coal is started for "retail dealers" who never retailed before, and there are plenty of instances where the definition "physically handled" is being used in a way not to be recognized by those who framed it. Operators in considerable number are apparently shipping freely on orders of this kind and passing over the patrons they have had for years. Such cases are a hard test of one's faith in regulation, at least as now practiced.

The fact remains, however, that the volume of coal all-rail has much improved. Average daily receipts at the five gateways for the first 12 days in July were 616 cars of commercial bituminous. This is on a basis of approximately 4300 cars per week from central Pennsylvania, northwestern Pennsylvania, and the Westmoreland districts together. This is somewhat over the summer weekly quota for Central Pennsylvania alone, but is considerably short even for the "budget" the three districts are supposed to furnish all-rail

Washington has made a new program with regard to New England supply. Most of the changes are in the sources for railroad fuel, the latter being decreased from central Pennsylvania and increased from Westmoreland and from Fairmont. The result is a diminished burden upon the Altoona district for railroad supply, but it is doubtful if the volume of commercial coal for New England will be at all increased thereby. The great anxiety of operators over possible congestion at the New England gateways because of increased movement is not borne out by the actual situation. The New England roads are handling comfortably all that is delivered to them and the volume can be increased a lot more before cars will be delayed at the junction points or elsewhere.

The railroads are building up their reserve stocks only with great difficulty. Receipts of railway fuel all-rail still average considerably less than 150 cars daily from commercial consumers. After a fortnight of strenuous effort the Boston & Maine has increased its reserve only three days' supply, and it still stands at a point some 300,000 tons less than a year ago. The other railroads are only in less urgent position, and when the New Haven gets its storage depots in shape to take on coal a big movement will be needed in that direction. Cargoes as they arrive are being requisitioned more or less regularly for two of the railroads, and there is every prospect this practice will continue.

The most acute situation just now, however, is at Hampton Roads. Boats are arriving from day to day without coal being available. A week ago there were 49 steamers and barges aggregating 173,000 tons waiting at the piers, against a total available coal tonnage of 98,000. This week the number of vessels has increased to 60. Through strenuous representations to Washington Mr. Storrow was able to get coal for twelve steamers that were otherwise unprovided for. Three of these had to be intercepted on their way to Baltimore because congestion was also beginning to threaten at that point.

As an emergency measure 200 cars daily were ordered out of western shipments from the Kanawha and other high volatile sections along the Chesapeake & Ohio and again, late last week, a general embargo was put into effect on all west-bound coal. The increase in high volatile should clearly be made permanent, for this grade is in extremely short supply for all purposes. If the Westmoreland and other districts shipping to this territory all-rail are instructed to show preference in low sulphur coals for gas-producing requirements, it will be all the more necessary to build up the volume of coal from Kanawha and other high volatile districts accessible to Hampton Roads in order to relieve the needs of New England railroads.

Anthracite—For the first 12 days in June the average receipt of domestic sizes all-rail were 502 cars daily. This is a good showing, but it is not yet up to the June mark. Steam sizes are still coming through in good volume, the average for the mine period standing at 167 cars daily.

Retail dealers who have neglected making reports of receipts and stock on hand have been systematically notified, usually by telegraph, that their supplies will be shut off unless returns are made promptly. It should be said in defence of New England, in view of statements handed out to the press, that the number of delinquents is misleading. For instance, the Fuel Administration has names of 1200 "dealers" in Massachusetts alone who at one time or another have received anthracite in quantities from a carload up. Some of these were never in the retail coal business and others withdrew years ago. Yet they get telegrams from Washington! The list should be edited by someone in Massachusetts.

There are signs of slowing up on deliveries of steam sizes, but the demand is still strong. Plants of all kinds are accumulating buckwheats and nut in anticipation of shortage later on.

NEW YORK

Dumpings at the New York tidewater piers fall behind and the demand for coal continues. Discontinuance of shipments to three states may help local situation shortly. Demand for state fuel administrator keeps up. Labor shortage hinders bituminous production.

Anthracite—The smallness of stocks and the continued urgency for deliveries stand out as the prominent features of the situation. Dumpings at the New York tidewater docks were about the same as the previous week but local deliveries are far short of requirements. On the other hand most dealers admit having delivered more of their winter orders than they have under normal conditions. In some localities near New York dealers claim to be a month ahead of the season.

There is little difference in the amount of domestic sizes including Pea coal and Buckwheat No. 1 available. The latter is practically a domestic coal now.

Some shippers look for an improvement in supplies as a result of the orders issued by the anthracite committee of the United States Fuel Administration prohibiting shipments of the domestic sizes including Pea coal to 29 communities in Delaware, 72 communities in Maryland and 75 communities in Virginia. The committee has also issued a warning to producers and distributors who have already made shipments to a number of small towns and communities in excess of their whole 1918 obligation based on the 1916-1917 tonnage plus increased percentages. Suspension of such shipments is ordered and action must be taken to prevent a repetition.

The committee also says there are some instances where producers and distributors have actually shipped coal this year to communities into which they did not ship any at all during 1916-1917. This has also been ordered to stop, otherwise drastic action will be taken. Complaint has been received that insufficient tonnage is being furnished for domestic consumption to various towns and cities in New Jersey and Pennsylvania and the committee directs that regular shippers to these points arrange at once to forward the normal amount of tonnage plus the increased percentage.

The demand for a successor to Albert H. Wiggin, who resigned as state fuel administrator, is likely to bear fruit shortly, according to a letter received here a few days ago. The trade is fearful that the delay will cause a greater shortage here than would have resulted had the state been properly represented.

Consumers in Kings County who placed their orders early in April and who have not already received their coal will be compelled to pay for it at the price at the time of delivery, according to a decision of the local fuel administrator.

Shippers believe that the situation is going to be considerably better in the fall and winter, due to the heavy storing now going on in consumers' bins.

There is a heavy call for rice and barley with quotations for individual coal ranging from $3.10 to $3.25 at the mines and for individual barley ranging from $2.10 to $2.50 at the mines.

For the seven days ended July 15 there were 6870 cars of anthracite dumped at the local tidewater piers, a decrease of 81 cars from the number dumped the previous week. For the first half of July there have been dumped at the docks 14,025 cars of anthracite as compared with 14,648 cars dumped the first 15 days of June, a decrease of 623 cars.

Current quotations, per gross tons, f.o.b., tidewater, at the lower ports are as follows:

	Circular	Individual		Circular	Individual
Broken	$6.75	$7.50	Pea	$5.20	$5.95
Egg	6.35	7.10	Buck	5.10	5.90
Stove	6.60	7.35	Rice	4.65	5.10
Chestnut	6.70	7.45	Barley	4.15	4.30
			Boiler	4.60	

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates. Prices for buckwheat, rice, barley and boiler are not fixed by the Government.

Bituminous—Lack of labor continues to be the predominating feature in the situation, while the shortage of supplies continues to be such that as the season is rapidly passing building managers are becoming worried as to the prospects for next winter's fuel.

Conditions here show a slight change for the better. Some shippers report having been offered a few cargoes at alongside quotations, which were said to include the additional 35c. commission allowed jobbers. There was a decided scarcity of free coals, however. Regular customers, as a rule, received medium supplies and some are reported as having fairly good-sized stocks on hand.

The demand keeps heavy due to the expansion of war industries and the desires of manufacturers to prepare themselves for future consumption. Producers are ready to do their part in eliminating as much as possible the inevitable shortage which the country will face next winter, but there is a lack of labor which can hardly be overcome.

The demand that shipments to New England from this harbor shall be increased rather than diminished, notwithstanding the local demand is likely to continue since it is reported that the prospects of getting

more coal into the East from the Southern ports is less encouraging.

Production figures from the central Pennsylvania fields for the week ending June 29 show 1,142,420 tons of coal mined, the loss by reason of car shortage is estimated at 46,806 tons.

The dumpings at the local docks for the week ended July 15 were 6913 cars as compared with 7089 cars the previous week, a decrease of 176 cars. For the first 15 days of the month there were 14,202 cars of bituminous coal dumped here, as against 15,315 cars dumped during the first 15 days of June, a decrease of 1113 cars.

Current quotations, based on Government prices at the mines, net ton, f.o.b. tidewater, at the lower ports, are as follows:

	Mine Gross	F. o. b. N. Y. Gross
Central Pennsylvania:		
Mine-run, prepared or slack	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of-mine	3.08	5.23
Prepared	3.36	5.51
Slack	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite shipments under quota. Dealers discouraged and believe relief far in distance. Domestic production decreasing. Retailers called on for more statistics. Producers taken to task for irregularities in shipping. Domestic buckwheat demand growing. Plants equipping for smaller steam sizes. Bituminous shows improvement. Good shipments arriving. Car supply good. Labor fair. Wagon-mine ruling not effective yet.

Anthracite—Shipments to this city have not improved, and there continues to be a slowly increasing pressure from the consumers for their coal. There is more coal stored away in the cellars of consumers than ever before, but when it is considered that last year established a record both in production and buying on the part of the public, and that there was a shortage during the winter, the seriousness of the present situation is realized. Production of fresh-mined domestic sizes is slowly dropping behind from month to month, and that explains the activity of the Fuel Administration in depriving manufacturing plants of buckwheat. The administration has limited the consumption area for anthracite and in addition has added two more counties of this state to the embargo list. This week a list was issued of about 25 counties in Virginia to which all shipments of anthracite are embargoed.

Retailers continue their efforts to get more coal, but without avail. Many of them seem resigned to the idea that heavier shipments will not be received for some weeks to come. In the meanwhile they continue to maintain their delivery organizations as fully as possible. One frequently hears of dealers who claim to be doing business at a loss on account of the lack of coal.

This week dealers were called upon for information concerning their business. They all received letters from the General Director of Distribution at Washington advising them that coal for domestic use is to receive preference in shipment and requesting weekly reports on a form provided by the Government. Information is desired as to the deliveries for domestic use, as well as to other dealers and to industrial plants. They must also show the number of tons on hand, their receipts and the coal en route.

The retail men are asked to report the aggregate annual tonnage handled by each, showing anthracite and bituminous separately; the aggregate amount in dollars of their 1917 business; the approximate aggregate amount invested by each in the coal business and the approximate number of men employed.

It is now quite a task to find a dealer who is willing to accept any additional business, and one large concern in the city, that had ceased taking orders several weeks ago, has unfilled orders for domestic coal alone amounting to over 100,000 tons.

Judging from a letter sent out this week to the various "producers and distributors" by the secretary of the anthracite committee of the United States Fuel Administration, all of them have not been governed entirely by the rules laid down by that body. Attention is called to the fact that up to the present time shipments in excess of the whole 1918 obligations, based on the 1916-17 tonnage, plus increased percentages, have already been made to a number of small towns and communities. Immediate action is ordered to suspend shipments to such points and to prevent it in any other direction. The letter states there are instances recorded where the producers and distributors have consigned coal this year to communities into which they did not ship any coal during 1916-17. They are advised that such practices must stop at once unless proper authority is received in advance. The committee threatens "drastic action" against delinquents.

Another matter likely to upset tonnage calculations is the fact that the army cantonments have not yet begun to take their full requirements of fuel. When these shipments begin in earnest there cannot be the least doubt, as last year, that everything will be put aside to take care of this tonnage, which is likely to be even heavier than last year.

There continues to be a moderately increasing growth of the domestic buckwheat trade. As indicated recently, the really foresighted dealers are taking all they can procure and this number is being occasionally added to. We recently learned of a dealer who never heretofore handled this coal but was surprised to find that two cars had been shipped to him. He raised no question whatever and dumped the coal.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.25	Buckwheat	$3.40	$4.45
Egg	4.50	5.85	Rice	2.90	3.80
Stove	4.75	6.10	Boiler	2.70	3.70
Nut	4.85	6.20	Barley	2.40	3.30
Pea	3.45	4.70	Culm	1.25	2.15

Bituminous—This week the soft coal trade has a more favorable aspect. Many of the mines, in fact most of them, report they have received practically as many empties as they can use. It is thought that this condition is partially due to the congestion of empties on account of the protracted Fourth of July holiday.

Good shipments have come into this territory recently and some plants have stocks much heavier than they have ever had at this time of the year. As a matter of fact the essential plants are in good condition as to the future, with coal piled high. These piles in many instances are thicker than they actually should be when the liability to spontaneous firing is considered. The heads of plants realize this and they are simply taking a chance, claiming that they have made preparations to handle such a situation should it arise.

While there has been much talk as to withdrawing all cars from wagon mines, yet this order does not seem to have been generally applied. A tour of the region this week discloses that many of these small operators continue to haul coal to the railroads for loading. There are also some murmurs of dissatisfaction as to this ruling, not only from the owners of the small operations but from the local consumers who are expected to purchase this coal. As the majority of these operations produce an inferior grade, the consumers tributary thereto do not feel that they should be compelled to take it, but want to be allowed to procure their supply as they have heretofore.

BALTIMORE

Increasing shortage is the cry from both ends of the coal trade here. Bituminous receipts continue light, and much poor coal keeps coming in. Anthracite men are genuinely worried, as each month shows a deficiency, and there is now a threat to cut the state's allotment.

Bituminous—There can no longer be a doubt but that soft coal distributors here, and this includes many of the Government fuel administrative force, are feeling genuine alarm over the fall and winter outlook. Instead of the shipments arriving during June and early July coming in such amount as to enable some stocking up for the winter, the tonnage has been scarcely able to meet urgent demands. Indeed, a number of industries have eaten into their scanty stocks in such fashion as to force an appeal to the state fuel administrator for some sort of preferential aid. This aid for the most part has consisted merely in sending the name to Mr. Brydon, the district representative, who now has a long list of requests beyond any apparent possibility of early shipment.

Not only are the receipts here light, but there continues a flow of bad coal that is discouraging. Following a complaint of ice manufacturers that they were frequently unable to get more than 60 per cent. efficiency out of the coal sent them, several other industrial groups have complained.

Even the cement makers, on a preferential shipment list, have not been without their troubles over poor grade coal recently. The 50c. per ton reduction in price plan of the Government to encourage clean coal does not so far seem to be working well.

A considerable tonnage is being received here for Government shipping account, and this movement has led some to confuse the general supply situation with it. Thus one Government official announced that the mines were not getting out tonnage because of poor rail movement, and another said that there was no trouble with the tonnage movement to this section, as it was up to normal. The real situation is that coal for ordinary industrial use is extremely scarce.

Anthracite—There can be no element of doubt about the anxiety of the anthracite handlers here. The receipts are far below the tonnage allotment announced for Maryland, despite the fact that a considerable amount of the shipments are also being diverted to war industries and other parts of the state than Baltimore. The spring and summer months have piled up such a deficiency that there is stronger talk of cutting down the two-thirds supply basis on orders until a betterment is in sight, in order that all may get at least a little coal.

The threat that is heard from the anthracite committee that the state's allotment may have to be cut is causing great anxiety, as the situation is bad enough as it is. A number of country clubs near Baltimore will be hit by the order that they cannot burn coal this winter. The wood fire seems to be the only solution, and for some of the clubs that will not be a happy one, as they are not equipped for adequate heating in that manner. Likewise a number of extensive private greenhouses are cut out from burning hard coal, and the plan to heat but half by bituminous will cause severe floral losses hereabouts. Wood-burning may come to the relief of some who can get wood without having it shipped by rail, which method will be banned as far as can be learned here.

Lake Markets

PITTSBURGH

No coal for stocking. Heavy extra demand for Lake shipments. Market narrow.

R. W. D. Gardiner, coal distributor for the Pittsburgh district, states positively that there must be no stocking of coal by manufacturing consumers or retail dealers prior to Oct. 15. This determination was reached as a result of the demand of the national Fuel Administration late last week that the Pittsburgh district increase its lake shipments as much as possible, over the 1,300,000 tons originally allotted for July, following 900,000 tons assigned for June. The Navy demands for smokeless coal will fall so heavily upon West Virginia and Kentucky that those districts may not be able to contribute any of their quotas to the Lake trade and a heavy burden accordingly falls upon the Pittsburgh district and Pittsburgh No. 8, in Ohio. The Pittsburgh district's production in July is expected to be 4,500,000 tons or a trifle over, and more than one-third of the output must go into the Lake trade if there are to be heavier Lake shipments than the 1,300,000 tons orginally set for the month.

Mr. Gardiner points out that the Lake coal shipping districts are in different position from other districts, in that the heaviest demands upon them occur in the summer, and stocking is therefore out of the question. If the plan succeeds, to have all Lake coal away from mine by Oct. 15, there will be a period in which large stocks can be accumulated, equivalent to the amount released. Meanwhile anyone who attempts to stock coal is likely to have his supply shut off and those who have stocks may be required to use them.

The local coal market has been narrow and is likely now to be much narrower. The market remains quotable at the set limits: Slack, $2.10; mine-run, $2.35; screened, $2.60, per net ton at mine, Pittsburgh district, brokers being permitted to charge 15c. brokerage to consumers.

BUFFALO

Trying to get more anthracite locally. Movement by lake still light. Bituminous as hard to get as ever. Claims that the miners are idle.

Bituminous—The situation has not changed materially. Jobbers are making every possible effort to get more coal to handle, but with no further success. The mines are not favoring them, as is always the case when coal is in greater demand than supply. As this state of things is likely to continue indefinitely the outlook is not pleasing. Some of the jobbers report that their business is improving but as a rule they are still waiting for business to come their way. It is the idea of the trade in general that the Government does not think the wholesaler is needed in business.

The prices of bituminous, though supposed to be so rigidly regulated, are not as definite as they should be in the minds of shippers. They mostly have to figure considerably before making a quotation. Following are the latest figures: Thin vein Alleghany Valley, $4.65; Pittsburgh lump, $4.45; Pittsburgh mine-run and slack, $4.20; cannel, $6.15; smithing, $5.85, all per net ton, f.o.b. Buffalo, with jobber's profit added.

There is much figuring out of supply and needs of coal here by the fuel authorities, both in bituminous and anthracite, with the result, commonly, that some new consumer is listed as unnecessary and likely to be cut off soon. The breweries, for instance, are now down to half supply, but it is expected that in a few days they will be shut off entirely.

Anthracite—The local fuel authorities are looking for an allotment to this territory, after which an effort will be made to obtain more coal. As it is the city trestles are idle most of the time, sometimes not running more than two or three days a week. This does not mean that the midsummer movement is smaller than it used to be, but the demand is so urgent that if the coal could be obtained it would be brought in so as to stop the complaining.

The movement to Canada is light at present and the loading of lake vessels has not of late kept up with that of May and June. The demand for this coal seems to be too heavy in the direction of the war camps and for export to afford a full supply this way. The amount loaded for the week was 88,470 net tons, when an average of more than 100,000 tons has been the rule during the summer months.

The distribution was: 33,400 tons to Duluth and Superior, 17,570 tons to Chicago, 17,400 tons to Milwaukee, 8200 tons to Sheboygan, 5900 tons to Manitowoc and 5600 tons to Fort William.

Freight rates continue quiet at 60 to 65 cents to Chicago, 50 cents to Sheboygan, and Manitowoc, 55 cents to Milwaukee and 48 cents to Duluth and Fort William.

CLEVELAND

Car supply at southern Ohio mines has improved so greatly in the past week that shipments of bituminous are coming forward at a faster rate than at any time so far this season. The lake movement has been accelerated and, though many freighters are going up light, the Fuel Administration at Washington is expecting July to be a 5,000,000-ton month.

Bituminous—The middle of July sees bituminous shipments the best of the year to date. Car supply in the Pittsburgh seam district of southern Ohio, where Cleveland and northern Ohio get their supplies under the zone system, is reported to have been practically 100 per cent. on all lines in the past week. In fact, operators declare that at some mines there have been days when more cars were set than could be loaded. Inasmuch as shipments up the Great Lakes still are not all that could be desired, it is believed more coal than ever is going now into stock piles and cellars. Contracting continues at a low ebb; in fact, some operators say they have not made one for 90 days. Inquiry for harvesting coal—quite a factor in northern Ohio and Indiana with some No. 8 district operators at this time of the year—is coming in. More coal is to be seen on sidings and main lines between Cleveland and the mines than in over a year. The abolition of preferential car supply is working out excellently. Little has been heard here for the past two weeks of the "buy your coal early" movement. Latest statistics available at the office of the Pittsburgh Vein Operators' Association, for the week ended July 7, place shipments to the Great Lakes at 2105 cars; railroad fuel, 1151; Ohio, 1183; Michigan and Indiana, 138; and Canada, 54. These shipments were made as follows: Over Baltimore & Ohio, 2058; Pennsylvania lines, 1244; Wheeling & Lake Erie, 1228, and New York Central, 101.

Anthracite—Under the zoning system practically the only anthracite seen here is a few carloads a month, and no market for it exists here.

Lake Trade—One big shipper of bituminous up the Great Lakes who has just returned from Washington declares that the Fuel Administration is expecting July to break all records. Officials will be disappointed if shipments do not reach 5,000,000 tons, he declares, though July's quota is 4,500,000. The record month for the Great Lakes was September, 1917, when 4,900,000 tons of bituminous went forward. More coal cargoes have been available in the past week, but many freighters have gone up light. Iron ore is coming down at a record clip, and some cars that might be in the lake coal trade are engaged in expediting iron ore shipments off the docks to the furnaces. An extra effort is being made at present to get the Northwest's coal up as early as possible, since the ore season will be finished early in the Food Administration wants as many carriers as possible to go up light in the fall in order to speed the down movement of grain. It is figured that every lake cargo of grain releases so many freight cars that can be otherwise employed, and this indirectly will have its effect upon the coal industry. In the week ended July 6, which was a 5-day one, 747,535 tons of coal were dumped into freighters. In the week ended July 13, with the return for the final day estimated, the number of cars dumped totals 19,900 cars, which is better than 900,000 tons.

DETROIT

Neither steam nor domestic coal is reaching Detroit in satisfactory volume. No improvement in anthracite. Lake shipments are below schedule.

Bituminous—Complaint is still coming from jobbers and wholesalers that the movement of coal into the local market is much lighter than Detroit should be receiving to meet current requirements of consumers of steam and domestic stock, and provide adequately for reserves. While the supply reaching the city seems to provide fairly well for needs of industrial plants, little remains for storage. Most of the stock is mine-run. Slack and prepared sizes are received in much less quantity, and jobbers say there is considerable deficiency in supply of domestic bituminous.

State and county fuel administrators, and the dealers also, are striving to stimulate early buying by householders, in the effort to provide as far as possible for needs of next winter while transportation conditions are favorable; but the diminished volume of receipts is proving a troublesome handicap to the success of the campaign.

Anthracite—Uncertainty continues a prominent factor of the anthracite trade. Shipments are so small that retailers have made almost no progress in distribution. The gross margin allowable to dealers has been fixed at $2.50 a ton. Though the amount is unsatisfactory and is called inadequate, an appeal to the dealers on the ground of patriotic duty, which was made by James Couzens, chairman of the Wayne County fuel committee, influenced its acceptance. Regulations for distribution of anthracite were issued to the dealers by the state fuel administrator.

Household consumers using base burners are allowed their requirements up to six tons. Stove and chestnut sizes are to be reserved especially for users of base burners. Consumers having hot-air furnaces are to have one-half their normal supply of anthracite and are required to purchase one ton of bituminous for each ton of anthracite. Consumers operating steam or hot-water heating plants must provide themselves with fuel other than anthracite, as they are allowed none. This regulation has evoked a storm of protest. Violation of the regulations by dealer or consumer renders him liable to a fine of $5000 or two years in jail or both.

Lake Trade—Expectations of vesselmen and shippers are not being realized in lake shipments. Loading is short of schedule, which requires about 1,200,000 tons a week.

COLUMBUS

A good demand for all grades of coal characterizes the coal trade in central Ohio territory. Domestic buying is more active, and the lake movement is heavy.

The coal trade has developed a strong buying demand for all grades of coal—domestic, steam and lake. The lull in the domestic business is gradually passing, and retailers are now in the market for more tonnage. Steam and lake trade are both strong, and on the whole the tone of the industry is generally satisfactory. Production has been increasing under the influence of a better car supply.

Domestic demand is one of the strongest points in the market. Dealers are having a better run of business as consumers have been placing orders rapidly. Orders are both for immediate and deferred delivery. Retail stocks are low, as dealers have been unable to accumulate much surplus in the face of the heavy trade. The Franklin County Fuel Committee is supervising deliveries with a view of preventing hoarding in case such a thing should be attempted. Retail prices are firm at the higher levels announced several weeks ago. Still higher prices are in prospect when the new freight schedules are thoroughly worked out. Pocahontas is quite scarce in the local market. There is a considerable tonnage of West Virginia splint and New River arriving. The main fuel in the local market is Hocking, which is arriving in large quantities.

The steam trade is active also, as many of the smaller consumers are now in the market in an effort to get some surplus stock. This desire has not been gratified, as many difficulties are encountered. The demands for lake shipment are restricting steam tonnages in all sections. Schools have received the greater part of their fuel requirements. Public service concerns are looking around for a larger tonnage and state and public institutions are also in the market. The demand for threshing coal was extra heavy and taken care of by orders from the State Fuel Administration.

Production has been increased slightly because of a better car supply. This was especially noticeable in the Hocking Valley and Cambridge fields. Eastern Ohio still reports a car shortage, which coupled with labor shortage has been restricting production. In fact there is a growing labor shortage in every section of Ohio. This is due largely to the draft, which has taken hundreds of miners.

The lake trade is still active, and every effort is being made to rush a large tonnage to the head of the lakes. Reports show that there is a shortage from estimates made earlier in the season. The boat movement is active, as the ore trade is moving along without friction.

CINCINNATI

Market continues strong, with demand active and supply good. Car situation was not so good last week, but is expected to improve.

The steady demand for all varieties of fuel, from both industrial and domestic consumers, continues to take care of the large production being turned out and shipped from the mines in this section, and there is no surplus of supply over demand, making the situation ideal, as it has been for some time, from the standpoint of the trade. Domestic consumers, by placing in their basements practically their entire winter's supply of coal are making arrangements by which they will be better taken care of than ever before, and indications are that the entire current production of the fall and winter season, with the exception of the relatively small quantity required for emergency use by the poorer classes, will be available to meet the needs of the manufacturers and public utilities, who cannot possibly place in reserve storage enough coal to meet all of their requirements. Except in the New River district, where the Government's needs for the navy are being met, the car supply was not so good last week as usual, but this is expected to be remedied at once with increasing deliveries of new cars. Labor conditions are excellent at present, both as to the supply of men and their spirit; but operators are anticipating with gloom the effect of coming drafts upon their forces, inasmuch as the Government has not yet seen the necessity of exempting coal miners of all ages from military service. This measure has been urged as vital, and it is still hoped that it may be adopted.

LOUISVILLE

Demand for both steam and domestic running heavy, with dealers unable to supply domestic promptly. Production showing improvement in both fields. Car supply satisfactory, and considerable improvement in labor conditions.

The most important progress of several months has been made in the eastern Kentucky field during the past few days. It is reported that considerable labor which has been employed on farms, or working small holdings, has drifted back to the mines, resulting in a much better supply of labor and larger production. The car supply in June was much better than during any recent month, and there has been a good increase in production all around. The situation in western Kentucky has also shown some improvement, due to better car and labor supplies.

Kentucky and the Southern States dealers are becoming concerned over the future supply, as not enough coal is being received to take care of stocking orders, and no surplus stocks laid up. The situation is not very bright, and no improvement is in sight until the large shipments of coal now going to the Lake districts are completed and coal is again running to the small dealers.

The supply of eastern Kentucky coal reaching the Louisville market is now very light, and indications are that little of this grade will reach here until late in the year. Some Hazard coal, which is not a byproduct coal, is being received, and this with the western Kentucky grade is about the only coal that is being sold to any extent. Orders in a retail way are coming freely, and there is also a good demand for steam coal. No surplus stocks are in the yards, and it is now taking retailers ten days to three weeks to make deliveries on domestic stocking orders. On orders placed before the rate advance became effective the consumer is being forced to pay the increase, except where stipulations were made in advance.

BIRMINGHAM

Demand for domestic and steam coal shows no abatement. Supply and production about even with that of past weeks. Improvement in labor supply expected as result of coal mines being placed on priority list in the distribution of labor. Car shortage reported in a few instances.

Efforts of mine operators and fuel administration officials are now centered as never before on measures for increasing the production of coal in the Alabama field. The scarcity of labor and delay incident to delivery of material and equipment used in the industry are now the only serious factors crippling the production. A better labor supply is expected within the next week or two by the transfer of men from non-essential industries to the coal mines and other industries placed on the priority list for man power.

The requirements for steam coal are heavy, and much in excess of the supply under existing operating conditions. Railroads have fairly well provided for their fuel for the coming year, though of course the anticipated requirements have not been fully taken care of.

A steady and persistent buying movement is being maintained in domestic channels—both wholesale and retail—each month showing a substantial gain in the tonnage of storage coal. As one distributor expressed it, consumers are as much perturbed over securing their coal supply as if it had been announced that the domestic mines would close down about Sept. 1. Stocks in local yards are not accumulating, deliveries about offsetting receipts.

Coke

CONNELLSVILLE

Supplies practically adequate. Efforts to secure better labor performance. Narrow market.

Coke supplies at blast furnaces continue practically adequate but there is rarely any surplus to put into stock. Furnaces which had accumulated some stocks had no occasion to draw upon them after Independence Day, as production did not fall off at that time. Operators had made every effort to encourage men not to celebrate in the usual manner and their efforts were fairly successful. The campaign to educate the men to doing a full week's work every week, as a war service, has only begun and while hopes are entertained that this activity will be of some benefit it is the common opinion that absolute prohibition is the only really adequate remedy. It is maintained that even if prohibition should cause a considerable proportion of the men to leave the region there would still be an increase in the total amount of work done.

Good progress is being made in byproduct coke, plants recently put in partial operation having put on additional ovens while other plants are nearing completion. From May 1 to date the Geological Survey reports show an addition of 20,000 tons a week to rated capacity of the country, practically all of this being in Pennsylvania and Ohio.

The coke market is without incident. A fair volume of foundry coke is coming into the market, some of it being sold through brokers with a small commission paid by the operator. There are scarcely any offerings of furnace coke but furnace representatives are picking up odd lots occasionally. The market remains quotable at the set limits, $6 for furnace, $7 for foundry, 72-hour selected, and $7.30 for crushed, over 1-in., per net ton at ovens. Coke screenings from old dumps bring up to $6.50, but coke breeze has little sale, particularly as the byproduct operations offer a cleaner material.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended July 6 at 349,795 tons, a decrease of 2695 tons.

Buffalo—The demand for all grades of coke continues good and if the movement of iron ore by lake (325,507 gross tons for the week), continues the consumption of coke will have to increase. The plan is apparently to make a record, for the vessels are unloaded much more promptly than they sometimes are. Coke is hard to get and none worth mentioning is put on the general market, the furnaces buying of the ovens direct. There is complaint of lack of both cars and men, but the output is heavy. Fuel coke is in large demand, with amount to be obtained small.

Birmingham—Trade is quite active and there is a steady demand for much more than the available tonnage of either furnace or foundry coke. According to the statement of a prominent official of a foundry coke producing company, unless there is a natural increase in the output of this grade of coke in the near future industries in this district will be compelled to secure from 3000 to 4000 tons per month from foreign producers. The output has been reduced in the past few weeks by an increased tonnage of 48-hour coke for furnace consumption by one of the larger companies, and labor shortage and irregularity are contributing factors in further crippling the production. A new selling price has been announced by the Fuel Administrator for New Castle 72-hour selected foundry of $8.25 per net ton ovens. Other producers contemplate seeking an increase in price schedules as soon as data can be compiled from June cost sheets.

Middle Western

MILWAUKEE

Dealers swamped with orders for anthracite upon which no scale of prices has been fixed. Margin of profit for inland dealers is cut down.

Consumers of anthracite coal in Milwaukee are still in the dark as to what they will be called upon to pay when their bills for fuel are rendered. It is said this condition will remain until the Fuel Administration establishes the margin of profit from vessel to consumer, which is being determined by experts. Inland dealers have been allowed a maximum profit of $1.35 per ton on anthracite, $1.45 on household bituminous from lake sources and $1.70 upon soft coal from Illinois and Indiana. The latter margin also applies to coke. This is a decrease from $2.25 per ton, or the margin originally set by State Fuel Administrator Fitzgerald. An extra charge for delivery is subject to the approval of county administration heads.

Milwaukee coal dealers are swamped with orders. The leading dock company has closed its retail order department, as orders now on hand will keep its teams busy until the middle of December. The allotment of anthracite to small dealers has been cut down to such an extent that it will take far into the winter before they can supply their customers.

The labor situation is such that coal dealers are seeking the privilege of dumping coal in the streets at points of delivery, leaving the problem of putting it into bins to consumers. Coal dealers place the responsibility for delayed deliveries upon the fuel administration, because of its failure to fix a scale of prices.

Effort is being directed in Milwaukee and other points in the state to provide means for financing consumers who are unable to place their coal orders at the present time. A Beloit, Wis., manufacturing firm is assuming the coal bills of its employees and reimbursing itself in installments from the payroll.

By awarding contracts for 42,000 tons of bituminous coal for state institutions early in June, or before freight rates were advanced, the State Board of Control effected a saving of $7500 on 15,000 tons.

Cargo receipts by lake since last week's report aggregate 14,919 tons of hard and 161,050 tons of soft coal, making the total recepits of hard coal since the opening of navigation 172,591 tons, and of soft coal 1,094,357 tons.

The Milwaukee-Western Fuel Co.'s Sixteenth Street dock, on the Menomonee River, which has been in course of enlargement and reëquipment for a year past, is now being stocked with coal.

ST. LOUIS

Market shows growing strength on Standard, contrary to expectations. Carterville scarce, and other grades likewise. Car shortage develops seriously on some lines and transportation lags. Railroads begin to confiscate coal.

Contrary to all expectations, the local Standard market has taken an upward turn. While there is still an overproduction of coal in the Standard field to some extent, the market is stronger and prices are better. The steam sizes also seem to be improving. This is perhaps the result of more activity in railroad buying in the Standard filed. In a general way local conditions show improvement. The domestic trade is still dragging now as far as new orders are concerned, but there is the usual demand that cannot be taken care of for Carterville coal.

The high class trade in the city that has in the past been using anthracite and smokeless coals has not as yet begun to place its orders, with few exceptions.

Car supply in the Standard field is not all that it could be, but transportation shows considerable improvement in the last week, and this may account for better car supply in the next ten days to two weeks.

With a heavier tonnage of Standard for the railroads the market is going to improve, and this will have a tendency to better conditions by reason that there will not be a surplus of steam sizes, which has been the cause of some idleness on account of unbilled steam coal.

In the Mt. Olive field conditions are about as normal as in any field in the state. The car supply is fairly good, labor is holding out remarkably well, and the production about equals the demand. In the Carterville field a car shortage still continues, and the mines are not getting anywhere near the time that they should, even with their reduced tonnage. The railroads continue to draw heavily from this field, despite rumors to the contrary that this condition would be eliminated for the time being at least. There has, however, been a little more free Carterville during the past week than for some time previous, but little of it is coming into the Missouri market.

There is not likely to be any disturbances in labor conditions for the remainder of July in this field, but the inroads that the draft will bring in August and September will cause a further decrease when there should be an increase in tonnage.

The conditions in the Duquoin field are somewhat similar to those in the Carterville field. There are no eastern coals coming into the St. Louis market at all, with the exception of a few cars of Ayershire, Ind., and other coals for gas-producing or gas-making purposes.

One unusual feature in the local market is that there seems to be a surplus of Big Muddy coal from the Murphysboro district. A little Arkansas has moved in the past week, and some outside gashouse coke, but the local market is one that has got to depend practically from now on upon the coal from the local Illinois mines.

An order has been issued that all operators and jobbers shipping coal into Missouri should make reports of such shipments to the Local Fuel Administration, so that they may keep check on the tonnage put into each locality.

The retail market holds up to the maximum for July, which is: Elkhorn Laclede and St. Louis Elkhorn byproduct coke, $12.75; Carterville lump, egg and nut, $6.20; Duquoin, $5.95; Mt. Olive lump, $5.70, and Standard lump, $5.45.

The market in carloads is:

	Williamson and Franklin County	Mt. Oliv and Staunton	Standard
6-in. lump...	$2.55@2.70	$2.55@2.70	$2.40@2.70
3x6-in. egg..	2.55@2.70	2.55@2.70	2.35@2.55
2x3-in. nut..	2.55@2.70	2.55@2.70	2.35@2.55
No. 2 nut....	2.55@2.70	2.55@2.70	.....
No. 3 nut....	2.55@2.70	2.55@2.70	.....
No. 4 nut....	2.55@2.70	2.55@2.70	.....
No. 5 nut....	2.05@2.20	2.05@2.20	.....
2-in. scrgs...	2.05@2.20	2.05@2.20	1.25@1.50
3-in. lump...	.....	.....	2.25@2.40
2-in. lump...	.....	.....	2.25@2.40
Steam egg...	.....	.....	2.25@2.40
Mine run....	2.35@2.50	2.35@2.50	1.85@2.00
Washed:			
No. 1.....	2.75@2.90	2.75@2.90	.....
No. 2.....	2.75@2.90	2.75@2.90	.....
No. 3.....	2.55@2.75	2.55@2.75	.....
No. 4.....	2.55@2.75	2.55@2.75	.....
No. 5.....	2.05@2.20	2.05@2.20	.....

Williamson and Fronklin County rate is $1.10; Duquoin field, $1; Standard and Mt. Olive fields, 95c.

General Statistics

NORFOLK & WESTERN

Below is given a statement of the coal tonnage from mines on the Norfolk & Western Ry. and from other railroads, for the month of May, 1918.

From:	Net Tons
Pocahontas field	1,505,115
Tug River field	310,860
Thacker field	281,929
Kenova field	103,171
Clinch Valley field	141,816
Other Northern and Western fields	12,918
Total Northern and Western fields	2,355,809
Williamson & Pond Creek R.R.	181,832
Tug River & Kentucky R.R.	57,641
All other railroads	81,700
Grand total	2,676,982

COAL AGE

Volume 14 New York, July 25, 1918 Number 4

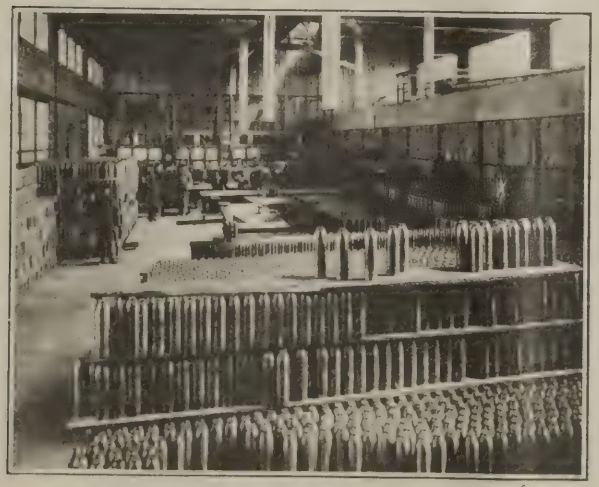
The Interpretation

Written expressly for "Coal Age"

By RUFUS T. STROHM

FORGET that coal is a stony mass
That grimes the breaker and chokes the screens,
And try to think, as you watch it pass,
Of all that its shiny blackness means;
For when you see that it's tons of steel
For shell and rifle, for wheel and rail,
For plate and armor, for rib and keel,
You will not falter, you dare not fail!

EACH time your shovel completes its round,
The coal that over it slides and runs
Will make steel bullets enough to pound
The daylights out of a hundred Huns;
And four such shovelfuls represent
The polished form of a three-inch shell—
The pointed sort of an argument
That Yankee fighters can handle well.



"Four shovelfuls of coal represent the polished form of a three-inch shell"



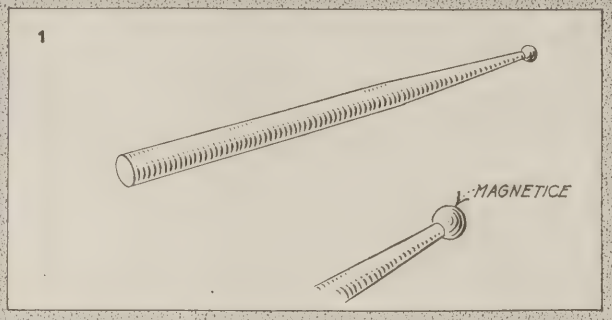
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The boys who go "over the top" in France offer their lives. Can we at home offer less than our full-time labor?

A FULL day's yield of a mine will feed
The flaming maws of a transport ship
That cuts the sea at a greyhound's speed
With an army corps at a single trip;
But it takes the coal that a mine can turn
In the space of six or seven days
To build that vessel from stem to stern
And send her slithering down the ways.

WITH every stroke of your flying pick,
With every blow on the ringing drill,
You're doing your own small part to lick
The 'tarnal tar out of Kaiser Bill;
For coal is the thing that will stem the tide
And write the end of the bloody tale,
So, while we battle with Prussian pride,
You must not falter, you dare not fail!

IDEAS AND SUGGESTIONS

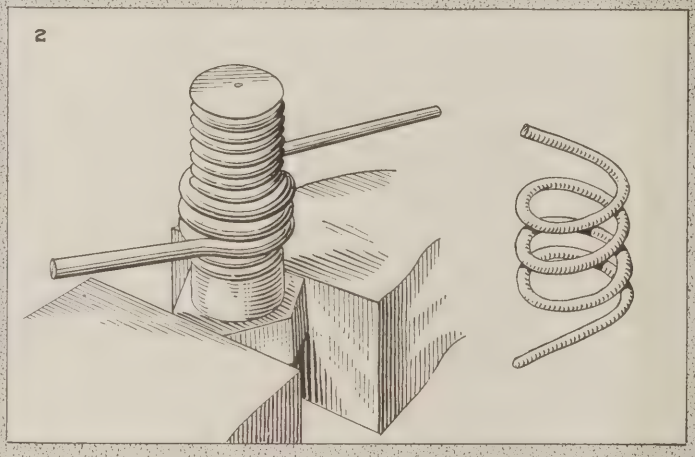


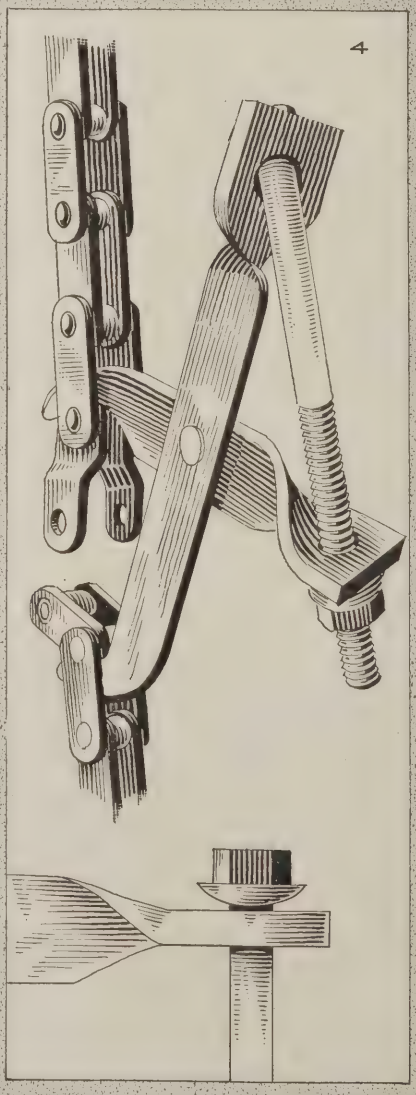
1 A GREAT AID IN REMOVING IRON CHIPS FROM THE EYE

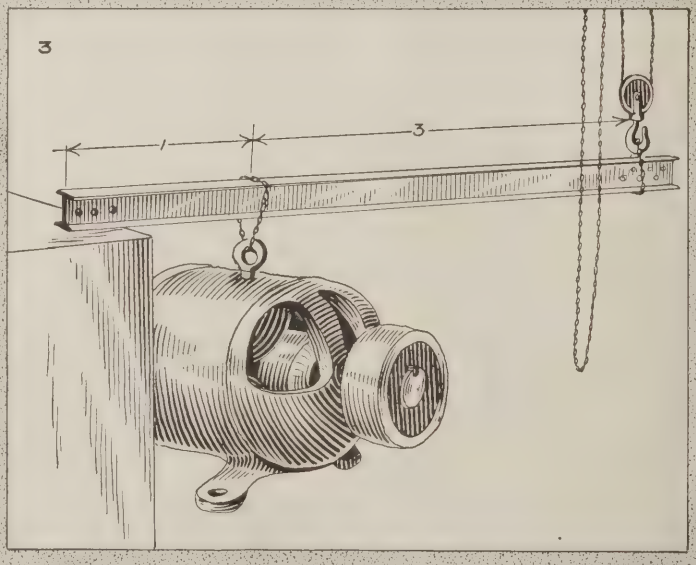
2 A NEAT WIRE COIL MADE UPON A SIMPLE SCREW

3 A HANDY CHAIN TAKE-UP

4 CONVERTS A 1 TON HOIST TO 3 TONS CAPACITY







Little Schemes That Have Proved Their

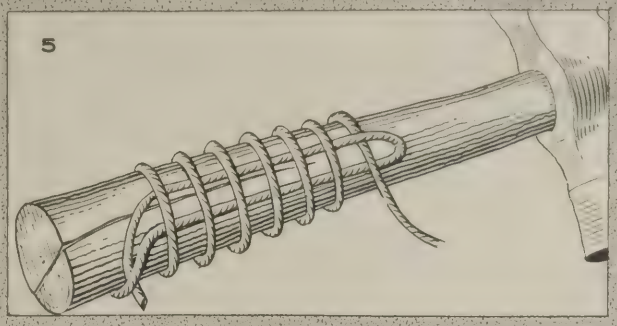
KINKS FOR USE AROUND THE MINE

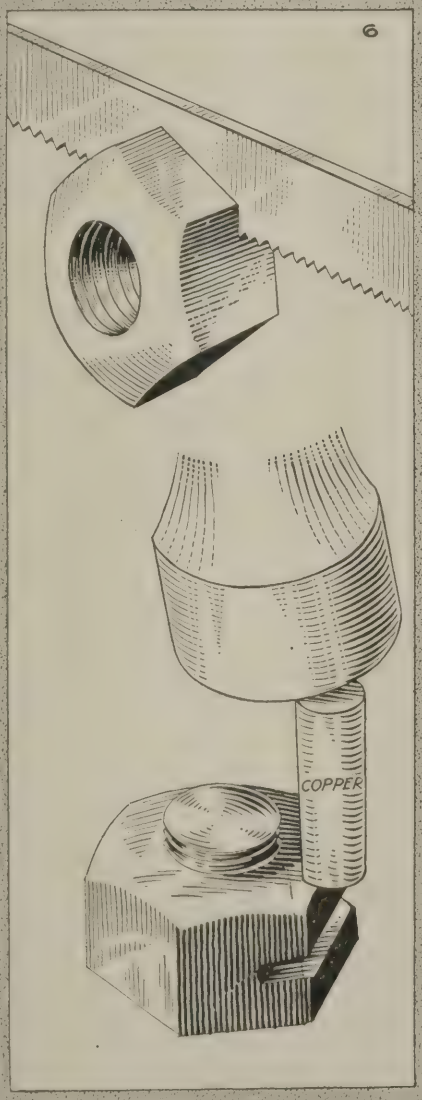
5 EFFICIENT LASHING FOR A SPLIT HANDLE

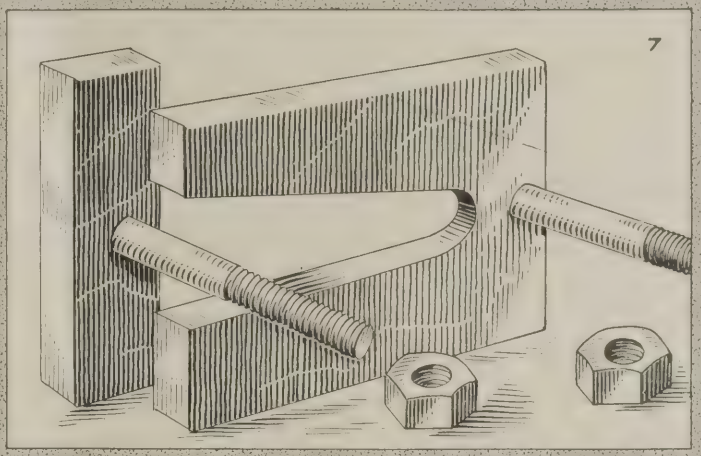
6 A READY MEANS OF LOCKING A NUT

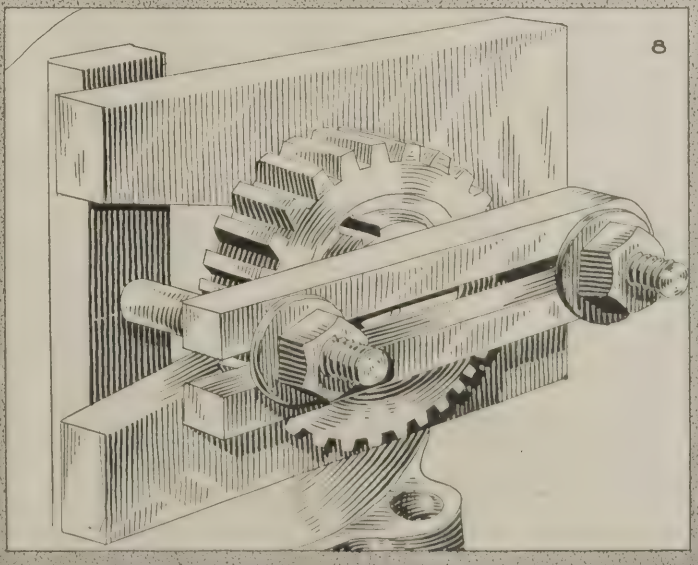
7 A HOME-MADE ADJUSTABLE GEAR PULLER

8 HOW THE GEAR PULLER IS EMPLOYED



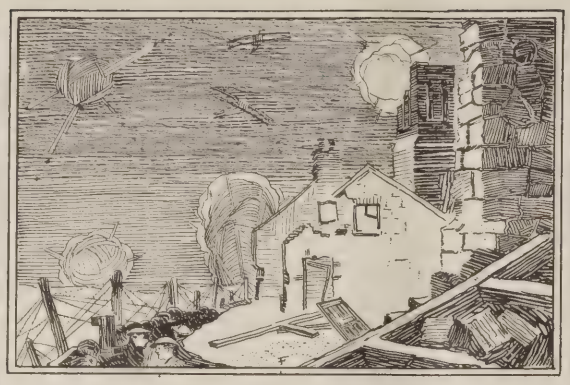






Utility and Value in Cases of Emergency







Coal, Explosives, War—I

By H. J. BROUGHTON
Wilmington, Del.

SYNOPSIS—*This article is the first of a series of three on this subject. It sets forth the relation that coal bears to business in general and the conduct of war in particular. Coal is of such prime importance that all means possible should be employed to increase its production. The careful and intelligent use of explosives may be made a potent factor to this end.*

EVERYWHERE has been heard the call for efficiency, conservation and coöperation, owing to the stress of war which has laid new requirements upon the country and upon industrial organizations. No more beneficial thing could be proposed than efficient conservation by coöperation, to avoid waste and promote production of coal.

Without coal we cannot wage war, cannot progress in manufacture nor can we live with any degree of comfort. Coal is one of the most commonplace articles with which we come in daily contact, yet at the same time one of the most important. Its possession by a community or a nation means comfort and progress, and simultaneously a strong strategical position from a military standpoint.

The equivalent of ten tons of coal a second is running to waste over Niagara while "Speed Up Coal Production" is being agitated. Niagara is only one instance of waste energy. The streams of this country in which millions of horsepower are running to waste every day could be made a perpetual source of wealth and prosperity.

When we hear of a cathedral or other work of art being blown to atoms, or an almost priceless bronze statue being melted up to make bullets, we are likely to think it a shame. It would be much less a shame to harness the power that is now going to waste in streams that in thousands of cases are merely beautiful sights to be gazed upon, while we go hungry for the things their power would supply. Many trains could be driven by the energy of the restless mountain streams without seriously affecting their attractiveness or in any way detracting from their beauty.

Another enormous saving of coal could be accomplished by using the million of feet of lumber, the millions of cords of wood that are now being wasted, not only in the form of cut and standing timber, but also in the form of stumps. This has developed into such a momentous question that it will be only a matter of time before the Fuel Administration will take a hand in its solution. The Ohio Fuel Administration has already announced that shipments of both hard and soft coal to communities where there are no essential war industries may be stopped entirely.

On our farm lands in every direction is an immense supply of wood waste, in wood lots and stumps without number. Particularly in the case of the latter have we a fuel supply that is cheap, ready at hand and abundant.

Many hours could be saved by the consumer in unloading coal from the cars as soon as they arrive at their destination, could he be brought to the realization that every hour saved may be the means of saving a soldier's life in France. Millions of tons of coal could be produced, but it could not be moved at this time for want of cars; and the time wasted in unloading the cars makes a surprising total when the number used for this purpose is considered.

When electric generating stations are located at the mines, doing away with the transportation of much power coal, we will have accomplished something worth while. All railroads could be electrified, factories operated from central distributing stations and isolated plants abolished.

Our present-day boilers and furnaces are inefficient in getting the biggest percentage of heat out of coal. Newer apparatus that can burn poorer grades of fuel are needed badly. This would tend to conserve a large amount of the supply. Many owners of plants using coal are sleeping a dreamy sleep, dreaming that their plants are efficient, that they are getting the greatest possible percentage of energy from their coal. When they awake and find how much real money they could save by using a little of it now, to increase the efficiency of their coal-consuming apparatus, they will wish they had set their alarm clock for an earlier awakening.

By not properly insulating steam pipes last winter

much steam went to waste that otherwise could have been used to advantage just at the time when coal was needed most vitally. Next winter should see every exposed pipe covered with the proper amount of insulation. The saving thus afforded would pay for many a ton of coal, but the initial expense of installation seems to bother many a man otherwise cautious.

So when we see a lump of coal and consider its immense value as a force in civilization, and realize how practically all industry at present depends upon this fuel, we can look a little farther and perceive that at the present time our production of coal depends largely upon explosives; but of equal importance is how these are employed. When properly used, they result in a greater quantity of coal being produced with less effort. This means a conservation in man-power.

Every effort is apparently being put forth by the coal operators, the miners' organizations and the individual miner, but closer attention to details will work wonders. And if the householder is to be kept warm, while our ships, railroads and factories run at war speed and ordinary business proceeds without lessening its forward trend, more attention to blasting details must become the rule at the mines.

The welfare of our country depends upon those who have learned, or will learn, to do in the right way the things that are to be done. Just now the demand for production has overcome time-honored rules and ways of doing things in every form of industry, coal mining included. More direct and more efficient methods must be adopted, and the stereotyped way improved upon. The great question that every miner must ask himself is, "Am I going to embrace this opportunity to be of service to my country in its hour of need, or am I going to dodge the issue and go on with my work as usual?"

Every miner's reputation is at stake. The greatest prosperity the world has ever known will be the lot of this country after the war, and the men who have hung back and have not tried to do their utmost are the ones that will suffer for what they have failed to do. The man with the reputation for doing things is the man who will gain in the end. He who pays a little more and unusual attention to performing his work better right now than he has ever done before will be the man remembered by his superiors when peace comes.

The miner is going to be just as instrumental in winning this war as the soldier and sailor, with the exception that the miner will not be called upon to risk his life; for there is little need of risking his life in his daily occupation if he will but study improved methods of doing his work. It is his patriotic duty to do so. It is either face this fact now, or duck and dodge and be called upon to suffer later.

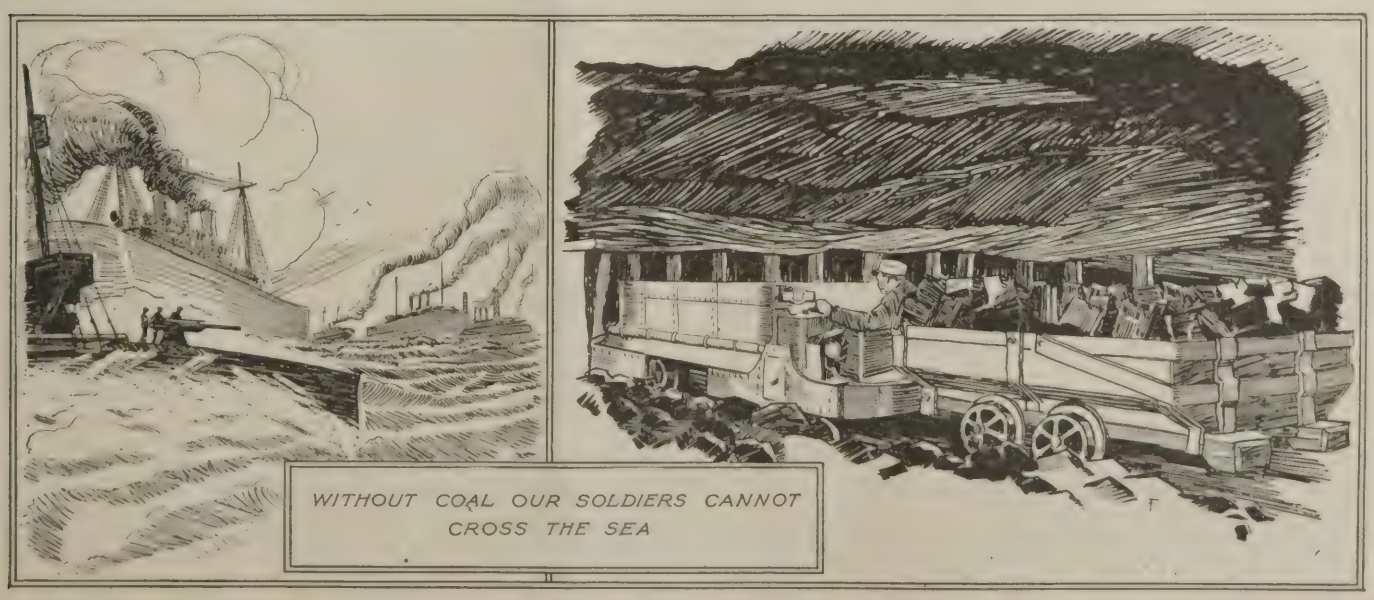
In a recent statement Frankin K. Lane, Secretary of the Interior, said: "Our three-quarters of a million coal miners produced 644,000,000 tons of coal in 1917, an increase of 54,000,000 tons over the previous year, notwithstanding transportation conditions in certain regions were worse than ever before in the industry. The increased output of war-making materials shows very clearly how faithful, how energetic, how patriotic has been the army of miners upon whose efforts depends our production of these vital supplies. . . . If the demands increase this year, our efforts will also increase. What we must achieve we shall."

Many Men Taken by the Draft

The call to the colors has taken many men from the mines. Alien coal diggers have flocked in great numbers to the land of their birth; the draft has drawn away countless others, while many more have been attracted by wage inducements offered by the industrial concerns engaged in the manufacture of war supplies.

If additional labor cannot be secured, more efficient methods of production must be practiced. One of the greatest of these is the proper use of the means we have at hand, by men who are patriotic enough to take a sufficient amount of pride in the increased production to warrant their search for, and use of, more efficient methods of employing explosives in blasting coal. Close attention to the details offered by the makers of explosives in the various handbooks of instruction published by them will do much toward relieving this situation.

In many places the men are laying off three days a week, and only working enough to insure their ordinary wage. That there is a shortage of labor is no excuse for those now engaged to lay off and become slackers. The Government should take a hand in this matter and draft the services of the men and compel them to work full time, as the soldier and sailor have to do. Without



coal our soldiers cannot cross the sea. More coal must be produced, hence the miner should try to do more than his ordinary share.

Another way in which the miner can be of great assistance is by paying particular attention to the amount of "gob" that he allows to come up with the coal. It takes just as much power to transport this useless mess as it does to carry clean fuel. For every pound of slate delivered to the consumer, a pound of coal will later have to be delivered, that he may get maximum production. Every bit of gob going into the firebox means just so much added to the destruction of the grates. Industry can speed up, railroads can haul more and use less fuel, warships can make faster headway, every manufacturing plant can multiply production if clean coal is the rule and not the exception. This is up to the miners, who must see to it that the coal is at all times loaded clean.

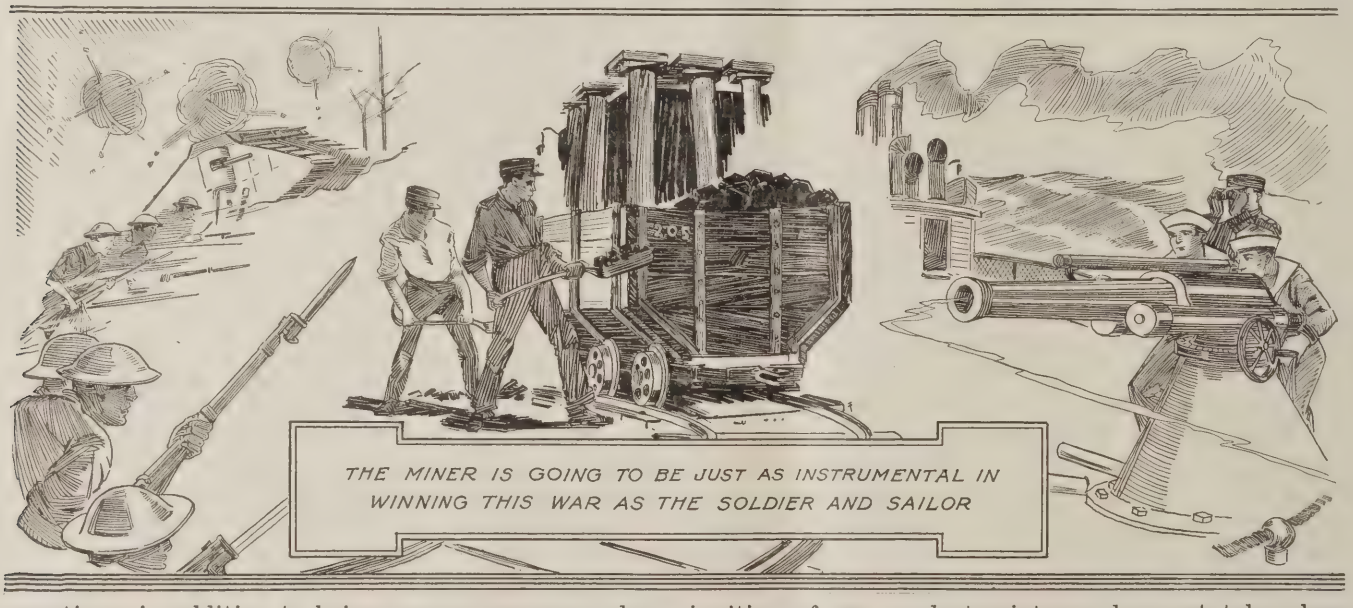
Unfortunately, in the mining of coal a great deal of inflammable gas is encountered, this amount varying in different localities. Some of the mines are filled with gas pockets so that their upper workings are full of an inflammable mixture of gas and air. Some of these operations, in addition to being gaseous, are very dry, and the dust from the coal fills the air. The combination of these two—the gas and the dust—makes a mixture which is not only easy to explode, but in which detonation when once started becomes self-propagating throughout the mine workings. Such an explosion nearly always results fatally.

The great development of the mines, caused by the demand for fuel, drove the operators to seek coal that lay far below the surface. This necessitated shafts into gaseous territory, with headings driven miles from the openings, requiring thousands of cubic feet of air to supply the miners. The air gives them life and strength, but at the same time absorbs the moisture, dries out the mines and makes the dust more inflammable. This dust is easily placed in suspension by a passing trip, or a heavy or windy shot, which may short-circuit the air. Then comes a "blowout" shot with its terrible results that make one shudder and wonder that some means have not been taken to lessen the toll paid for the mining of coal. True, thousands of tons of coal have been mined without this awful price; even mines known to contain gas and dust have been operated for years without an explosion. But is this because of good management or is it just luck?

It must be remembered that not all coal mines are gaseous and dusty, and vast quantities of blasting powder are used today in producing lump coal in mines which are practically free from gas and which are so wet that dust does not hang in the air.

Gas and dust explosions in England, France and Belgium became so frequent that chemists were set to work to devise some explosive that would give a shorter and cooler flame than that produced by black powder. These researches eventually resulted in the production of what are known as "safety explosives," or "permitted explosives," in the United States. In Europe the national authorities designate what explosives shall be used in the coal mines, whereas in the United States the national government only specifies which explosives are recommended for use in dangerous coal mines.

Permissible explosives, when properly used in accordance with the instructions furnished by the manufacturers and the United States Bureau of Mines, give a flame of such short length and duration that ignition of gas or dust mixtures does not take place. Not only this, but the fact that these explosives are made up in cylindrical form and do not have to be either poured or broken, makes their handling much safer than that of black powder—contrary to the popular notion.



Permissible explosives, being a first cousin, as it were, to dynamite, it would naturally seem that they would be more dangerous to handle than black blasting powder; but such is not the case, as they are very difficult to ignite—that is, they do not burn readily—and for their explosion require an intermediate agent known as a "detonator," or "blasting cap." They are also much less sensitive to detonation than is dynamite and require a powerful detonator to completely explode them.

A permissible explosive is defined as follows: "An explosive is considered permissible for use in coal mines when it is similar in all respects to the sample that has passed the tests required by the Bureau of Mines and when it is in accordance with the conditions prescribed."

It is generally understood that a permissible explosive should be used in all those coal mines containing dust and gas; however, there are difficulties to be overcome in this connection. The greatest difficulty is the prejudice of both the operator and the miner. The next is the improbability of being able to induce the miner to use the explosive in such a manner as to get its greatest efficiency. It can be shown that in using permissible explosives the operator is buying the cheapest kind of mine insurance. The miner also, in using permissible explosives, is gaining the cheapest kind of life insurance.

At a great many collieries the miners make a habit of using the "combination shot"—that is, using black powder and dynamite in the same borehole. This pernicious practice has always been the great objection against the use of the better grade of permissibles, owing to the fact that a good permissible will not satisfactorily detonate when black powder is used as a detonating agent. Consequently, until a definite stand is taken against the use of the combination shot by the operators, and also by the mine inspectors, little progress can be made toward increasing the use of permissibles.

When mine operators come to a realization of the necessity for protecting their men, they will squelch the combination shot and absolutely enforce the use of permissibles, or black powder with electric firing. The use of electric blasting caps with permissibles is recommended for the reason that all miners are in a safe place before the shot is fired and the risk is not run of hang-fire from a piece of fuse that does not burn properly.

The proper placement of boreholes and the use of the right explosive assure a maximum production and avoid the necessity of either redrilling or drilling extra holes in making the original shots, in this way saving much labor in boring. The first cost of permissibles to the miner is a trifle higher than that of blasting powder, but if it were possible for him to fully appreciate and realize the safety feature, the difference in the air, saving in time in allowing him to return to his work and the lessening of falls of slate from a broken roof, he would gladly pay the difference.

The blasting of coal with black powder in the presence of gas and dust mixtures is dangerous. Black powder produces a long, hot flame from the charge in the bore, which instantly ignites any gas or dust present.

The flame temperature of all explosives is above the ignition point of inflammable gas and dust mixtures, but the flame of a permissible explosive is of such short duration that under the conditions of blasting down coal it does not ignite the gas and dust present. There is only one plausible reason for not using permissibles, and that lies in the preparation of the coal. It cannot be denied that coal shot with permissibles is racked more than when shot with blasting powder, but in many instances this is caused by misuse of the explosive, or by not selecting the one best suited for the coal. Sometimes a fast powder will give a better coal than a slow one, but proper undercutting with properly placed holes should give a good-sized lump without an excessive quantity of slack.

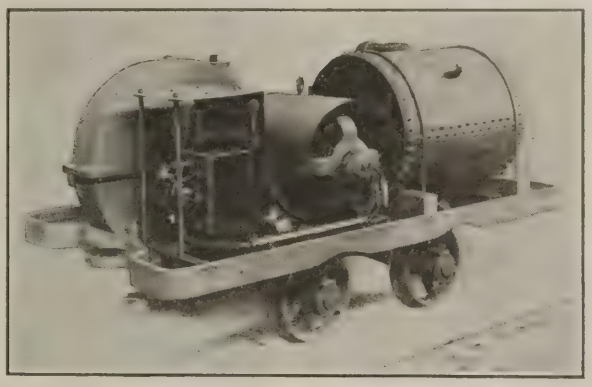
(To be continued)

Portable Motor-Driven Compressor for Mine Use

It has been said that coal will win the war. Therefore, anything that will help to increase the production of this fuel is of interest, not only to the mine operator but to the whole nation as well.

A useful machine in this connection is the small portable compressor manufactured by the Ingersoll-Rand Co. for mine service, either as an auxiliary to the main compressed-air system, or for development work in operations without compressed-air service. It can be used for operating drills, coal cutters, air lifts and for other purposes. The complete outfit is mounted on a truck with flanged wheels of a gage to suit the mine track, and can be hauled wherever needed.

This type of compressor is made in capacities up to 415 cu.ft. of air per minute and for pressures up to



PORTABLE COMPRESSOR FOR OPERATING DRILLS, COAL CUTTERS AND AIR LIFTS

100 lb. The motor, which is built by the Westinghouse Electric and Manufacturing Co., is designed to operate on the available current, and is furnished in sizes ranging from 12 to 56 hp., depending on the capacity of the compressor. A large air receiver forms a part of the outfit. Into this the air is pumped and the pressure therein is automatically maintained constant.

Compressor at Coal Mine

There are nearly always opportunities for operators to pick up bargains in second-hand machinery by watching the advertising columns of technical and trade papers. A progressive Illinois coal man recently, in commenting on this subject, pointed out the advantages of having a small compressor at his plant. He had purchased a small second-hand air outfit, set it up at his mine shop, and it is now doing good service.

Many of the numerous small jobs around a coal plant can be facilitated by power machinery. Possibly riveting is to be done on a cage, on the steel framework of the tipple, or other metal work. Holes are to be bored in heavy timber or drilled in metal away from the shop. As part of the shop equipment, the air lines may be extended to various nearby points about the plant to furnish power when needed. The operator in question considers the use of live steam too expensive a means for blowing off boilers—he utilizes compressed air for the purpose. Like many another facility, its application multiplies with the many opportunities afforded for its use.

Conservation of Miners by Employment of Mechanical Equipment

By R. L. HERRICK, M. E.
New York City

MINE-LABOR shortage is the "bugaboo" of the anthracite district. Recent drafts to the army have aggravated an already bad labor condition. Before the draft many mines were running with mine crews depleted from 15 to 40 per cent. from those of normal pre-war times, and now the production of anthracite threatens to ebb to a new low mark. The mining situation presents a curious discrepancy, however, that may well be noted. It is this: While the loss of many men has adversely affected the production of some of the largest and oldest mines of the district, others with similarly reduced mining crews have actually increased their tonnage investigation into the causes of this discrepancy has led me to the conclusion that the gain or loss of tonnage is largely a question of mechanical equipment. Those mines which have held their tonnage output to about normal—or if anything have increased it—have installed modern machinery equipment which has conserved the man-power of the organization. Instances are common where the installation of certain machines has made what was formerly heavy labor now easy on the men, and at the same time allowed one or two of them to do the work formerly requiring the united efforts of from six to eight. It is, of course, understood that the men thus released from routine work have been immediately transferred to the vitally important work of getting out coal.



FIGS. 1 AND 2. THE SMALL DRILL IN THIN COAL

In what follows it is proposed to give typical examples of such man-power saving as have come under my immediate observation in the course of a 450-mile automobile trip about the mines in various parts of the anthracite district. For the figures upon which various statements are based, I am indebted to an engineer intimately acquainted with the district through long residence—William Wilhelm, Scranton manager of the Ingersoll-Rand company. To what extent will it pay to replace hand with machine drilling? The anthracite operator is squarely face to face with this issue to-day. And upon his answer to that question largely depends the amount of man-power conservation he will be able to effect. In general terms it may be stated that coal is ordinarily machine-drilled in say from one-fifth to one-sixth the time that the same holes can be put in by hand. The hardness, dampness and physical properties of the coal vary widely in different parts of the anthracite district, and all of these conditions affect the speed of drilling. Thus in some sections the hand drilling of a 6-ft. hole requires say 10 min., while in



FIGS. 3 AND 4. ILLUSTRATING THE USE OF JACKHAMERS IN A THICK COAL BED





FIGS. 5 AND 6. CHANGES IN A BLACKSMITH SHOP FROM USE OF DRILL STEEL SHARPENER

others it cannot be done in less than 30 min. In general, therefore, the same holes will require only say 2 to 6 min. when drilled by machine.

On the face of the situation thus presented there could be no question about the advisability of universally adopting machine drilling. But actually there are a number of other considerations which influence the operator. Perhaps one of the elements most vitally affecting the problem is the fact that in most of the large operations the miner is practically a free agent. He is paid by the ton of coal, or yard of advance in rock, and his hours of work are advised, but not dictated, by the mining companies. In addition to this, the miner owns his own tools, although he may be financed by the operator to enable their purchase.



FIG. 7. TAKING UP BOTTOM

Under such conditions it is only natural to expect that machine drilling of coal is in vogue only where the mining conditions themselves caused the miner to employ drills in order to make, what are to him, satisfactory wages without a great deal of unnecessary hard work and in a satisfactory number of hours of labor.

So far mining conditions have made immediately advisable the adoption of machine drilling only in thin beds of comparatively small pitch. War conditions such as high price, etc., have enabled the working of such beds at a profit. Hence, in thin measures we find machine drilling of coal naturally making its first big progress of supplanting hand drilling. This is not meant to imply that in thick beds progress with machine drills has not been large, but only that this progress has been comparatively greater in thin beds. Some of the reasons for this condition are made plain by contrasting Figs. 1 and 2, showing thin-seam mining, with Figs. 3 and 4, which illustrate conditions in much thicker beds of coal. Fig. 1 shows the drilling of a bottom hole in an anthracite bed which is only 20 to 24 in. thick. In this case a plank is used on which the Jackhamer is slid along. Fig. 2 shows another view in this same bed, using a JC-40 drill mounting. The bottom of this bed consists of 6 in. of bone and is consequently exceedingly hard to drill.

Such beds as this were practically impossible cer-





FIGS. 8 AND 9. SMALL HOIST HANDLING PIT PROPS AND LOADED CARS

tainly unprofitable, to mine with the old hand-auger drilling method, but have been made profitable with machine-drill methods which produce a good tonnage per day.

Fig. 3 shows the drilling of a horizontal hole in the Dunmore vein, which, as plainly shown, consists of alternating bands of coal, bone and slate, making up a total thickness of about 6 ft. Such a bed is hard to drill by hand, and hence the favor shown to machine drills. Fig. 4 shows taking up the rock bottom with a $\frac{7}{8}$ hexagon steel replacing the twisted bit in the same drill shown in Fig. 3.

An example will suffice to still further clarify the situation: A coal bed 30 in. thick is mined in the Scranton district by rooms 30 ft. wide. The coal face is attacked by say from 11 to 14 holes, drilled about 6 ft. deep, which should blast down 450 cu.ft. of material, netting say 16 tons of coal.

The hand-auger drilling of these holes will require an average of say 30 min. to the hole, thus requiring 6 or 7 hours of labor. The machine drilling of these holes will take only from 55 to 70 min. to complete, although these are by no means the quickest figures on record.

Figs. 1 to 3 all show the use of twisted cruciform steel in connection with the Jackhamers. These machines differ in no way from the standard drill striking a hammer blow, but the use of twisted steel allows the standard drill rotation to produce an auger-like effect in the holes, thus rapidly clearing them of pulverized coal (clearly shown in Figs. 1 and 2 beneath the steel).

The use of this cruciform steel has rapidly grown in favor, especially during the past year in the Scranton district. It was originally furnished by the manufacturer in sizes to accommodate the usual diameter of black powder cartridges. But in response to the demand for hand-drill outfits in other districts, where Monobel powder is in use, another size of twisted steel is being manufactured and will soon be available.

For the mining of thin coal beds the drill mounting shown in Fig. 2 has proved a boon to the miner. In fact its lightness enables quick movement from place to place, while its operating features reduce the miner's drilling job to a sinecure. He has only to push the drill straight ahead, and it practically runs itself.

Aside from being easier than hand-holding upon the drill operator, the mounting performs the double function of providing a steadyrest in starting and pointing the hole, and that of furnishing a support during the drilling. Without such a support the average miner lets the drill practically hang upon the drill steel after the latter has advanced 6 or 8 in. into the coal. The support afforded by the mounting has been found to practically eliminate drill steel breakage arising from this cause.



FIG. 10. A SHORT STEEP GRADE

While machine drilling of coal is apparently most common in the thin beds, and in those thick ones whose bone and slate layers make hard hand drilling, it has a great future in the thick and easily hand-drilled seams. Wartime conditions seem certain to hasten the coming of that future.

The visitor to the various mines of the anthracite district is somewhat puzzled to account for the facts as he sees them. For instance, in many thick and easily mined beds he finds the Jackhamer busy, as shown in Fig. 7 taking up the rock bottom. For rockwork nearly every mine in the district has such machines by the score. But when it comes time to mine the coal, the miner picks up his hand auger and goes at it. This may not be the rule, but I saw it often enough throughout this district to be impressed by its frequency.

For example, in the case of the mine shown by



FIG. 11. THREE SMALL HOISTS PULLING CAR UP GRADE SHOWN IN FIG. 10

Fig. 7 the coal bed was 8 ft. thick, had a high pitch, and the coal itself was comparatively soft. The miner could drill his 8-ft. holes in about 10 min. each by hand auger, and could completely drill his room in about two hours. Under the present working conditions he could bring down in a few hours all the coal by hand that his one "buddy" could load in a day.



FIG. 12. PORTABLE AIR COMPRESSOR UNIT

Those few hours enabled him to quit about noon well satisfied with his usual day's wages.

This particular miner was not interested in the machine drilling of coal, and for obvious reasons. This illustrates the perplexing problem some mine operators face today. The present situation may, in fact, be paraphrased as this: "One miner, one auger and one buddy." Why should it not be: "One miner, one machine drill and four buddies?"

Is there any reason why the miner should not acquire greater dignity as the employer of four helpers instead of one, and make increased mining profits in proportion? Must the correction of a decreasing coal production be impeded by the old-established custom of having one buddy only? Upon the answer to these questions may hang the fate of nations!

Suffice it to say that it is believed that under changed conditions a machine-drill miner can easily replace four hand-auger men in thick beds and thereby allow the saving of three miners, thus made available for either increasing the coal output or filling the gaps in the ranks of the buddies drafted into the army. Fifty hand-machine drills installed in a mine should result in a man-power conservation equivalent to 150 miners per day.

Many of the coal-mining companies of the anthracite district have greatly increased the number of hand-machine drills employed underground during the past year. As a result, an increased burden of steel sharpening has been thrown upon the blacksmith shop.

The sharpening of hollow drill steel by hand is a comparatively slow and unsatisfactory method. In the average shop a blacksmith and helper will hand-sharpen about 35 to 40 seven-eighth-inch hexagon steels per day, depending upon their condition. And since the blacksmith must rely solely upon his eye for gaging, he usually makes a gage interval of about $\frac{1}{4}$ in. between successive steels of a drill set in order to insure against sticking. This handwork is so slow that frequently defects develop in the bit due to its cooling before it is properly shaped.

With the increased demands upon the blacksmith shop for steel sharpening, many mining companies started the installation of Leyner machine sharpeners. These have proved one of the most pronounced labor savers introduced into the district. The situation before and after the installation of one of these sharpeners in one of the largest shops of the Scranton region is shown by Figs. 5 and 6.

In this shop there are four forges employing four blacksmiths and four helpers. Fig. 5 shows one side of this shop with the men employed at the hand-sharpening of steel. Fig. 6 shows this same shop after the installation of a machine sharpener. The operator of this machine did all the steel sharpening of the eight men and turned out a large amount of routine blacksmith work in addition. The seven men thus made available were badly needed at other work about the mine and were so utilized.

Aside from this labor-saving feature of the machine sharpener the bits themselves are far superior to the hand-made ones. Owing to the perfection of bits, made inevitable by the machine's gaging, it was possible to reduce the gage interval between steels to $\frac{1}{16}$ in. instead of the $\frac{1}{4}$ in. as formerly. This results in greater drilling speed in the mine.

This machine sharpener is equipped for making the shanks on $1\frac{3}{8}$-in. twisted cruciform steel. Besides its common work of shanking and sharpening steels, it is admirably adapted to blacksmith work of many kinds, such as making boltheads, and even drawheads for coupling mine cars. Some of the mines have fitted up these sharpeners with dies for making mine-car couplings, which work is being done with great rapidity.

In many sections of the anthracite district, particularly where the coal beds are of steep pitch, the movement of mine timbers into the upper workings presents a real problem. In such places the Little Tugger hoist serves a double purpose—that of supply-

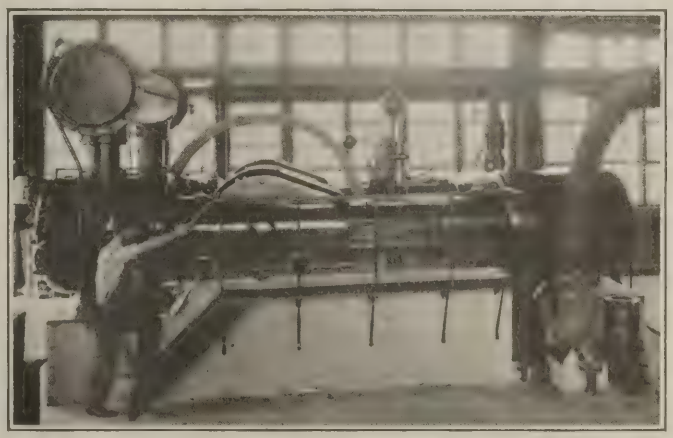


FIG. 13. A MODERN AIR COMPRESSOR ON THE SURFACE

ing the needed tractive power and furnishing air for ventilation.

A typical installation of its kind is shown in Figs. 8 and 9. In one section of the Catherine colliery of the Trevorton Coal Co., the Lykens No. 2 vein pitches $15\frac{1}{2}$ deg. and the steady movement of timbers up such a steep slope taxed the endurance of the men formerly

employed on the job. A slope 250 ft. long connected two levels. Up this the timber was moved, and down it was discharged the coal extracted in the development of the upper level.

The development of four rooms and two gangways required six mine-car loads of timbers per day, and for carrying up the timbers by hand six men were formerly employed constantly.

Fig. 8 shows the Little Tugger hoist recently installed in close quarters at the head of the sheet-iron-lined timber chute. Its $\frac{5}{16}$-in. wire rope is pulled down into the lower level, where one man attaches it to the timbers on the cars. On signal, the hoist then pulls up from three to four timbers 14 ft. long and averaging 8 to 10 in. in diameter. The ropeman rides the timbers to the upper level and returns with the slacked-off rope.

The timber is thus hoisted with only one man in addition to the hoist operator. These two men thus accomplish, in one-half day, the work formerly requiring six men all day. The other four men are accordingly available where badly needed for getting out coal. The hoist, therefore, performs the equivalent of eight men's work per day.

The hoist has a speed of 85 ft. per min. in lifting a maximum weight of 1000 lb. vertically, but in hauling these heavy timbers 250 ft. up the slope, about 5 to 6 min. are required for the round trip by the ropeman.

When not in use for timber hauling, this machine is available for hauling coal in a one-ton buggy from the face of the level along a slight grade, to the rocker dump at the head of the chute. Fig. 9 shows the loaded buggy approaching this discharge point.

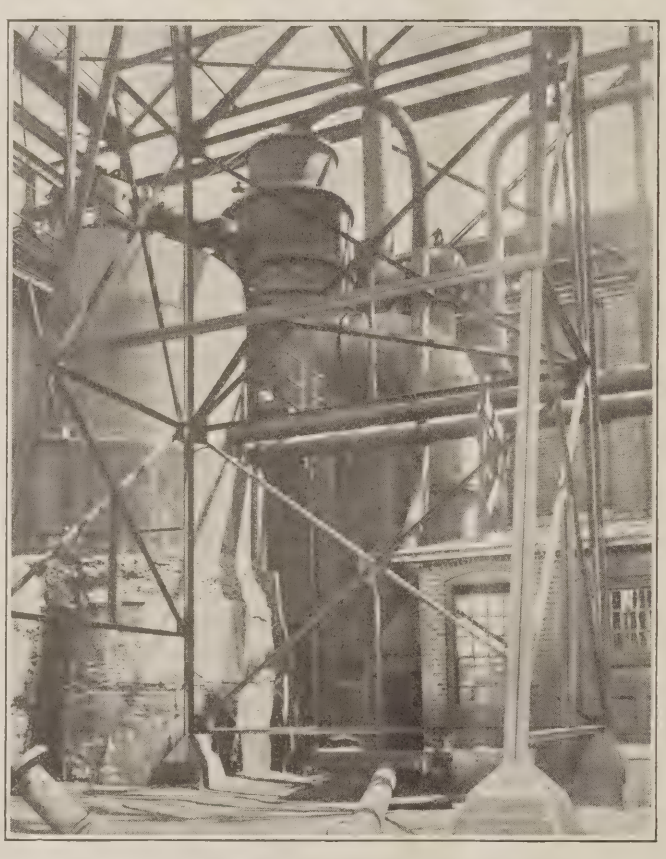


FIG. 14. AN ACID-RESISTING CONDENSER

Scores of these hoists have already been installed in many mines of the anthracite district. They are used for a wide variety of purposes, such as, for instance, the hoisting of rock in buckets from shallow shafts, the hoisting of tools and men into raises, and even pulling 40-ton capacity empty coal cars up a slight grade to a loading position beneath the discharge chutes of a breaker.

At another large colliery an unusual installation of these machines shows their strength as well as adaptability. In driving a rock tunnel to connect with a shaft, it was desired to use the 108-cu.ft. capacity cars, standard about the mine, to receive the rock mucked from the face. The rock tunnel connection was about 300 ft. long and had only a slight grade except at one point—shown in Fig. 10—where for about 50 ft. the track was given a grade of 10 per cent.

The 108-cu.ft. car loaded with rock weighs about 12,000 lb., and to pull it up the 10 per cent. grade three hoists were installed, as shown in Fig. 11.

The concentration of three separate hoists pulling three ropes attached to one heavy car is, of course, rather unusual and would not often happen except in emergency cases, and then only for temporary work. This installation serves to forcibly illustrate, however, the extreme flexibility of these machines, and the possibility of tiding over, with them, a situation where the delivery of a powerful single hoist under present conditions would seriously delay urgently needed mine development.

I have noticed a large number of installations of these little hoists in the anthracite district. In each case the machine did the work formerly requiring from six to eight men. Assuming, however, that each one effects a man-power conservation of at least four men, twenty such machines effect a conservation of at least eighty men. There are a number of companies throughout the district which have installed this many machines or even more.

In the foregoing, mention has been made only to man-power conservation made possible by increased coal production due to machinery. Another phase of the same problem is the decreased coal consumption of the mines themselves, due to improved equipment for power production. This brings us to the subject of improved machinery for compressing the air utilized in all the machinery mentioned above.

Anthracite operators may, for descriptive purposes, be divided into three classes as regards their method of compressing air. The first and possibly largest class depends upon small portable units installed underground. The second class depends wholly upon large central surface compressor plants, and the third class, in which there are comparatively few, depends upon both surface and underground units. For instance, one large company has several scores of portable compressors underground, but is at the present time installing several surface units.

Referring to the small portable compressor machinery underground, the most popular machine in the district is the Ingersoll-Rand mine-car type, shown in Fig. 12. These cars are moved about from point to point in the mines and are usually placed in some niche or out-of-the-way spot from which the air can be conveniently piped to the drills. When hose is employed for air transmission, the compressors are usually placed within 200 to 300 ft. of the drills; but frequently the air is piped as far as 800 to 1000 feet.

These portable compressors are made in several sizes capable of furnishing air from two to eight hand-machine drills, their equivalent in Radialaxes and small hoists. The compressor cars carry a water-cooled compressor, its driving motor, air receiver and automatic starting rheostat. To connect with the power system it is only necessary to hang the bare end of the cable over the trolley wire at some convenient out-of-the-way point. Any laborer can start the compressor without danger to either himself or the machine by simply throwing an ordinary knife switch. He can then go away and leave the machine running and, except for daily attention in filling the compressor hopper with cooling water, it needs no further care since lubrication is automatic.

If by reason of stopping all the drills the air pressure rises to a predetermined pressure limit, the air intake is automatically closed, thus cutting off the load on the machine and reducing its power consumption until such a time as the drills are again operated, when the automatic opening of the intake again allows the compressor to carry the load.

The obvious advantages of such an installation are the saving of transmission losses incident to long lines and the saving of power at all times, except when the drills are actually running.

In the case of the mining companies who produce their compressed air in surface plants and pipe it underground, their compressor economy is undoubtedly superior to that attained in the small portable units.

Many Surface Plants Have Been Remodeled

During the past year many of these surface compressor plants have been completely overhauled and reëquipped with modern machinery capable of making notable savings in coal.

A new compressor plant typical of a large number of installations in the district is shown in Fig. 13. This illustrates an Ingersoll-Rand, Type XPV, size 18 & 29 and 26 & 16 x 20-in. stroke. It has a rated capacity of 1955 cu.ft. of free air per minute, develops a maximum of 344 i.-hp. and has a steam consumption of only 15 lb. of steam per ½-hp.-hr. running condensing.

This type of compressor has a number of notable features, but they may all be summarized by saying they give practically a Corliss steam economy for less than Corliss first cost. This is due in large measure to their piston valves, which are especially adapted to the use of high steam pressures and superheat.

Many of the old compressors, which newer equipment recently displaced, compressed the air in a single stage and operated noncondensing. A brief example from actual practice will serve to illustrate the coal economy made possible by the installation of these new compressors having two-stage air compression, steam compounding and run condensing.

The old compressor required 129 lb. of steam per 1000 cu.ft. of free air actually delivered at 100 lb. pressure. The new compressor required only 68.3 lb. of steam per 1000 cu.ft. of air when operating noncondensing, and only 50.6 lb. of steam per 1000 cu.ft. when run condensing. The difference in steam consumption between the old compressor run noncondensing and new compressor operated condensing, for equal delivery of air, is 80,800 lb. of steam per 10-hour day. This saving, expressed in terms of fuel consumed at the rate of 1 lb. of coal per 5 lb. of steam, is 16,160 lb. of coal per day.

To furnish the air required for fifty Jackhamers, two such compressors would probably be required whose saving over former compression methods would be at least 16 tons of coal per day. This is equivalent to the coal productions of two men per day from some thin coal beds.

Can Mine Water Be Utilized?

The majority of mines in the anthracite district produce rivers of water from their drainage systems which are not utilized in condensing plants because of their acid nature. The condensing problem seems to be peculiarly difficult in the Scranton district, where the mine water is strongly acidulous and boiler water must be purchased from city mains.

Considerable experimenting with various types of condensers has been conducted by one company during the past two years, with the view to finding a way to utilize its mine water. All the condensers tried inevitably ended on the scrap heap after about 90 days' corrosion by the acid water, until finally the Beyer condenser shown in Fig. 14 was installed. The steel craneway shown in this illustration was doubtless built over the condenser in expectation of the necessity for making frequent and rapid repairs. This condenser has, however, now been in service nearly a year, and so far has given no sign of corrosion. This is due to its superior internal design and partly, of course, to its wood lining of heavy thickness.

This condenser handles the exhaust from a 5000-kw. Curtiss turbine and holds a high vacuum with a remarkably small variation of temperature between the hot well and the entering exhaust steam.

The present steam consumption of the Curtis turbine is about 19 lb. per kilowatt-hour, whereas the former consumption when, during condenser breakdowns it was run noncondensing (for which it was not designed), was about 35 lb. per kilowatt-hour. The Beyer condenser is therefore to be credited with making a saving of 40 tons of steam per hour when run at full load, or over 400 tons per 10-hour day.

Translated into terms of coal consumption with 1 lb. of coal producing 4.2 lb. of steam, the coal saving equivalent of 400 tons of steam is about 95 tons of fuel daily, or the equivalent of about 10 men's mine production.

While it is manifestly not conservative to say that every mine should install the equipment described above, enough has been said to show the possibilities latent in its use.

As stated at the beginning of this article, the mine-labor shortage in the anthracite district is its "bugaboo." The situation is bad, but in the light of the foregoing it seems reasonable to suppose that some improvement can be made by companies that have not already installed modern machinery equipment.

When coal is burned carbon dioxide and water are the final products of complete combustion. The extent to which they are dissociated depends upon the temperature in the furnace and determines the limit of completeness of combustion.

Determination of Latitude and the Meridian

By A. C. CALLEN
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WHEN a compass mounted on a Jacob's staff was the sole instrument used by surveyors the solar attachment, invented and patented by William A Burt, in 1836, was a satisfactory means for determining the true meridian. It was recognized that the accuracy of the work was greatly increased by using the solar attachment in place of the needle. With the increasing use of the transit as the engineer's instrument it was only natural that the solar attachment should be transferred to it, in an improved and more accurate form.

Engineers are coming to realize, however, that it is difficult to keep the solar attachment in accurate adjustment, that it is an expensive "extra" and means just so much additional weight to carry. If every engineer realized that his transit is sufficient equipment for determining a meridian, doing it more accurately than by means of a solar attachment, it is probable that the use of the latter instrument would soon be obsolete.

With an instrument in good adjustment and by a little practice accurate results may be obtained. I have found that even engineering students, having no surveying experience except that gained in their elementary college work, have been able to secure results correct within about a minute of arc, after they have had a few hours' practice.

The method used is that of direct observation of the sun, which requires that a piece of colored or smoked glass be used over the eyepiece. Instrument makers supply a colored-glass eyepiece that screws on or is used instead of the regular cap. On many prismatic eyepieces there is a colored glass that swings over the opening when solar observations are to be made. If preferred, the image of the cross-hairs and the sun may be thrown on a sheet of paper or the back of a field notebook. Some engineers like this method, but I have not found it as satisfactory as the colored-glass method.

Observation for Latitude—Set up the transit at any convenient point, some time before the sun has reached his maximum altitude—that is to say, some time before true noon. Follow, with the cross-hairs, the upper or the lower edge or limb of the sun until it ceases to rise. The vertical circle will then give the greatest altitude of the observed limb of the sun. This angle is easily obtained, for the sun seems to move horizontally for a few minutes when it has reached its greatest height, and the cross-hair can be accurately set to the limb.

Observation for Determining the True Meridian—These observations should be made between 8 and 10 a.m. or 2 and 4 p.m., if possible. If made earlier than 8 a.m. or later than 4 p.m., the correction for refraction will be large and possibly inaccurate; if made later than about 10 a.m. or before 2 p.m., the sun's change in altitude is so slow that an error of 1 minute in reading the vertical circle will produce a comparatively large error in the result. Proceed as follows:

Set up the transit at one end or at any convenient point of the line whose bearing is to be determined. Having the plates clamped at zero, sight to the other end or to another point of the line and clamp the spindle or lower motion. Then, releasing the upper motion, sight the sun, bringing it, say into the upper left-hand quadrant of the cross-hairs. The sun will appear to be moving rapidly across the field; but, by using both hands to manipulate the slow-motion screws on the vertical and horizontal circles, the cross-hairs can be kept tangent to the sun, as illustrated in Fig. 1 (*a*). Record the readings of the horizontal and vertical circles and time of taking the observation. Now, quickly plunge the telescope, reverse the instrument and repeat the observation, placing the sun in the diagonally opposite quadrant as shown in Fig. 1 (*b*) and record the readings and time as before.

It is evident that the average of the readings thus obtained will give the altitude of the sun's *center* above the horizon, and the horizontal angle between the sun's center and the line at the average time of observation. The double set of observations taken not only tends to eliminate errors in the adjustment of the instrument, but brings the observations to the sun's center. The reason for making the cross-hairs tangent to the sun is that it is very difficult to place the sun in the exact center of the field of the telescope, and much greater accuracy can be secured by observing the sun in opposite quadrants and averaging the results, as explained.

In making latitude observations, also, it is possible to make double readings if the transitman is quick. Then, if the upper limb of the sun is made tangent to the horizontal cross-hair, as shown in Fig. 1 (*c*), for the first reading, and likewise the lower limb, for the second reading, as in Fig. 1 (*d*), no correction will be needed to bring the readings to the sun's center. Unless this is done, however, the semi-diameter of the sun, which is nearly 16 min. of arc (varying from about 15′ 45″ to 16′ 17″), will have to be substracted from the observed reading when observing the upper limb and added when observing the lower limb.

Owing to the refraction of the sun's rays in passing through the atmosphere, a correction for refraction must always be subtracted from the observed altitude of the sun's center before further computations are made. The amount of this correction depends on the altitude of the sun and may be obtained from the following table.

TABLE SHOWING MEAN REFRACTION CORRECTIONS TO BE SUBTRACTED FROM OBSERVED ALTITUDE IN DIRECT SOLAR OBSERVATIONS

Observed Altitude	Correction for Refraction	Observed Altitude	Correction for Refraction
10°	5′ 19″	20°	2′ 39″
11°	4′ 51″	25°	2′ 04″
12°	4′ 27″	30°	1′ 41″
13°	4′ 07″	35°	1′ 23″
14°	3′ 49″	40°	1′ 09″
15°	3′ 34″	45°	0′ 58″
16°	3′ 20″	50°	0′ 49″
17°	3′ 08″	60°	0′ 34″
18°	2′ 57″	70°	0′ 21″
19°	2′ 48″	80°	0′ 10″

Ascertaining the Sun's Declination—In calculating latitude and meridian from solar observations it is necessary to know the declination of the sun at the time

of observation. This cannot be obtained by measurement with the transit, but must be taken from the Nautical Almanac, or the Solar Ephemeris, which is published each year by practically every manufacturer of surveying instruments and can be obtained from them free of charge. The Ephemeris gives the declination of the sun for each day in the year, at Greenwich (England) noon.

In order to calculate the corresponding declination for any other time or place, it is not necessary to know

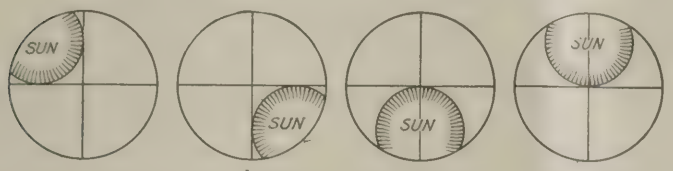


FIG. 1. APPEARANCE IN TELESCOPE WHEN OBSERVING SUN'S DISK

the longitude of the place of observation, as some assume, but only the longitude of the meridan for which the observer's watch is set. "Eastern time" is the standard time of the 75th meridian west of Greenwich; "Central time," of the 90th meridian; "Mountain time," of the 105th meridian; and "Pacific time," of the 120 meridian.

Since 15 deg. of longitude corresponds to one hour of time, it is evident that Eastern time is 5 hours behind Greenwich time, as the sun appears to move from east to west. In like manner, Central time is 6 hours, Mountain time 7 hours and Pacific time 8 hours slower than Greenwich time. To find the Greenwich time corresponding to standard time at New York, Chicago, Denver or San Francisco, it is necessary therefore to add 5, 6, 7 or 8 hours to standard time, in those localities, as indicated by the observer's watch.

Suppose, for example, it is desired to find the declination of the sun at 10 a.m. at Pittsburgh (Eastern time), May 30, 1918. This is equivalent to 3 p.m., Greenwich time. The Ephemeris gives the sun's declination, at Greenwich true noon, May 30, this year, as N. 21° 41′ 28″ and shows that this is changing at the rate of 22.8 sec. of arc each hour. For 3 p.m. therefore, since the sun's declination is increasing from Dec. 22 to June 22, the declination will be N. 21° 41′ 28″ plus three times 22.8″, or N. 21° 42′ 36″, which is the declination at Pittsburgh (or New York, Philadelphia, Bluefield, or any point having Eastern time), at 10 a.m. May 30, 1918. In like manner the declination for any other time or place may be calculated. Or, if desired, the chart devised by J. T. Beard and published in *Coal Age*, Apr. 20, p. 733, may be used instead of the method given above.

Calculation of Latitude—Having determined the altitude of the sun's center at true noon, as already described, and having obtained the declination of the sun for the time and place of observation, as well as the proper correction for refraction from the table previously given, the latitude is found by the following formula:

Lattitude = 90° — (observed altitude of sun — correction for refraction ± declination of sun)

In *north latitudes* the sign of the last term is positive if the declination is south, but negative if it is north. In *south latitudes*, the sign is positive if the declination is north, and negative if it is south.

Example—Observation taken at noon (Eastern time) at Morgantown, W. Va., May 30, 1918:

Solution—

Observed altitude of lower limb	71° 50′	
Add the semi-diameter of the sun	16′	
Altitude of sun's center	72° 06′	
Subtract correction for refraction (Table)		21″
Corrected altitude of sun's center	72° 05′	39″
Declination (Ephemeris), Greenwich noon,	21° 41′	28″ N.
Noon, Morgantown, equals 5 p.m. Greenwich.		
Add correction 5 (22.8″)		1′ 54″
Subtract declination at time of observation	21° 43′	22″ N.
	50° 22′	17″

Latitude = 90° — 50° 22′ 17″ = 39° 37′ 43″

Calculation of the True Meridian—The following formula gives the azimuth of the sun at the moment of observation.

$$Cos\ A = \pm \frac{sin\ d}{cos\ h \times cos\ l} \pm tan\ h \times tan\ l$$

A = Azimuth of the sun at time of observation;
d = Declination of sun at time of observation;
h = Altitude of sun's center corrected for refraction (Table);
l = Latitude of place of observation.

In this formula, the sign of the first term is positive if the declination is north, but negative if it is south. The sign of the second term is positive if the latitude is south, but negative if it is north. The value of cos A, as found by the formula, will generally be negative,

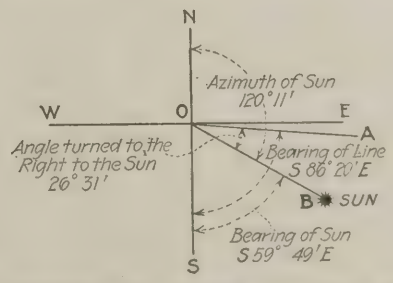


FIG. 2. DETERMINING TRUE BEARING OF SURVEY LINE BY OBSERVATION OF SUN

though it may be positive. However, the trigonometric rules for this sign will always determine in which quadrant the angle A lies.

Inasmuch as many engineers are somewhat rusty on the fine points of trigonometry it may be well to state the following rule: If cos A is negative, the bearing of the sun denoted by the angle A is southeast when the observation was made in the morning, in north latitudes; but southwest if made in the afternoon. If, however, cos A is positive, the bearing of the sun is northeast when the observation is made in the morning, in north latitudes; but northwest if made in the afternoon.

Example—Let it be required to determine the true bearing of the line OA, in Fig. 2, from the following notes obtained by direct observation of the sun, Apr. 13, 1918, in latitude N. 41° 54′, longitude, 90° W.:

Quadrant	Angle AOB	Vertical angle	Time
Upper left,	26° 20′	40° 15′	9.43 a.m.
Lower right,	26° 42′	41° 45′	9.47 a.m.
Average (sun's center),	26° 31′	41° 00′	9.45 a.m.

Solution—

9.45 a.m. (90° *W*) = 3.45 p.m. Greenwich.

Declination, noon Greenwich, Apr. 13, 1918,	N.	8″ 51′ 02″
Add Correction, 3¾(54.6″)		3′ 25″
Corrected declination (*d*)	N.	8° 54′ 27″
Altitude sun's center,		41°
Subtract correction for refraction, (see table)		0.1′ 07″
Corrected altitude (*h*)		40° 58′ 53″
Latitude (*l*)	N.	41° 54′

Substituting these values, sin d = 0.1548; cos h = 0.75492; cos l = 0.74431; tan h = 0.86872; tan l = 0.89725 in the formula previously given, we find

$$\text{Cos } A = \frac{0.15480}{0.75492 \times 0.74431} - 0.86872 \times 0.89725$$

$$= +0.27561 - 0.77946 = -0.50385$$

The azimuth of the sun is therefore 120° 11′; or, according to the rule previously given, the bearing of the sun is S 59° 49′ E (180° — 120° 11′ = 59° 49′). Since the angle AOB, turned to the right to the sun from the line was 26° 31′, the true bearing of the line OA is S 86° 20′ E (59° 49′ + 26° 31′ = 86° 20′).

It may be noted that there are several instruments on the market, which are either straight or circular slide rules, made for the purpose of solving a formula for the azimuth of the sun. Their use does not appreciably lessen the labor of making a meridian determination, however, as the readings must be made with the transit and the declination and corrected altitude of the sun determined as just described. In my opinion, it is questionable whether it pays to purchase one of these contrivances when a five-place table of trigonometric functions will be more accurate and less costly.

When the clocks have been set to accord with the "Daylight Saving Law" it is important to remember that one hour should be subtracted from clock time to give the standard time used in computing the sun's declination.

The velocity of chemical reaction increases with rise in temperature. At ordinary atmospheric temperatures the oxidation of carbon monoxide and hydrogen proceeds so slowly that the velocity of reaction can not be measured. At high temperatures and with thorough mixing, oxidation takes place rapidly; that is, the gases burn.—*Bureau of Mines Bulletin No. 135.*

Where the Coal We Produce Is Consumed

The United States Geological Survey is quoted by George S. Rice, in his "Review of the Coal Situation of the World," read before the American Institute of Mining Engineers at the February meeting, and he has furnished us the following table which gives some further details for the benefit of those who have not seen the original computation:

CONSUMPTION OF BITUMINOUS COAL IN THE UNITED STATES, 1915

Purpose	Tonnage Short Tons	Per Cent.
Industrial steam uses	143,765,500	33.0
Railroads	122,000,000	28.0
Domestic purposes and small steam trade	71,336,489	16.0
Beehive and byproduct coke	61,832,898	13.6
Exports	18,773,782	4.0
Mines for steam and power	9,798,681	2.0
Bunker coal (ocean and Great Lakes)	10,707,507	2.3
Manufacture of coal gas	4,563,579	1.0
Miscellaneous	714,073	0.1
Totals	443,492,509	100.0

Minecdotes

500 Volts Versus 250 Volts

There has always been a rather strong tendency among engineers to use 500 volts for a mine-locomotive haulage system in preference to 250 volts, owing to the great saving in copper and the better voltage regulation that is obtained.

A few years ago a well-known engineer with one of the large electrical manufacturers was emphatic in his advocacy of 500 volts for mine-haulage systems, feeling that there was practically no more personal danger than when 250 volts were used. This engineer was exceeding prolific in the use of a certain class of the English language more commonly known as "French." In fact, he could put the average oldtime Irish labor boss to shame in a short space of time.

During a visit of a number of engineers to a mine located in the vicinity of Johnstown, Penn., the party was inspecting the haulage system inside of the mine when the engineer mentioned above passed from one side of the track to the other. His hat being off, his bald head brushed the 500-volt trolley wire; and the ground being wet, the result can be imagined. Some exceedingly rapid action then took place, the mud flying about in all directions.

The engineer landed up against the rib, glared at the trolley wire and then cut loose. He kept going for about 15 min. without repeating himself, and the miners working in the vicinity, although hardened to nearly any kind of language, just stood around with their mouths open in amazement. Later, at the superintendent's office, when the incident was all but forgotten, a delegation of miners came out of the mine and asked the superintendent if that man who knew how to talk was gone; and if not, they would like to hear him talk some more.

Needless to say, after the foregoing experience the engineer strongly advised that 250 volts was the maximum which should be used for mine haulage under any conditions.

Marcus Screen at Plants of the Carnegie Coal Co., Pennsylvania

BY RICHARD G. MILLER*
Chicago, Ill.

IT HAS been said that the most vital question before the American people today is the coal problem. Authoritative opinion asserts that the labor and transportation questions are the principal difficulties in the mining and distribution of coal. Over 100,000 coal miners are subject to the draft, so that the industry is facing a serious labor problem. Moreover, according to estimates, 100,000,000 more tons of coal will be required during 1918 than during 1917, for carrying on our war program and continuing our national life. Under the existing circumstances these 100,000,000 more tons of coal likely will not be forthcoming, so it remains for us to do what we can in order that we come as near to meeting the requirements as possible. It will therefore be necessary to make the greatest use of efficient machinery and labor-saving devices in our attempt at this goal.

Transportation or the lack thereof received a good share of the blame for past and present conditions, and no doubt the car-shortage problem has to a greater or lesser degree affected the shortage of labor. Furthermore, the shipping of dirty coal not only compels the railroads to haul useless material, but it decreases the efficiency of industrial plants as well as the railroads, by reason of the increased percentage of refuse in the coal. This decrease in efficiency is not only due to the low heat value of the dirty coal, but also to the additional expense necessary for handling the larger quantity of ash.

There is a difference of opinion among people with regard to who is most responsible for this larger percentage of refuse in the coal. Some think it is due to the defects in the producing organization, while others think that the miners are more to blame. However, the blame in many instances, no doubt, should be shared by both.

Methods of Removing Impurities

In some localities mining conditions are such that it is not advisable or practical to attempt to eliminate all the removable refuse at the face; while there are many instances where coal, devoid of rock or slate, could readily be delivered to the tipple or screening equipment. However, operators have an opportunity at this time to manifest their patriotism and provide themselves, where necessary, with adequate means for removing as large a percentage as possible of the slate, rock, bony coal or sulphur balls from the good coal at the tipple before loading into the railroad cars.

Of course, each particular mine has its own set of conditions to consider in determining just what methods should be provided for producing a coal with a minimum percentage of ash. All the measures adopted should be made fully adequate to the task to be imposed upon them irrespective of the enormous demand for coal, or the price paid for it; the former has run riot, while the latter has been regulated by the Government.

Many operators have had the foresight to include in the design of their plants special machinery and equipment for improving the quality of their product. Those now in a position to market, and also those who can modify their facilities for marketing a better prepared product, should receive recognition from the Fuel Administration by the granting of an additional price per ton to such operators. The justification for this premium, whatever the merits of a particular case may warrant, will be due to the additional investment required for the special means and the additional labor also required for obtaining the "extraordinarily clean coal."

Problems in Coal Cleaning

In deciding upon the type of equipment, many features of existing plants govern the procedure, due to the fact that the impurities in the various coals exist in different forms, and also that in one size they are different from that in another. For example, it may happen that the lump coal at a particular plant carries with it most of the removable refuse either as rock, slate, bone or sulphur balls, while the nut or egg coal at another plant might carry these impurities. It therefore may be necessary in one case to use one method of elimination and in the other case some other method.

If, however, these impurities occur in the finer sizes of coal, a more complex method of improving the quality, such as washing, might be necessary. The coarser sizes at most mines are the grades which could be more easily improved by simpler methods. If a large part of the impurities in these sizes could be picked out by the addition, to existing plants, of a moderate amount of simple picking machinery (especially the Marcus combined screen and picking table), then the necessary additional investment and labor required for manning the improvements would be small in proportion to the improvement in the product.

Coal companies in various localities have adopted picking facilities of one or another type. It is notable at this time to observe that especially in the western Pennsylvania field, such companies as the Pittsburgh Coal Co., the Pennsylvania Coal and Coke Corporation and the Carnegie Coal Co. have adopted the combined screen and picking table as a means of meeting the present situation in the most economical way. This is true both as to the necessary investment of capital and the labor required for producing a coal with the minimum amount of ash without going to the necessity of washing. It is desirable to avoid washing except where the coal is used for coking purposes, in which

*Contracting engineer of the Roberts & Schaefer Co., engineers and contractors, McCormick Building, Chicago, Illinois.

case low ash and also low sulphur are imperative. These and other coal companies who have adopted the Marcus screen are in a position to ship "extraordinarily clean coal" and thereby receive an additional price per ton by obtaining permission from the Fuel Administration.

The organizations mentioned above have, all told, 17 of their properties equipped as stated, but the Carnegie Coal Co., with six operating properties near Pittsburgh, is in a class by itself, having six tipples provided with seven of the Marcus horizontal combined screens and picking tables.

One of these installations is a new plant, while the rest are old plants worked over, the old plants having previously been equipped with the old style gravity bar screens and weigh baskets.

New Carnegie Plant

The new plant of the Carnegie Coal Co. is at the Louise mine, illustrated by Fig. 1A and shown diagrammatically in Fig. 1. This plant is unique for the reason that the Marcus screen *A* is designed so that a car of coal is dumped into the dump chute, fed by means of the feeder *B* so that the preceding car of coal remains separate on the screen from the car following and the removable refuse is picked out by pickers after the fine or slack coal passes to the bottom deck.

When the picking operation is completed the coal enters the weigh hopper *G*, the pickings never being weighed, so that the miner in no case is paid for the removable dirt in the coal. Moreover, the speed of the coal on the screen is such, and the arrangement of the screenhouse and the position of the weighman is such, that if a car of coal comes along which contains an extra large quantity of dirt, then the equipment is stopped for an instant—long enough to completely remove all of these visible impurities.

The miners knowing this are therefore more careful not to waste their time filling a car with dirt, because it would be useless to them. It might be said in passing that this design was more or less experimental at the time it was developed, but with only a few minor changes in details after erection it was made to work most satisfactorily.

If Fig. 1 is carefully followed, it will be noticed that the lump coal is delivered by means of the shaker loading boom *I* to the center track, while the nut coal is loaded by the chute *N* to the outside track and the slack coal by the chute *S* to the inside track.

Figs. 2, 3, 4, 5 and 6 are diagrams of the McDonald, Atlasburg, Primrose, Armide and Oakdale plants respectively, all of which illustrate installations at existing tipples. All these tipples, with the exception of the Atlasburg plant, are single Marcus screen installations; the Atlasburg plant is a shaft mine and provided with duplicate equipment.

In Fig. 2 the coal is dumped into a weigh hopper, the weighing and operating mechanism of which is suspended overhead. The reciprocating feeder *B* feeds the coal onto the horizontal screen *A*, after which it passes successively over the slack perforated screen, the blank picking space and then the nut perforated screen.

By this procedure, the fine coal is first removed from the coarser sizes so that the removable impurities can be more easily seen and removed because of the decreased quantity of coal on the combined screen and picking table. These finer sizes pass to the lower deck, and in the case of the slack coal is immediately loaded into railroad cars on the slack track by the chute *S;* the nut is loaded into railroad cars on the center track by the chute *N* and the lump over the shaker loading boom *I* is loaded on the outside track. The pickers remove the rock, slate, bony coal or sulphur balls, throwing them into the refuse trough *F*, which being rigidly attached to the screen conveys them forward, delivering them by means of the chute *K* to a refuse car for the purposes of disposal.

This arrangement of combined screening and picking machinery gives the most perfect screening and loading facilities as well as a most efficient means for picking. Obviously this design lends itself readily to installation in existing structures, which is quite in its favor, in addition to the greatly improved preparation that is thus made possible.

Coming to a discussion of the Atlasburg plant, which is illustrated diagrammatically in Fig. 3, we have an example of a duplicate horizontal equipment as applied to a shaft tipple. The original plant was of steel construction and with slight modifications in it the equipment readily adapted itself, giving all the advantages of modern screening and picking. The weigh basket *G* was changed to a double bottom discharge type so that it became necessary to furnish a new dump chute designed with doors for the disposition of mine rock by way of the rock chute *O*. The car on the rock trestle carries this to a rock pile not shown in the diagram. From the weigh basket *G* the coal from either or both self-dumping cages is delivered to either or both of the reciprocating feeders *B* and onto the Marcus screens *A*. The operation of these screens is the same as previously described, including the feature of the fixed refuse trough *F* for delivering pickings to the pickings chute *K*.



FIG. 1A. VIEW OF TIPPLE SHOWN IN FIG. 1

One point of difference, however, is that this is a four-track equipment, which lends itself to loading lump coal from one Marcus screen over the shaker loading boom *I;* picked run-of-mine or picked egg and lump combined can be loaded on the second track, or *vice versa;* at the same time slack coal and nut coal can be loaded from either or both screens to the railroad

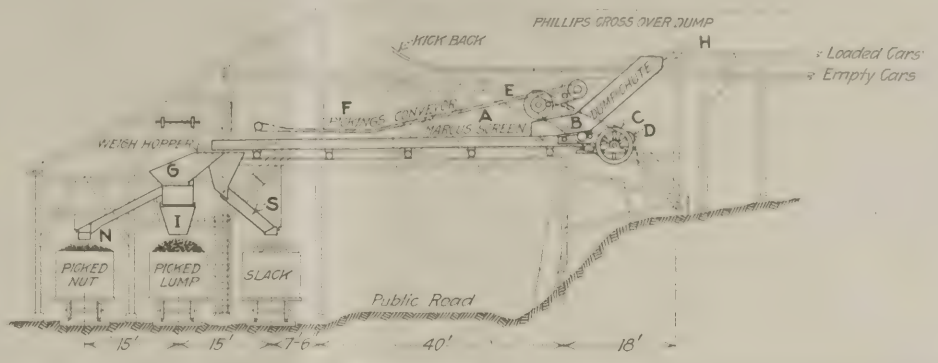


FIG. 1

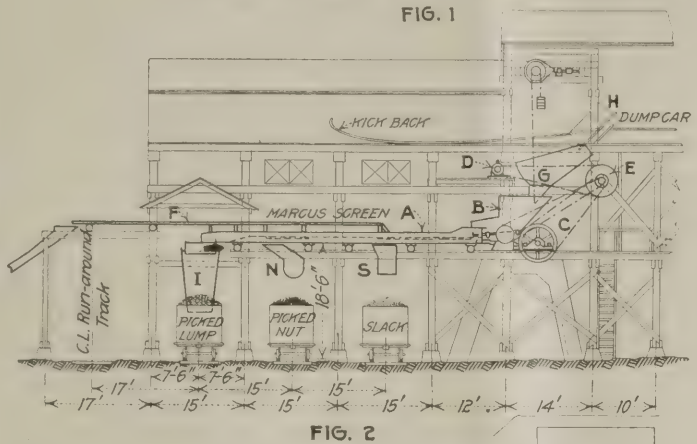


FIG. 2

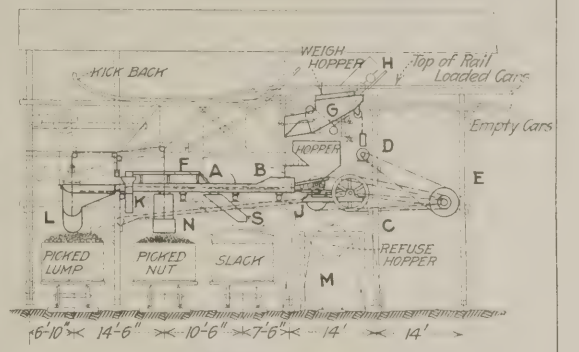


FIG. 4

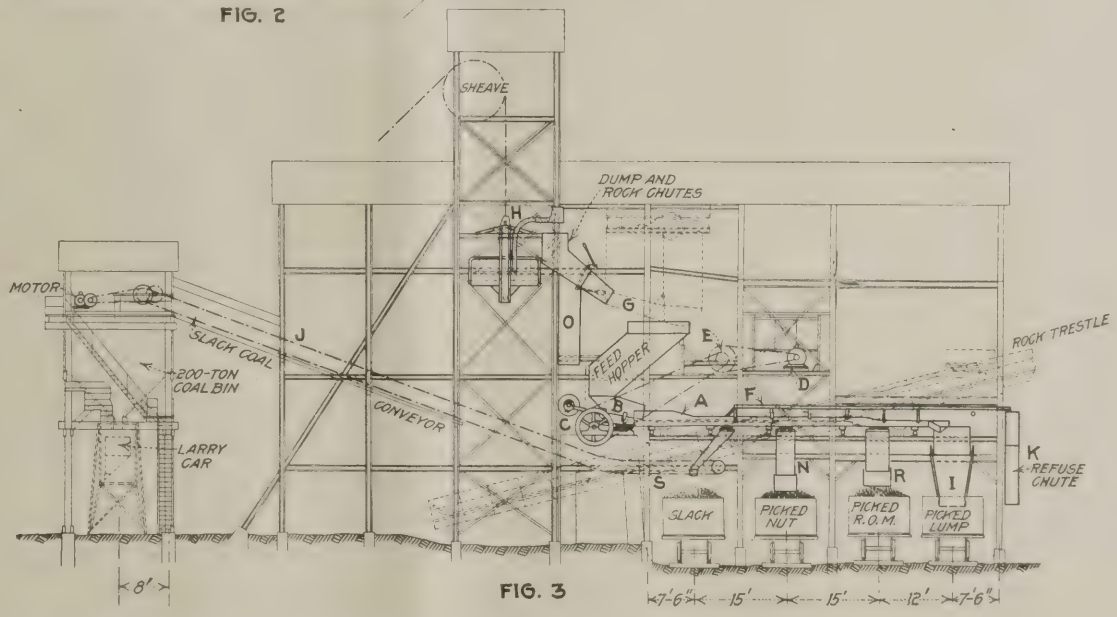


FIG. 3

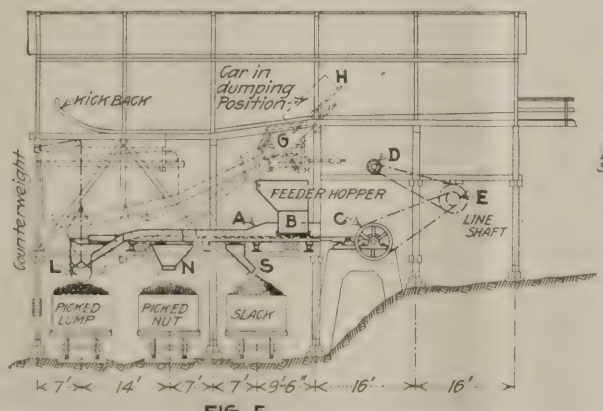


FIG. 5

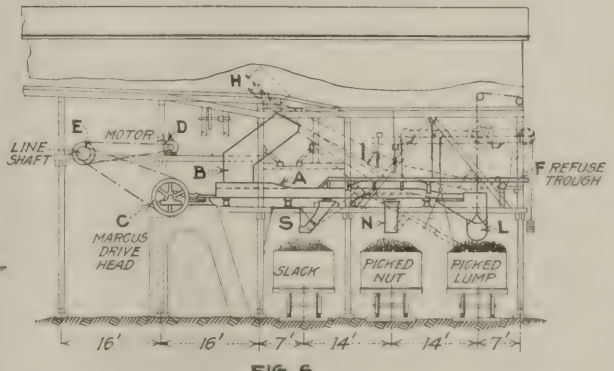


FIG. 6

FIGS. 1 TO 6. PLANTS OF CARNEGIE COAL CO. IN WHICH MARCUS SCREEN HAS BEEN INSTALLED

cars on the slack track by way of the chute *S;* or railroad cars can be loaded on the nut track by way of the chute *N*. This point in the design adds to the flexibility of operation in the case of emergency, which is a valuable asset at any coal-preparation plant. In connection with this installation, also, the slack conveyor *J* can receive slack coal from either or both screens and deliver to the 200-ton coal bin on the left for loading larries to charge the coke ovens. The installing of this equipment at the Atlasburg plant was done without interfering with the operation of the mine or hoisting of coal.

The Primrose plant, as illustrated in Fig. 4; the Armide plant, Fig. 5; as well as the Oakdale plant, Fig. 6, are similar equipments of the same type of machinery which was installed where the old gravity bar screens and weigh baskets were undisturbed. These are shown in light dotted lines, whereas the new equipment is shown bolder. Each is a three-track arrangement making lump, nut and slack coal. Loading booms in these three cases were not required for the lump coal, and the plant illustrated in Fig. 5 is not equipped for refuse disposal as the nature of the coal and preparation required did not demand it.

At Primrose the standard rigidly connected refuse trough *F* is shorter than usual, delivering sideways to the chute *K* into the pickings conveyor *J*. This arrangement facilitates operation by taking the pickings to the rear for disposal; having this fixed refuse trough *F* makes it convenient for depositing the pickings as they are removed from the coal.

The disposal of refuse at the Oakdale plant is done in a manner similar to that described for the McDonald plant, illustrated in Fig. 2. For feeding the screens at Armide and Oakdale, and to facilitate installing them without disturbing the existing bar-screen equipment, the feeders in these two cases were placed at right angles to the screen, which will be noticed by observing the diagrams.

The principal thing to bear in mind in considering these installations, which are intended to facilitate removing the refuse as well as to improve screening, is that in each and every case the fine coal is screened from the run-of-mine coal before any picking is done. This leaves the coarser sizes by themselves and in lesser quantities, so that pickers can see the bone, slate, rock or sulphur balls and therefore can better remove them.

Another big advantage, and this is that after picking is accomplished the finer sizes, screened out at the start, travel to the front end of the screen by closing the slide gates on the bottom deck; here they combine with the picked coarser sizes, giving a picked run-of-mine product mixed as uniformly as it was before the separation at the start of the process.

It is obvious that coals with a large percentage of slack, therefore, are the ones most conveniently picked by this method. For the general run of cases it is a more efficient method as regards operation, because usually about one-third of the run-of-mine coal is black which passes to the lower deck of the Marcus, relieving the picking operation therefore of one-third of the volume of coal. Furthermore, after the coal on the screen passes the nut perforations the egg and lump in lesser volume are more easily picked; after the egg coal passes through the egg screen, the lump coal alone remains and can be picked just before it reaches the lump chute or loading boom.

Every engineer interested in the preparation of coal in all probability has at one time or another felt the need of a combination arrangement whereby coal could be simultaneously cleaned and screened, and it therefore seems strange that until recently a device of this sort had not been developed.

It has been approximately four years since the Marcus combined screen and picking table was introduced into the United States. Previously to that time it had been thoroughly tried out in foreign countries, including among others England, Germany, Algiers, Borneo, Japan, South America, Mexico and Canada.

At the present time in the United States there are more than 100 of this class of coal-preparation plants in operation and building. It is interesting to note that the application of this device has been very general, applying itself to all classes of bituminous coal, including the harder, medium and softer grades as well as the lignites and semi-bituminous coals. These plants are in operation from Wyoming to Pennsylvania and from North Dakota to Alabama.

The installations described and illustrated, and as put in operation for the Carnegie Coal Co., were all designed and built by the Roberts & Schaefer Co., of Chicago, Illinois.

Some New Ideas in Coal Storage

A recent article by Prof. George Knox, published in the Journal of the Monmouthshire Colliery Officials Association, while it advises that no slack coal or mixed small coals be stacked to a height of over 13 ft., urges that coal for coking purposes should not be piled more than 4 ft. deep, for slight heating renders the coal unfit for coking purposes.

Professor Knox adds that inferior coal should not be mixed with the better varieties. "Rashings" or other friable bituminous shale bands should be removed as far as possible. Coal should never be stacked behind wooden structures, on moist vegetable soils or on ground covered by coarse vegetation. Mr. Knox does not say why the vegetation is objectionable, but it may be because it has in itself a great tendency to heat. It probably does not have any direct, or chemical, effect on the coal.

Where "Byproductless" Ovens Waste Coal

The following tabulation has been made from the enumerations of ovens in the various states of the union, as made by *The Coal Catalog* :

State	Beehive Ovens	Rectangular Ovens	Total Ovens	Per Cent.
1. Pennsylvania	45,523	3,185	48,708	57.41
2. West Virginia	16,511	.....	16,511	19.46
3. Alabama	6,111	.....	6,111	7.20
4. Virginia	5,082	.....	5,082	5.99
5. Colorado	2,994	.....	2,994	3.53
6. Tennessee	2,003	.....	2,003	2.36
7. Kentucky	875	150	1,025	1.21
8. Utah	874	.....	874	1.03
9. New Mexico	817	.....	817	0.96
10. Washington	232	.....	232	0.28
11. Oklahoma	200	.....	200	0.24
12. Ohio	178	.....	178	0.21
13. Illinois	104	.....	104	0.12
	81,504	3,335	84,839	100.00

The number will probably decline from this time onward, as the byproduct oven will doubtless drive out the "byproductless" oven in a few short years.

Coal Production and Lubrication

BY REGINALD TRAUTSCHOLD
New York City

SYNOPSIS—*The greatest problem in coal production, outside of railroad car supply, is transportation from the face to the tipple. Heretofore a cheap grade of fluid, black oil, has been used in large quantities. Much of this has dripped or run out of the bearings without performing the service for which it was used. More modern semi-grease compounds have in service given much better results.*

A RECORD production of bituminous coal, an anthracite output close to normal, and the prospect that the car shortage will soon be relieved go far toward removing some of the pessimistic forebodings of a few weeks ago. Although these conditions seem to have engendered a feeling of optimism for the time being, the growing scarcity of labor is, nevertheless, viewed with much disquietude.

This mixture of emotions is further enhanced by the discouraging reports from the anthracite fields. In certain mines, despite the fact that the number of persons engaged in production of coal has increased, there has been a marked diminution in output. This decrease in labor productiveness is explained by poor attendance. Absences on the part of the workers ran from 8 to 15 per cent.

A production of coal decreasing more rapidly than the available labor supply would be a calamity to the country, yet the report from the anthracite field would appear to indicate such a possibility. To guard against this, and to secure a material increase in production with the growing scarcity of labor is one of the country's vital problems, to realize which every ounce of energy and precaution must be expended. Coal production must be increased in spite of the labor situation and this can only be accomplished through material improvements in present-day conditions.

Should Use Every Available Mechanical Aid

Every effective mechanical aid must be pressed into service. Unnecessary absences must be prevented, the efficiency of the workers must be increased and this can be realized by placing more and more dependence upon mechanical assistance and by decreasing the manual efforts required of the miners and their helpers.

The more general use of mining machines, mine-car loaders and the numerous other mechanical aids of proved value now on the market will all materially assist in securing coal with a minimum amount of labor. Production in a mine employing adequate mechanical aids resolves itself, to a considerable extent, into a problem of expediting and facilitating the movement of mine cars from the face of the coal to the tipple.

The gradual withdrawal of the time-honored mine mule to the more urgent work on the battlefield and behind the lines—work for which "Maud" appears to be particularly qualified, and for which she must be spared—necessitates the installation of mechanical systems of mine-car haulage. The passing of the mule tends to cut down the number of persons required, since by locomotive longer trains can be handled. In this way the changed conditions tend to adjust production to reduced labor supply. It is not enough, however, that production be maintained in spite of a decrease in the working force; it must be materially increased.

Speed of passage through the haulageways and facility in moving the cars are thus essential if the gains in output which can be secured at the face are to be fully realized and effective advantage taken of the speed with which the cars can be dumped at the shaft bottom or on the tipple. The problem is primarily one of improvement in rolling stock, and any modification, practice or installation which will lighten the labor of handling the mine cars must be adopted. Obviously, the first step in this direction is a complete overhauling of all mining equipment, the equalization of grades and, of chief importance, the securing of proper lubrication.

Importance of Lubrication in Coal Mining

How important the question of lubrication is to a coal mine may be judged from the quantities of lubricants annually consumed. In one anthracite mine with an annual output of somewhat less than 4 million tons, close to 50 tons of grease were required and some 53,000 gal. or more of liquid lubricants. Starting from the power house, proper lubrication is required for every piece of moving equipment—engines, pumps, etc.—but the major amount of lubricant is employed for the mine cars. At this particular mine, which is typical of the great majority of such operations throughout the country, 60 per cent. of the total lubricant consumed was car oil. Thus, about 0.0136 gal. of car oil was used for every ton of coal mined.

Obviously there is here an important opportunity for economy in the use of lubricant and an accompanying saving in the attention which must be given to mine cars. No such quantity of lubricant would be required if it effectively discharged the service for which it was supplied. Not only can a lubricant be ineffective, but a considerable amount of time may be consumed in the frequent refillings that such lavish use necessitates. Quite aside from the questionable economy of such lubrication is the consideration of the labor required in feeding the oil to the journal boxes or bearings.

Heavy railway cars require replenishment of lubricant only every 1000 to 3000 miles, while mine cars are considered to be giving good service when they average 50 miles per oiling. Emphasizing still further the inefficiency of ordinary mine-car lubrication is the fact that from one-quarter to one-half the power generated at the colliery is used for mine haulage.

The car oil in use at the mine under consideration, as in many others throughout the country, was "black oil." This lubricant is employed chiefly because it is cheap. Much of it drips from the bearings without performing any useful work. Tests have shown that when such oil is used for mine-car lubrication, from 50 to 90 per cent. of it is wasted. Any such inefficient lubrication would

not be tolerated outside of a mine, and the use of this oil is here accepted solely because it has always been considered the suitable lubricant. This is an example of the blind acceptance of dangerous traditions.

Not only is from two to ten times as much "black strap" as is effective in combating journal friction required when using such oil for lubrication of mine cars, but the dripping oil is apt to fall on the track and cause a lack of grip of the driving wheels on the rails. The floors of the haulageways become oil-soaked, making footing insecure and materially increasing the already high fire risk of a coal mine. The use of any lubricants that are easily volatilized should be prohibited, particularly when other far more stable and effective lubricants are easily obtainable.

A mine-car lubricant in order to be considered satisfactory today must be one of high lubricating value, unusual tenacity—a tenacity equal to that of a high-grade grease in order to guard against drippage and to prevent its being squeezed out of the bearing under load; impervious to acid and alkali solutions or fumes with which it may come in contact and of lasting qualities in order to economize in labor for lubricating. These exacting requirements, important as they are at any time, are infinitely more so at present if the coal demands of the country are to be met. The use of such a lubricant (which is now obtainable) would cut down the frequency of lubricating periods to one each three to six months, reduce the tractive force required to start and move mine cars and greatly improve operation.

Proper Lubrication a Matter of Test

General lubricant requirements for bettering the operating conditions have been enumerated before taking up the more specific requirements imposed by the type of mine-car bearing or journal construction, in order to emphasize the necessity of exercising great care in the selection of lubricants. The construction of the bearing should be given proper consideration in selecting the most effective lubricant. A lubricant best suited for a roller-bearing construction, for instance, does not prove to be the best suited for the lubrication of a plain-bearing wheel.

The importance of bearing construction on lubrication was appreciated even when an oil was recommended which could be wasted without entailing a heavy monetary loss.

The bearing and journal constructions employed for mine cars affect primarily the amount of tractive force required for their movement. The effective operation of the existing mine rolling stock is now of more importance than the immediate installation of more efficient running gears. All available mine cars must be put into service, operated to the best possible advantage, and the lubrication of any type of bearing construction not allowed to jeopardize the rate of handling coal by cars equipped with other types of running gears. That is, the evils incident to the use of lubricants readily affected by changes in temperature, whether these be climatic or originate in the bearings, must be avoided.

For mine cars, a lubricant is required that will not drip, spatter or climb, one with the tenacity of a high-grade grease, but without its failing of having to melt before it can function. These exacting requirements are possessed by certain products now on the market, the products of specialists who have made an intimate study of the lubrication requirements of mine cars and the conditions under which effective service has to be discharged.

In many instances the trucks of the mine car may pass through water, necessitating an insoluble lubricant. Frequently this water is strongly charged with acid or alkali, under which conditions the lubricant must be impervious to the action of such solutions. Gases and fumes of a penetrating and corroding nature are also sometimes encountered, and the lubricant must resist the attack of such mediums and be able to protect the bearing surfaces from them. It is imperative, also, that the lubricant possess lasting qualities, for the lubrication of mine cars should be unnecessary more than three or four times a year.

Any mine-car lubricant that fails to function effectively under any of these conditions possesses a failing which may cause an interruption to the continuous and rapid movement of cars necessitated by the intensive operation of the mine. The requisite lubricant must be one which will not fail in its service under the most trying conditions. It should be, then, a special product of a lubricant manufacturer with wide experience in the specialty field. Among such products are the Slo-flo lubricants made by the Swan & Finch Co., of New York.

The lubrication of plain car wheels or journal boxes calls for a lubricant of the consistency of a medium grade of cup grease when reduced to lubricating consistency. The grade of the above lubricant best suited for this service is classified as No. 28. This is also admirably suited for use with solid roller bearings, since its consistency is sufficiently free flowing as not to interfere with the effective functioning of the rollers and at the same time is of sufficient body to withstand the heavy "squeegee" action of the rollers on the bearing surfaces of the shaft and cage.

For securing the best efficiency from the distinctive hollow roller construction of the Hyatt bearing, a slightly lighter lubricant is advisable. The hollow rollers act as reservoirs for the storage of lubricant and the helical flexible construction—alternate rollers wound in opposite directions—causes the lubricant to be distributed continuously over the bearing surface, first in one direction and then in the other. This wash back and forth assures even and continual lubrication of bearing surfaces, permitting the use of a more free flowing lubricant than could be advisably employed for bearings with the ordinary solid type of roller. The grade developed for use with the Hyatt construction of bearing is No. 27.

The use of either of the two grades of lubricant specifically mentioned, or that of any other particular brand or grade, cannot as a matter of course assure an increase in coal production. As aids toward such an end, however, they are extremely valuable. Coal can be cut with mining machines to meet almost any demand, despite the growing labor shortage; almost any capacity can be handled on the tipples, prepared for the market and, it is hoped, dispatched to distributing points and industrial centers. The vital consideration now, therefore, is to expedite the movement of the coal from the face to the tipple. And in this connection proper lubrication plays an exceedingly important part.

DEPARTMENT OF HUMAN INTEREST

Using Moving Pictures for Education

The Bureau of Commercial Economics, Washington, D. C., has the germ of a great idea, an idea which it is impossible to put immediately into complete execution, but one which is to be welcomed even in its initiatory stages. It is to prepare a series of moving pictures for the education of the public and the individuals in industry and to give through the eye the impressions which the tongue fails to convey because of its restricted powers of expression and because of the barriers set up by the many different languages of the diverse peoples who have thronged within our gates.

The bureau has already a coal film. It is not to all appearance well adapted to the teaching of mining, but it does, at least, show the importance of the industry in the present juncture. That is a message well worthy of the telling. The mine worker needs to realize the fact that his industry is basic and necessary to the proper conduct of the war.

Under the head of "mining" in the coal film is shown prospecting, boring, mine construction, operation of breakers, the loading of railroad cars, the shipment of coal, distribution and storage. Similarly the "oil refining" film illustrates the boring, casing, piping and tanking of oil, and the "refinery" film shows the separated products, the barreling of oil, pipe-line transportation and storage.

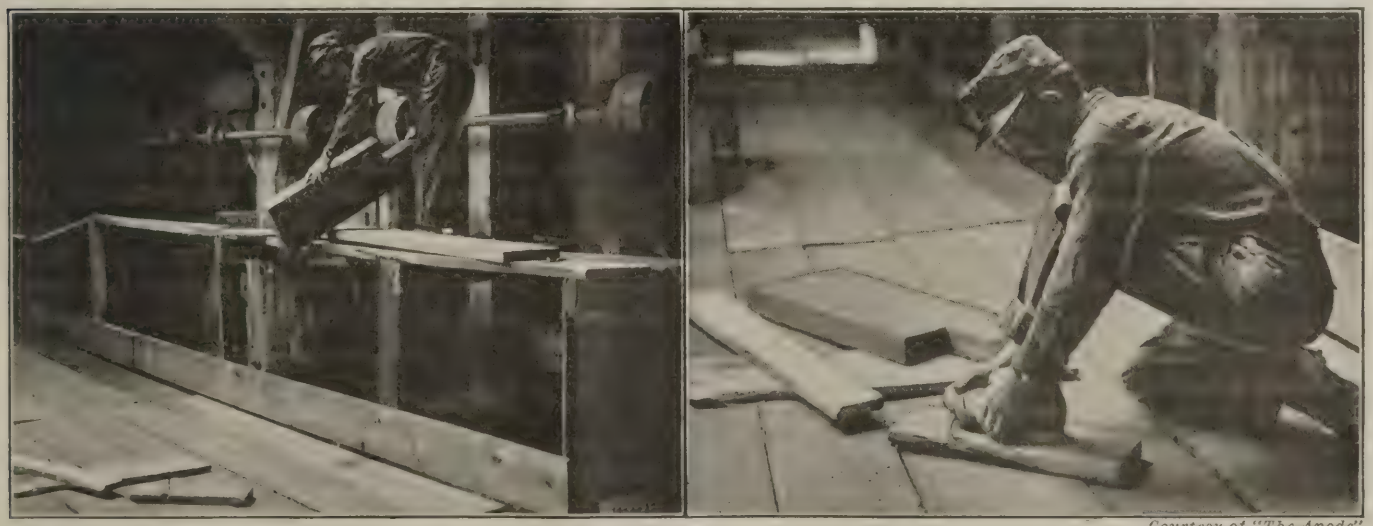
Other pictures give the mine worker an idea of the vast number and variety of the products made from coal, including, of course, in this such explosives as picric acid and trinitrotoluol. Thus they give him a realization of the dependence of the country on his active labors and in this manner stimulate his patriotism and urge him to larger service.

The Bureau of Commercial Economics is prepared to loan to any coal company any of its films. It does this through the various coöperating universities situatedthe all over the country, which act as service stations to any coal organization requiring the use of them. No charge is made for the service except for transportation charges from and to the distributing center.

The bureau requires that the films be shown on a standard motion-picture projector and manipulated by an experienced operator. It expects a report of the films shown and the number of persons who see them, and it further stipulates that no admission fees be charged when the film is shown. A booklet has been prepared by the bureau giving a partial list of the available subjects. The institution is maintained by voluntary subscriptions and annuities on which it depends for an extension of its activities.

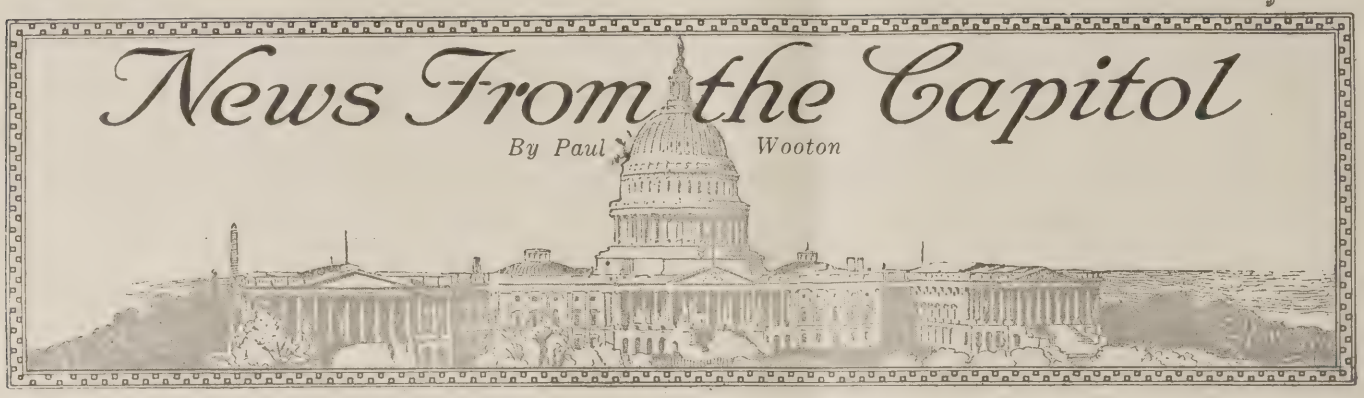
May Injured Employees Select Doctor?

The question of a coal company's liability for the doctor bill of an employee who refuses to avail himself of the services of the company's physicians and engages his own is involved in two writs of certiorari which have been obtained at Carlinville, Ill., by the Superior Coal Co. One is against Samuel O'Neil and the Industrial Commission of Illinois and the other is against John O'Berta. O'Neil was injured in the company's mine Oct. 16, 1917. Although the company had five physicians at Gillespie and two at Benld, and the employees had been so notified, O'Neil consulted others and their bill of $44.70 was presented to the arbitrators of the Industrial Commission and the company was notified to pay it. The company in the writ raises the objection that allowance of the bill is against the provisions of the compensation act. The circumstances in the O'Berta case are the same. His doctor and hospital bill is $97. He also filed a claim for $156 for wages lost and afterward raised this to $1731. The company claims all these charges are against the provisions of the compensation act.



Courtesy of "The Anode"

WHEN WILL WE LEARN THE EVER-PRESENT DANGERS OF THE UPTURNED NAIL AND OF THE THIN WELL-WORN SHOE SOLE?



Unforeseen Coal Demands Drain Supply

Rapid increases in the demands being made on this country's coal supply are viewed with growing alarm at the Fuel Administration. Not a week passes that does not see a new or an additional requirement which had not been included in former estimates. A recent call for coal for use in France and another to take care of an English obligation in Chile are the latest types of demand of which no previous calculation had been made. It is this continual drain on our supplies which is spurring both the production and the conservation division to their maximum effort.

Some see hope in the fact that both France and England have been able to increase their production materially after the first two years of war, during which production declined considerably. While coal production in the United States increased 10 per cent. during our first year of war, and promises to increase another 10 per cent. this second year, it may be possible to make even a larger proportionate increase next year. Since it was possible for England and France to attain important increases in production after sufficient time had elapsed to permit of more thorough organization of the industry, it is reasoned that we, too, will find ways and means of mining coal in greater volume.

High Production in Many Districts

Production records are being made in many coal districts. Alabama, during the week ended July 13, produced 412,478 tons. The previous high record for the district was 379,737 tons. The Big Sandy and the Elkhorn districts of Kentucky report the production of 157,996 tons during the same week. The best previous performance was 137,993 tons. Central Pennsylvania exceeded its previous high record of 1,175,883 tons by 150,000 tons. The Uniontown district of Pennsylvania exceeded the best previous record by 8000 tons.

Dealers Fail to File Weekly Reports

Railroad station agents are to divert coal consigned to dealers who have not filed weekly reports with the Fuel Administration. July 1 there were 750 dealers in New England who were delinquent in their reports. They were given until July 10 to get them in. All but 70 complied. Of the number to whom all shipments were denied, 37 are located in Maine, 20 in Massachusetts, 5 in Rhode Island, 3 in Connecticut, 3 in New Hampshire and 2 in Vermont.

Ohio Distributor's License Revoked

John W. Moore, of Columbus, Ohio, has been deprived of his fuel distributor's license for the violation of the regulations with regard to the distribution of coal. The Elk Coal Co., of which he is president, has been ordered to refund several thousand dollars which it had collected in commissions on transactions which had been carried on under the license issued personally to its president.

Lightless Nights Again in Effect

Thousands of tons of coal will be saved, it is estimated, by the new lightless night order. For four days of the week—Monday, Tuesday, Wednesday and Thursday—the New England states, New York, Pennsylvania, New Jersey, Delaware, Maryland and the District of Columbia have been ordered to discontinue the use of all illuminating signs and lights used for the external ornamentation of any building. In all the other states lightless nights are to be observed on Monday and Tuesday of each week. Roof gardens, outdoor restaurants and outdoor moving picture theaters are excepted in all sections.

All public lighting is to be reduced to that necessary for safety. Certain standards will be arrived at so that the local officials of the Fuel Administration will be able to secure the same degree of compliance throughout the country.

The Bureau of Standards estimates that 500,000 tons of coal are used in generating the electricity required for advertising purposes. Advertising lighting in New York City is responsible for the consumption of 16,000 tons per year.

To Increase Anthracite Supply to New York

During April, May and June New York City received slightly more than its allotment of anthracite coal. Movement into New York is to be increased as much as possible during the next three months, so as to cut down the amount which it will be necessary to handle after the coming of cold weather.

New England Hard Coal Shipments

During April, May and June 3,250,000 tons of anthracite moved into New England. The total which must be moved during the coal year is 10,331,000 tons. It is the aim of the Fuel Administration to move two-thirds of the total before the winter season begins.

Limits Use of Smokeless Coal

Smokeless coal passing into consumption by way of the Lake docks must be used solely for the manufacture of illuminating gas, byproduct coke or coal briquettes. If a specific case should arise where it is imperative to use low-volatile coal for another purpose, a special permit may be issued by the district representative of the Fuel Administration.

To Receive Preference in Anthracite

Communities which would experience the greatest inconvenience in changing from anthracite to bituminous coal are to be given preference in allotting the supplies which have been portioned out. This policy of the Fuel Administration became known when fuel administrators in Michigan, Ohio, Indiana and Illinois were given instructions as to how each state's proportion of anthracite is to be allocated.

To Cut Off Fuel Supply from Consumers Who Fail to Answer Questionnaires

It is feared at the Fuel Administration that it is going to be necessary to take drastic steps to secure responses from the questionnaires recently sent to consumers. Experience at the Fuel Administration has demonstrated that the most practicable way of securing compliance from the dilatory ones is to cut off coal supply. Since a great deal depends on the conclusions which must be drawn from the information asked of the consumers, there will be no hesitation in diverting their coal supply until the data requested are furnished.

Many Applications for Opening New Mines

So great has become the demand for a more lenient policy in the matter of granting permits for the opening of new coal mines, that a survey of the situation is in progress. More than 500 applications for permission to open new mines have been received by the Fuel Administration in the last six months. Only a few permits have been granted. Most of the requests have received unfavorable action on account of the fact that labor and transportation conditions in the district where it is proposed to open the mines are such that new operations would be likely to retard present production. It is recognized, however, that the development of new properties should not be retarded too long, and the matter is to be the subject of conferences in the near future between Samuel A. Taylor, the engineer adviser of Doctor Garfield, and interested operators.

Brief Washington Notes

An important part of the funds obtained by the Bethlehem Steel Corporation from the War Finance Corporation is to be expended for coke ovens at the Sparrows Point plant.

The Senate has passed Senator Gronna's bill authorizing the Bureau of Mines to spend $150,000 in the investigation of lignite coals to determine the practicability of their utilization.

Anthracite Shipments for June

The shipments of anthracite for June, as reported to the Anthracite Bureau of Information in Philadelphia, amounted to 6,867,669 long tons, as compared with 6,887,256 tons in May, and with 7,049,037 tons in June, 1917. These figures show that so far as the total tonnage is concerned, the output is being well maintained, shipments for June being only 19,587 tons less than in May of this year, and 181,368 tons less than in June, 1917, in both of which months the calendar provided 26 working days as against 25 days in June.

The average daily shipments were 271,117 tons in June, 1917; 264,894 tons in May, and 274,707 tons in June of this year. The effect of the labor scarcity is, however, being increasingly felt, as shown in the comparisons of the shipments of domestic sizes, practically all of which are from fresh-mined coal.

In June, 1917, the shipments of domestic sizes, including pea coal, amounted to 4,781,969 tons; in June of this year they fell to 4,498,976 tons, a decrease of 282,993 tons, or about 100,000 tons more than the total decrease last month as compared with a year ago.

In the first three months of the present coal year, beginning April 1, the total shipments have amounted to 20,123,298 tons as compared with 19,558,861 tons for the corresponding period in 1917, indicating an increase of 564,437 tons. The shipments of domestic sizes, however, show a loss of 95,908 tons from 13,375,797 tons in 1917 to 13,279,889 tons in 1918.

The shipments of steam coal, a goodly proportion of which is recovered from culm banks, increased 660,345 tons or over 10 per cent. Distributed by carrier companies the shipments during June were as follows:

	June, 1918	June, 1917	Coal Year, 1918	Coal Year, 1917
P. & R. Ry.	1,345,079	1,341,370	3,935,469	3,686,981
L. V. R.R.	1,352,820	1,347,205	3,856,311	3,611,595
C. R.R. of N. J.	622,005	632,402	1,717,865	1,775,670
D., L. & W. R.R.	1,015,438	1,085,072	3,061,059	3,069,179
D. & H. Co.	773,691	818,337	2,371,234	2,232,110
Penna. R.R.	482,737	500,037	1,424,491	1,431,403
Erie R.R.	756,257	807,047	2,212,879	2,258,651
N. Y., O. & W. Ry.	186,948	181,965	549,670	506,530
L. & N. E. R.R.	332,694	335,602	994,320	986,742
	6,867,669	7,049,037	20,123,298	19,558,861

Wagon Miners Combine

Between 300 and 400 owners of wagon mines met at Pittsburgh, June 27, and formed the Wagon Mine Owners' Association, the following officers being elected: H. S. Morrow, Frankstown road, Penn township, president; A. Audley Pierce, McKeesport, vice president; R. B. MacPherson, West End; Frederick W. Scott, Fair Haven; D. B. Sober, Tarentum; James L. Steele, Crafton, and F. J. Riddle, Turtle Creek, vice presidents; A. W. Mendel, North Side, secretary, and Hyatt M. Cribbs, Verona, treasurer.

The association so far includes few wagon-mine owners outside of Allegheny County, but the members are anticipating an extension of the list so as to embrace all the wagon-mine owners in Greene, Fayette, Westmoreland and Beaver Counties. A community coal pile will be formed at Pittsburgh. All surplus coal will be stored on this pile, cash being paid for the coal on its delivery. Emphasis is to be placed on the mining of clean coal. An increased rate, above $2.35 per ton, is to be sought by the wagon-mine owners. D. W. Kuhn, the fuel administrator of Pittsburgh, delivered an address.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

Already the work of the production department of the Fuel Administration, backed by the loyalty of the operators, union leaders and mine workers, is attaining results. We used to hope for an output of 12,000,000 tons of bituminous coal a week, and until the week ending June 8 we did not once get it. The output for the week ending July 13 was 10 per cent. larger than that figure. The mines produced 13,243,000 tons; this is equivalent to 688,636,000 tons a year if the speed can in the future be maintained and if it had been maintained during the months past.

Unfortunately, the railroads are not likely to furnish so adequate a service when moving crops or struggling with winter conditions. We must therefore look jealously at the output of the present moment. It is time for effort. Unfortunately, it has to be provident effort—the kind of effort which takes the highest kind of ideals. We can all work when the need immediately presses. A boy will gather wood when the fire is needed to warm up the room, but he is not so keen to cut and stack it for the winter's need.

The anthracite difficulties with regard to conscription do not seem to right themselves. Nothing but official discouragement of the enlistment of miners will keep them from entering the service. The boards will have to supply the protest themselves if they are going to prevent men from leaving the mines for the army and navy. Such half-hearted action in the matter as has been taken by the Provost Marshal's department will not cure the situation. The recent victories will make it even harder than in the past to hold the men at the coal face.

DANGEROUS TO MAKE INDUSTRIAL DISTINCTIONS

Crowder has given the draft boards the right to use their judgment. They are not under orders to put men into deferred classes, but they can do so if they desire, and we are led to understand that no protest to that action will come from headquarters. That is something, but still hardly enough to produce the desired results. One can understand the attitude of the Provost Marshal's department. It would rather treat every industry alike. There are many war industries, and it is hard to distinguish between them.

If the anthracite region is exempted, the bituminous industry will expect exemption on the ground that it is even more a war industry. This is true enough. The only reason why the anthracite region asks for exemption is because, while its product is essential in peace and in war alike, it is suffering more than almost any other by reason of labor shortage. It certainly is far shorter of men than the bituminous region.

There is some hope that some national recognition will be given to miners which will impress on them the importance of their work in the war. This will not be given to all miners; only those who do their part will receive the recognition which will be in the form of a service badge. By some it is expected that the award will be distributed by special committees at the mines guided by the record at the weigh scale.

The Hudson Coal Co.'s Greenwood colliery is located at Minooka, in that region of Bolshevism and labor trouble which lies south of Scranton. Between 800 and 900 men and boys who work at this colliery are on strike to increase the pay of some of the men. The mines closed down tight on July 16. It seems needless to say that no strike was necessary, as a Conciliation Board exists to settle all difficulties by arbitration. A strike is not only an unpatriotic but an extremely expensive way of righting a wrong and extremely wicked way of wronging a right.

James Gleason, organizer for the union, and a member of the executive board, declares the company is justified by its contract and adds that the mine workers are trying to get the Hudson standard raised to the level of that paid by other companies nearby. The regular meeting of the local will not occur till July 30, and the men are not disposed to call a meeting before that date. Meanwhile, at last reports, the strike was continuing.

There are not wanted evidences of the reason for the large tonnage to which we directed attention earlier in this review. Spangler, in Cambria County, central Pennsylvania, near neighbor to Barnsboro, Hastings and Patton, planned to hold a Firemen's Convention and Carnival. The four towns mentioned are all miners' towns, with little else than mining to support them. Had the convention been celebrated the whole section would have been laid idle. Men would have been drawn into Spangler by street car and railroad from far and near, for that region is fairly netted with railroads and trolley lines. James B. Neale, Director of Production, however, urged that the carefully laid plans be abandoned and by telegram came back the response that there would be no Firemen's Convention and Carnival. The affair would have started Aug. 11 and lasted through the week. The Fuel Administration does not approve of festivities of this kind so long as the need for steady work is as marked as at the present.

In northern West Virginia, so long nonunion, unionization is rapidly proceeding without opposition from the Consolidation Coal Co. and other large companies, if not with their active coöperation. There are, as usual, some men who do not desire to join, and some 12 organizers from various parts of the country are busy day and night arguing the benefits of unionization to the convinced and skeptical alike. Mother Jones, who for a while was sent to this region, went to Washington following a celebration at Clarksburg, July 4. The coal operators understand that she will not return to the Fairmont section.

ASKING DEPARTMENT OF LABOR FOR MINERS

Vance Randolph, examiner in charge of the United States Employment Service Free Bureau, recently located at Clarksburg, has orders for 500 men from the Consolidation Coal Co., including miners, machine men, machine helpers, coke pullers, and coke forkers. At a meeting of the Clarksburg Coal Club operators in that immediate vicinity gave him an order for 460 men and yet there were several other operations to be heard from.

In the Kanawha region the speeches made by Major Sandford, of the British army, during the last two weeks have had a potent effect in bringing the miners of that district to a realization of the needs of the war. The soldiers of the pick are now doing their duty as earnestly as the soldiers in khaki.

Miners at a certain mine in Raleigh County, in the Winding Gulf region, went to the manager of the company and informed him that they were ready to forego an eight-hour day and work nine hours, or as long as was necessary.

At Panama, Ill., the United Mine Workers' Union is suffering from the effects of too much prosperity. A scandal has developed in connection with the administration of the union's finances. The recording secretary is missing from Panama and the State Auditor of the organization is making an examination of the books to ascertain how the union managed last year to spend $59,000 for expenses. The auditors are said to have found numerous irregularities in the issuance and payment of warrants and checks; the amounts on both having been "raised," according to reports. Many checks not regularly signed by the officers of the union are said to have been cashed.

Operators Will Pay for Funerals

On July 8 a resolution was introduced by James Matthews, of Shamokin, Penn., president of District No. 9, United Mine Workers, at a session of the Anthracite Conciliation Board. Its provisions are best set forth in the actual wording of the resolution, because any attempt to rewrite it subjects one to the temptation of adding to its provisions those additional clauses that it was evidently the intention to have inferred or incorporated.

However, it may be permissible to say that while the purpose of avoiding funeral lay-offs is clearly stated, there is nothing in the agreement to make it clear whether a company would be justified in refusing to pay the funeral expenses where all the men decided not to work on the day of the funeral. Nor is the period limited to the time of the war, though the war is noted as cause for the provision.

There is also nothing to show whether the employed members of the family are only permitted to attend the funeral as members of the mine delegation or are not referred to at all in the resolution, their right to presence as members of the family being conceded. These matters should undoubtedly have been covered in the contract. Apparently the mine foreman is only an advisory member of the committee, for the grievance committee of the colliery is sure always to outvote him. Labor contracts should be written carefully. Their meaning should be absolutely above question. Unfortunately, both in the anthracite and bituminous coal regions ambiguity in contracts is quite frequent. The shortness of the contractual term saves the contracting parties from more frequent disputes. As it is, however, there are more than are necessary. This contract reads:

"The Board of Conciliation believes that as a war measure, at a time when public necessity requires a maximum production of coal, there should be no cessation of the operation of mines and collieries on account of the death of an employee caused by an accident or on account of funerals, and to the end that all collieries remain in full operation in such circumstances and in consideration thereof, it be directed that the operators pay to the nearest heir of the deceased employee whose death has been caused by accident the sum of $150, and in addition thereto directs that the grievance committee and mine foreman elect six representatives of the respective colliery to attend the funeral, it being understood that the six men be selected that will least cripple the operation on that day and that the wages of these six representatives be paid by the operator."

This resolution doubtless was the outcome of an understanding in which not only the members of the board, but the operators also, participated. It was accepted by the board as soon as submitted and it will be regarded in all probability as a part of the contractual obligations of the anthracite region so long as the war lasts. It has been hailed as a example of coöperation between employer and employee, but really it is a breach of contract accepted by the employer under pressure from the employee. The companies yielded easily and gracefully to their employees feeling that they could not let their rights avail anything when the national interests were at stake. The mine workers will do well to remember this and see if they "can go the operators one better" when some little matter that they can correct holds up the progress of the work.

Wages and Practices of Wagon Mines

The bonuses paid by the smaller mines working the less-desirable coal beds have been the cause of much of the high-price coal in central Pennsylvania. Some concerns instead of paying the scale rate of $1.10 are paying $1.60 a ton. Even at that figure they cannot get the help they want. It takes more than that to dislodge the workmen from the regular mines where work is conducted under better principles with better equipment and better conditions. And when the men are so dislodged it only aids the inefficient mine to the disadvantage of the efficient operation and of the nation at large.

The wagon mines have been extremely slow in loading railroad cars. Some will order a car placed and then be 10 days or two weeks filling it with coal. There are about 20 concerns in the central Pennsylvania district that will be brought to book under the new fuel regulations which have been promulgated against paying wages above the union schedule. The board of investigations held its first meeting July 5.

The following members have been appointed by the United States Fuel Administrator: John C. Forsyth, Harry Boulton and Charles O'Neill, all of Clearfield, and B. M. Clark, of Punxsutawney. The Central Pennsylvania Coal Operators' Association has appointed as its representatives: Judge A. O. Smith, of Clearfield, chairman; J. R. Caseley, of Dubois; T. V. Gould, of Brisbin; Earl Hewitt, of Blairsville, and M. J. Bracken, of Gallitzin. The alternates of the association's membership are George Nicholson, of Barnesboro; J. A. Bucher, of Beaverdale; C. B. Maxwell, of Morrisdale; H. B. Douglas, of Clearfield, and W. R. Wilburn, of Philipsburg.

Prohibition and Labor in West Virginia

The idleness following Independence Day at the West Virginia mines is acting in favor of prohibitionary measures, and yet, strange to say, it also acts against any such action.

West Virginia is a prohibition state, but it has neighbors that have not signed the pledge—Pennsylvania, Ohio, Maryland and Kentucky. In some sections the dry can migrate to the happy lands with bars, notably in the Panhandle, the Thacker and Kenova districts, the Elk Garden and Upper Potomac regions and the mines north of Fairmont.

But there are regions which are, or should be, as dry as the heart of Arabia—the New River and Kanawha regions, where much carfare must be spent and a long holiday taken if refreshment is needed. Yet the New River region says that Independence Day was over-well celebrated and did not end on July 5.

If, therefore, West Virginia speaks with an uncertain voice it is because different parts have a different experience. The Panhandle, which vainly tries to push a dry finger into the prevailing wetness of Ohio on the one side and Pennsylvania on the other, is convinced that July 4 proved to the hilt that national prohibition is needed.

The West Virginia Panhandle Coal Operators' Association, of which Johnson C. McKinley is president, addressed telegrams last week to Senator Howard Sutherland and Dr. H. A. Garfield, United States Fuel Administrator, expressing approval of Senator Sutherland's support of national prohibition, and recommending to Dr. Garfield the establishment of a five-mile dry zone around coal mines, in case the present movement to establish national prohibition fails.

In the telegram to Dr. Garfield, Mr. McKinley said: "We heartily concur in your belief that increased production of bituminous coal is absolutely essential to the winning of the war and urge your support of the effort now being made to abolish the sale of intoxicating liquor so long as the war lasts. Industrial conditions in West Virginia have improved materially since prohibition became effective in this state, but the coal mines of this section operate at a disadvantage because of the saloons in the border counties of Ohio. In case of failure of the present movement to establish prohibition, we would respectfully urge that a five-mile dry zone be established around coal mines as was advocated by the National Coal Association in October last, but total prohibition for the entire country we believe very desirable at this time."

As already said, New River cannot call on the hospitality of neighboring states and consequently should have observed Independence Day for 12 hours only and then retired decently for a hard day's work on the day following. But it is said that the New River people lost all their enthusiasm for putting out coal during the festivities of the Fourth. At one or two operations, where after Independence Day the operators threatened to put the penalty clause of the contract into effect if the mine workers failed to go to work, the men threatened to go on a strike. In fact, it is said that there are a few leaders in the union, few indeed but enough nevertheless to make trouble, who declare to the Washington authorities that they are loyal, but at the same time discourage the men from doing their best.

Attempt to Guarantee Justice Fails

The lamentable failure of a jury to find a verdict against the persons who recently hanged the inoffensive Robert Paul Prager at Collinsville, Ill., who was murdered simply because he had fallen under the suspicion of the mine workers, was the chief argument presented by proponents of a bill to grant to the state of Arkansas the right to change the venue of trials for men accused of mob and criminal violence. The bill proposed a change of the constitution of the state.

A few years ago, July 17, 1914, Arkansas was the scene of some extremely unfortunate riots. Men were killed and four tipples were burned at Prairie Creek (see *Coal Age*, Vol. 6, pp. 145, 191 and 270). A few days later another tipple was dynamited at Huntingdon. For this reason Arkansas should realize the need for changes of venue such as will make it easy to deal with general breaches of the peace for which conviction cannot be obtained in a local court owing to the general prevalence of sympathy with the law breakers. Yet despite this fact the change in the constitution, which would have given the law officers of the state this much needed power, was denied by a vote of 52 to 47.

Some Enter Mines to Avoid Draft

Some men in Illinois have been entering the mines to avoid the draft. The underground workings look quite attractive to men of draft age, for they hope that draft immunity will be conceded to those engaged in the production of coal. But the men who enter the mines to evade the draft have little or no intention of working steadily.

Frank Farrington, president of the United Mine Workers in Illinois, has made a statement indorsing Fuel Administrator Garfield's recommendation to President Wilson that draft of miners for the army be stopped. The coal industry of Illinois is, he says, already suffering from a shortage of labor due to the drafting of mine workers. "The draft," he adds, "is taking from the mines the young and agile men who must be depended on to keep the coal moving out of the mines. Tripriders, motormen and mule drivers, who are mostly young men, are fast being withdrawn from the mines by the draft, and a serious shortage will result from any further drafts."

In Canada Draftees Must Work or Fight

Coal mining is classified in Canada as a work of national necessity, and coal miners are treated as a special class in the enforcement of the Military Service Act of Canada. The course to be pursued in regard to the application of conscription to the miners has been a matter of serious consideration to the tribunals of British Columbia and other western mining provinces that are charged with power to grant exemptions, temporary and permanent. The attitude assumed by Judge Thompson of British Columbia recently may be taken as indicative of the generally accepted policy in this respect. In the Crowsnest Pass coal district he was confronted recently with a blanket appeal for exemption for 36 men—the appeal having the backing of the United Mine Workers of America. It was based on the contention that the appellants were engaged in a work of national importance. After hearing all the evidence as to the actual time being worked by each man, the amount of coal produced and the individual earnings, he allowed 31 applications for a limited period, renewal being conditional on the maintenance of an average production of coal by the men whose application for temporary exemption was approved.

In giving judgment Judge Thompson established the following rules:

"1—In cases where I grant exemption it shall be conditional upon the appellant being continuously employed in his occupation, either that in which he is now engaged or some other occupation in the mine. Any person ceasing to work for more than 24 hr. will be deemed to be not continuously employed, unless he can show some just cause or reason for his nonemployment. This prohibition does not apply to recognized holidays and the holding of funerals.

"2—A lay-off of 24 hr. without just cause or reason being shown shall not occur more than once a month. In case of illness a certificate signed by some medical practitioner must be produced within 48 hr., and if demanded by the military or civil authorities produced and filed in the office of the chief of provincial police at Fernie, B. C.

"3—In the event of a strike or cessation of work by workmen other than exempted men whereby the latter are prevented from working, exemption shall cease, subject, however, to the provisions of rules 9 and 10." (These are certain rules laid down in the agreement subsisting between employer and employee in this district.) Judge Thompson here observes: "This may seem a harsh ruling but it must be remembered that this appeal has been made by the United Mine Workers of America and it will be the duty of the officials of the brotherhood to see that no such strikes or cessations of work occur."

"4—No exempted man shall occupy an official position or carry on work which will necessitate his absence from work at his usual occupation in the mines. In the event of any person to whom exemption is granted desiring to change his employment from one employer to another he may do so upon application being made in writing to me and a certificate allowed by me.

"5—In the event of any dispute arising between the military authorities and any person to whom exemption is granted, or in the event of the military authorities drafting, detaining or arresting an exempted man for alleged noncompliance with these rules, or from any cause, the matter shall be brought before me speedily as possible for determination."

Putting the Slacker on Record

A record of the slackers such as is kept in parts of the anthracite region is to be made in the Connellsville field. It is not to be a complete record. It will only give the number of days of idleness, not the number of hours of working opportunity lost, but it is a good commencement. It is thought that the record now kept will serve as a basis for future choice between workers.

The material for such a record has in a degree always been available. The bushel record of the loaders was always posted for all and sundry to note and this record was in fact a better criterion of the industry of that class of worker than the record now proposed, while the day record of the day man could always be secured by a perusal of the pay rolls. But now a record is to be made for each worker and care will be taken to ascertain in every case of absenteeism whether the absence was accompanied by an acceptable excuse.

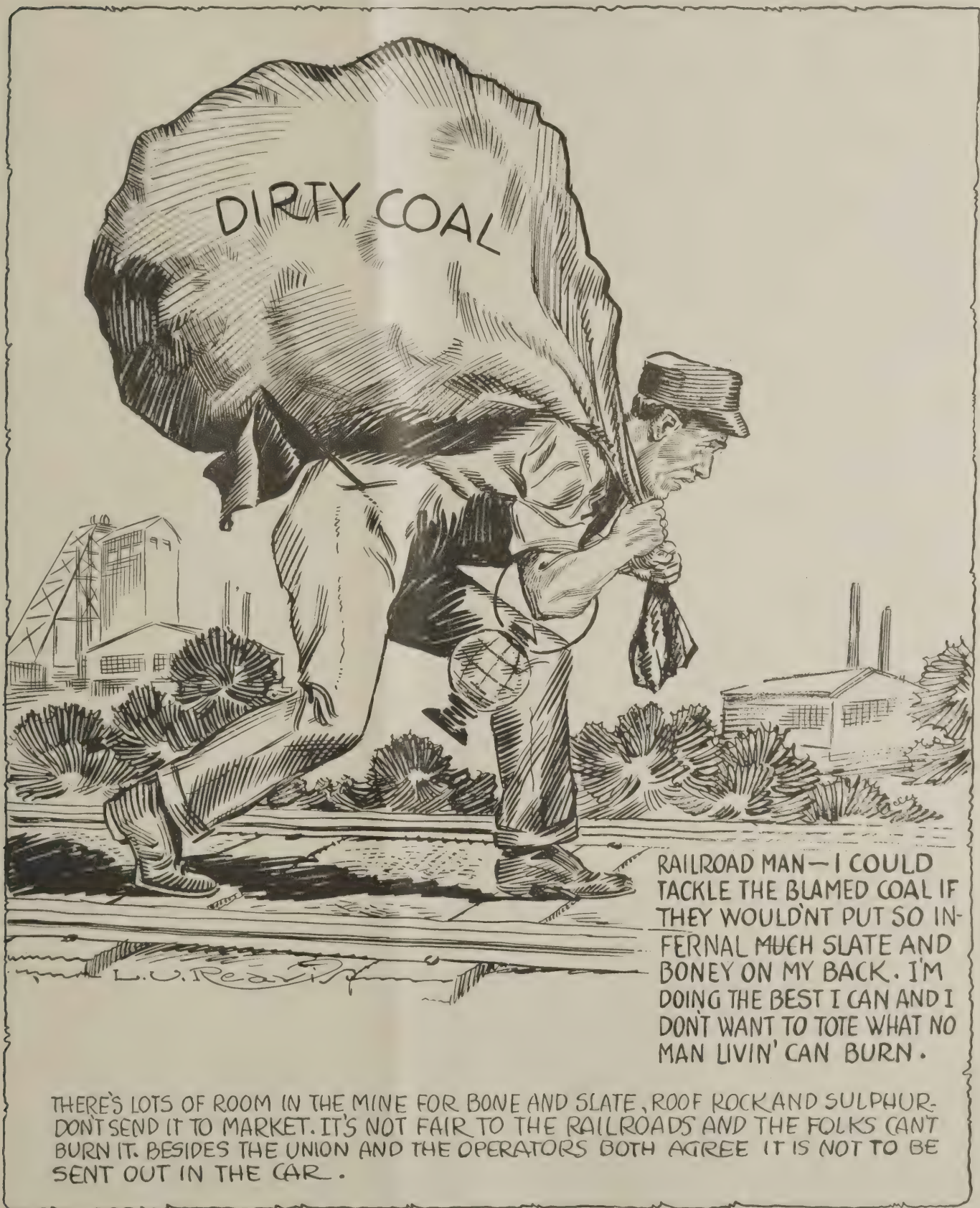
The Fayette County Fuel Administration is back of this new departure. C. E. Lenhart and R. M. Fry of the Uniontown region and J. M. Jamison, of Greensburg, members of the regional fuel committee, met at Washington with W. S. Blauvelt, coke director, and the legal advisors of the fuel administration, and decided that the plan should be adopted.

The operators will use the record, should they after the war is over have occasion to lay off men because business is bad. Those who have not been loyal to the nation during the war will be given their walking papers first.

The men themselves have entered into the spirit of the ruling. Its operation, while yet at too early a stage to permit any conclusions to be drawn, will without a doubt have an effect in stiffening the morale of the coal and coke workers.

Fuel administration officials point out that a majority of the men in the region are intensely loyal but that a slight minority of them have become restive under the abnormal wage scale. The fuel administration is working in close coöperation with the county draft boards, and the labor records kept by the fuel administration will be available to draft authorities for the enforcement of the "work or fight" ruling.

It's Hard Enough Work To Tote This Year's Coal, So Leave the Rock in the Mine



EDITORIALS

Pulverized Fuel

IN THE early days when anthracite was struggling for commercial recognition, nothing short of selected lump was accepted by the domestic consumer. He broke it up by hand for use in his stove. Today the smallest particle of combustible coming from the mine is conserved for immediate use or the probable demands of the future.

With the rapidly increasing demand for fuel and the better knowledge as to available supplies and their limitations for meeting future demands comes greater conservation of resources. Cheapening of costs of manufacture and simplifying labor problems lead to further refinements in processes, greater use of machinery and the more complete utilization of byproducts. From the foregoing, the use of pulverized fuel is a natural outcome. In some cases the application of this form of fuel seems to have passed the experimental stage; in other instances difficulties which developed have not always been overcome.

Possibly the first successful extensive commercial use of pulverized coal as fuel was in the cement industry. Here there was a pressing demand for a low-priced fuel of high efficiency, and powdered coal has proved to be almost an ideal fuel. It has come into almost universal use as a fuel for clinkering cement. It has also found wide application in many chemical and metallurgical furnaces. It has steadily advanced in a great variety of fields where requirements call for a degree of heat that may be readily controlled.

Machinery has been developed which will dry, pulverize and deliver fuel to furnaces at a reasonable cost. The advantages of powdered fuel are well known, including the utilization of practically every heat unit in coal and the use of automatic machinery which only needs supervision, adjustment and repair. With the decreasing and uncertain supply of fuel oil and natural gas, there is increasing interest in the use of byproducts of mining and manufacture. Anthracite culm, bituminous screenings and coke breeze assume a new and further importance.

The subject of pulverized fuel is most alluring, but balancing its notable successes are conspicuous failures. Its superiority and economy over successful stokers are slight if measureable. On railroad locomotives its use seems to have passed the experimental stage, and commercial applications are said to be making headway, especially in the West. This special field offers unusual attractions to the advocates of pulverized fuel, as next to labor the largest single item of cost in transportation is the fuel used in locomotive operation. Locomotives exact a toll of about one-quarter of the coal moved over railroads, which represents an expenditure of some 300 million dollars annually. Of this amount 75 to 100 millions of dollars are required to kindle, clean and maintain fires on grates at times when locomotives are non-productive. Railway demands are more exacting every year, and the use of pulverized fuel may be not only a most effective and economical means for increasing net earnings, but may also satisfy the demands of the public for a reduction in smoke, cinders and sparks.

It is a misfortune that this process has not been extended to include the furnaces of most general use, the class consuming more coal possibly than all other industrial furnaces combined. As applied to the generation of steam in externally fired boilers, the process has met difficulties which have not been generally overcome. In one special type of boiler developed to meet the special requirements of the combustion of pulverized fuel a certain measure of success has been attained. But in the main the process has not been successfully applied to existing steam plants, especially the water-tube boiler.

Among the causes of failure, inadequate combustion space seems to be prominent. The actual combustion should take place with the coal particle in suspension and in cramped space destruction of brickwork and boiler parts may result. The handling of molten ash is another serious problem. If existing plants can be readily adapted to pulverized fuel requirements, then the process would likely receive approval. If a plant must be scrapped to introduce the system, its adoption would probably be delayed some time in active power stations.

Coal Recovery Situation in Illinois

RARELY are coal mining and agriculture so closely associated as in scores of counties in Illinois, and rarely is each industry entitled to a leading place, as in this state. Nature has endowed the prairies of this state with a wonderfully rich soil on which record crops of corn and other farm products are raised. And underneath the surface is stored for use during the coming centuries billions of tons of fuel remarkable for its comparative freedom from impurities and for ideal conditions of mining.

To harmonize these two important industries so as to permit the freest development of each is a big and vital problem. The large coal interests have taken the lead in investigation of conditions affecting the situation. They have been accused as the aggressors in numerous suits for alleged damages to surface in which it was claimed that subsidence and other disturbances were due to improper methods of mining. Until recent years the operators have mined coal in many instances without much system, satisfied to leave two or three cars of coal in the mine for every car sent to the surface, provided the cost per ton would meet the fierce competition and resulting low market price for their product.

The conditions under which mining was carried on tended to give small recovery of coal, squeezes and unsatisfactory results generally. However, it was only recently that surveys have been made by operators to show just what percentage of coal was being recov-

ered. As the value of coal lands appreciated, a number of companies employed engineers to ascertain the amount of coal left in the ground. Finally, interest in this matter reached such a stage that concerted action was taken, and investigation was made of conditions of mining and percentage of extraction of coal in numerous Illinois mines under a coöperative agreement between the Engineering Experiment Station of the University of Illinois, the Illinois State Geological Survey and the United States Bureau of Mines. As an example of their findings it was learned that the recovery of coal in twelve average mines was 42 per cent.—it should have been 80 per cent. As a result of this agitation a change of mining was made in a number of instances with better recovery. In a general way, the adoption of the panel system has given the best results in Illinois up to the present time. But even with the improvements already made there is still abundant opportunity for much better recovery.

Let the Operator Get on the Job

THE mine foreman has rarely had a fair opportunity to make a good showing. Between the law (which regards him as a safety engineer and so trots him to every working face to see if it is safe) and the operator (who views him as a sort of mine manager) he never has had a moment of time. Scarcely has he arrived at the mine than a dozen persons assail him.

One man is about to go home; he has no props. Another man has his coat on and his pail in his hand; he cannot work, his place is full of water. Gennaro Baptiste is wildly gesticulating, trying to tell the boss in "pidgin" English that Tom Stuck didn't cut his place last night and that he, Gennaro, is consequently out of work.

Usually there is no night foreman. Only when the boss comes round in the morning does he learn how a quarter or a third of the night force failed to come out or, having come out, failed for one of a dozen reasons to do a night's work.

Where there is gas there are firebosses during the night turn, but they are usually too busy to correct what is amiss and frequently are not trusted to hire or direct others in the work of repair. Everything waits on the boss, and as he has been trained to regard himself as the end-all and be-all of his operation, he would not have it otherwise.

In a well-ordered mine the mine boss is merely the boss of the bosses in a mine. He is not afraid to have capable certificated men under him. He gives each a certain trick or a certain territory and holds him responsible for its steady running. If the operator had handled his foremen right, had told them the story of Carnegie wanting men who knew more than he did to run his various departments, had pointed out that a foreman was not rated by how hard he worked or how cheaply he supervised the mine, but on the general cheapness of the operation and the steady flow of coal to the tipple, there would be a very different condition.

The cost of supervision per ton may increase, the cost of roadmen and tracklayers may rise, the cost of blacksmiths and carpenters may grow larger; but if the haulage, dumping, pumping, cleaning and trimming costs decline by reason of larger output and better supervision, what matter about these smaller costs? The mine foreman is a worried man, and a worried man never yet made his employer rich.

Get in touch with your foreman. He has been longing to ask you for several changes, but has lost heart because you cut him off so inconsiderately. Look at his problems with your broader business vision. Ask yourself if a business can be run where the night work is performed by men without supervision and when the early morning finds all the loose ends of the night before to be solved in 15 or 30 minutes. Too often it must be so solved or a goodly minority of the miners get disgusted and restless and so march home.

Get on the job and see the foreman in action. If he had as many hands and heads as a Buddha, he could not perform what is expected of him. View the foreman sympathetically, not critically. Let him see that you are there to help. Stay long enough so that the foreman will not try to shelve difficulties until you are gone. You will soon see why the mine runs so badly, for it is equipped with only one mind and one pair of eyes—the mind and eyes of the mine foreman. If the foreman would only let some one else do some of the thinking and a little of the seeing, if the operator would only pay some one to do a little of both, many a roughly moving operation would run smoothly thereafter.

Cheering News from the Coal Mines

THIS is the period of the year usually marked by small demand for coal and low production. The miner goes to the farm to work, or goes a-hunting with his dogs. There are plenty of cars on all sidings and no orders. In 1916 there were mined in the second week of July perhaps one and one-half million tons of bituminous coal per day. In 1917 the pressure of the country's needs brought the production of bituminous coal in the second week of July to its maximum for the year. The output was nearly two million tons a day—33 per cent. more than in 1916.

This year the maximum is also reached in the second week of July. The tonnage is 2,207,000 tons per day—10 per cent. higher than last year. With fewer men the bituminous mines are producing a larger tonnage. Part of this can be credited to better car service, but a large amount may safely be laid to patriotism. Sentiment, much decried sentiment, is the basis of our success. In fact the moral forces of life are even more important than the mental and physical forces.

Let us be careful, however, about feeling overjoyed about our wonderful success in the industrial field. Let us not forget that while the second week of July last year was the date of our maximum output, it was also the date on which our production began to slump. From two million tons a day in the second week of July the production fell almost continuously to less than 1,700,000 a day in the week ending Aug. 17. Then the production rallied, but it hovered around 1,800,000 tons for the rest of the year, with a couple of slumps, when it fell well below that level.

This decline must not occur this year. The Railroad Administration, mine workers and the coal operators must resolutely determine to raise the record or keep it where it stands. The work of the week ending July 13 must not stand as a monument on the line of production.

DISCUSSION BY READERS

Shortage of Mine Labor

Letter No. 4—After reading the two letters on this subject published in *Coal Age*, June 29, pp. 1209 and 1210, I cannot refrain from remarking on one or two points suggested by the writers.

In the first place, I want to say that we should all stand behind the draft law. I am in favor of the draft proceeding in regular course. There is no question as to the need of men at the front, and the means taken by the Government to secure the necessary army of men is fair to all. It does not debar the volunteer, but volunteers are comparatively few and their number is inadequate, although as the old saying goes "One volunteer is worth ten drafted men."

When it became evident that the volunteer plan was too slow for the urgent needs of the country, there was nothing left for the authorities to do but to enact the Selective Draft Law, which was done without further delay. Compare conditions in this respect with those that exist in Germany, where men have no choice but to obey and there are no *"questionnaires,"* but men are quickly summoned from their various tasks and sent to the front. They are told what to do and when to do it, and there is no appeal. We are in this terrible war and few of us realize its meaning. We must oppose strength to strength, meet intrigue with intrigue and, in every way, withstand the advance of the enemy.

Reported Attempt To Have Miners Exempted

With some surprise, I read the reference made by Fred D. Hicks, in his letter, p. 1210, where he states that a committee of mine operators was appointed to go to Washington, for the purpose of obtaining a ruling, if possible, that would exempt coal miners and skilled mine laborers from the draft. While it is possible to argue in favor of both sides of this question, the fact remains that, in justice to all concerned, the coal miner has no greater claim for exemption than the workers in many other industries. Is it to be supposed, for a moment, that the authorities at Washington do not understand the situation, or are ignorant of the fact that mining labor is scarce and the mines have need of their skilled workers? It is my belief that they understand the matter from *A* to *Z*.

In the operation of our industries, I am inclined to think that we could well imitate what has been done in England and France, in this respect. In those countries, women have been utilized in many branches of industry to replace the men who have been called to the colors. In my opinion, we should do everything possible and exhaust all other means to run the mines, before attempting to secure exemption for mine workers. Several years ago when labor was scarce at the mines, I remember the plan was adopted of putting one man in charge of eight or ten men and letting him instruct them how to drill, charge and fire their holes, and set the necessary post timbers in their places. The scheme proved very successful at that time and there is no doubt that it would be an advantage now.

To the unprejudiced mind, it appears quite clear that the draft law cannot be modified to suit particular industries, and it becomes the duty of each branch of industry to adapt itself to the conditions as they exist. Let every worker do his part to win the war.

Perryopolis, Penn. R. W. LIGHTBURN.

The Mining Situation

Letter No. 5—Numerous instances can be cited showing gross ignorance in regard to coal-mining conditions, not only on the part of the general public, but also, persons in a position to be better informed, if they would use the facilities that are theirs for acquiring correct information. As proof of this statement, permit me to cite a few instances.

Last winter, the Pittsburgh Street Railways Co., in fighting for the privilege of raising its 5-c. fare, carried quarter-page ads in the city papers. In scare-head type, it was announced that the coal miners were making $10 a day, and the impression conveyed was that the miners were receiving a flat-rate of this amount. Of course, anyone acquainted with the Pittsburgh coalfield would know that this could not be the case. While there are individual instances of men drawing high pay on contract mining, the average earnings of the miner were much less than the amount named.

In one of its late winter numbers, the Saturday Evening Post carried a featured article that particularly emphasized the high wages it was stated miners were receiving. It was even claimed that a miner's wages frequently reached $15 or $20 a day. In this article, one coal company was stated to have built a village of new houses, which the miners refused to occupy, unless the company built garages for the automobiles that the miners were supposed to have owned. The article failed to give the name of the company, however.

Prizes Offered To Increase Miners' Daily Tonnage

Last summer, the United States Coal & Coke Co. offered prizes to the men working in their mines who would earn the most money, loading coal, in a two-weeks pay. The results of this contest were published in *Coal Age*, Vol. 12, p. 166. The men were stimulated by the offer to make their best efforts, with the result that the miner who received the highest prize of $50 averaged over $20 a day, for loading coal during that period. The other winners showed averages down to $10 a day. It can be said without fear of misstating the facts, which became known to many of the men and a few of the local mine officials, that two and in some cases even three men sent out coal on the same check-number and divided the returns after payday.

It is true that mine workers are making better money, today, than was possible a few years ago, but that is the case with the workers in almost every industry. Whether miners' wages are exorbitant or not, the attempt to create this impression in the public mind is quite evident. The instances that I have cited throw a helpful sidelight on the mining situation as it exists today; and it is well, in considering the numerous suggestions that are being made with a view to increasing the production of coal, that the miner should be accredited with his rightful dues.

A word in regard to the physical endurance of miners. West Virginia has a law requiring a certain number of hours that each miner must work per day. The situation becomes trying and difficult when, as occurred last winter during the car shortage, many of the mines are run little more than two days a week and occasionally less. Just before the holiday season, the Governor issued a proclamation, which was published and posted at all the mines, urging both operators and miners to cooperate in working the mines Christmas and New Year's Day.

Physical Endurance of Miners Questioned

No one will deny that there is a limit to physical endurance both in men and animals, and the suggestion of a nine-hour shift for the miner is a doubtful one. Much has been said about the miner working only a half-shift at a time, returning home with a full dinner bucket. The Pittsburgh papers have, this spring, contained interviews intended to show that coal miners were taking long layoffs, or working but a few hours a day. This was supposed to be in advocating labor conscription that would compel miners to work full time.

To one not acquainted with the conditions existing in mines, this suggestion would seem to be a proper one. The practical mining man knows, however, that it is frequently impossible to keep the work going so that there will always be places for the machines to cut; and, again, the miner frequently has finished loading all his cars long before quitting time. Such conditions being unavoidable, it would be senseless to ask the miner to remain underground the entire shift when he could be enjoying the sunshine and breathing the fresh air of heaven, which would invigorate him for the work of another day.

Conscription of Mine Labor

Speaking of conscription, if the Government conscripts labor, it should conscript the mines also. The coal operator should not be permitted to receive the entire benefit from a conscription of labor, compelling the men to work in the mines while the company enjoys the profits. When men are led to doubt the loyalty of coal miners as a class, they should consider the amount of money these workers have donated to Red-Cross work, and subscribed for Liberty Bonds. These amounts will compare favorably with those subscribed by workers in any other industry.

If conscription comes to the coal mines, the Government must play "no favorites," and the mines, with the workers in them, must be conscripted alike. In the draft of men for the war, the Government becomes responsible for their housing, clothing and living. In the conscription of labor for the mines, the Government must likewise be responsible for the welfare of the workers, and not leave this to the tender mercies of the coal operators.

In closing, let me say that it is my belief that much better results could be obtained in other ways than by conscription of labor, in coal mining. The work of the miner accustoms him to danger and develops an independence that resents compulsion. There is every reason to believe that conscription under private ownership would be regarded by the miner with suspicion.

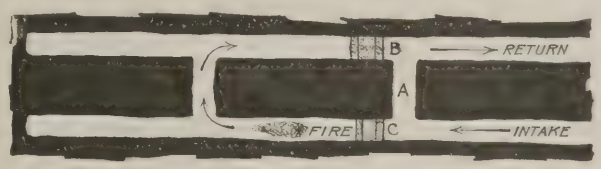
Connellsville, Penn. Ralph W. Mayer.

Sealing Off Fire on Intake

Letter No. 5—I have been much interested in following the discussion, so far, of the question of the order of building the stoppings to seal off a fire on the intake of a pair of headings. This question was asked by "Ancora," *Coal Age*, June 22, p. 1173, who stated that the headings were driven in solid coal and that the fire had gained such headway when discovered that it was thought best to seal it off by building air-tight stoppings.

It is most important to choose experienced men for this work. There should be two parties so that one party can relieve the other, at intervals, and be always ready to render assistance, if needed. The plan would permit the men to rest, for a brief time, in the fresh air, and avoid the risk of being overcome by the smoke and fumes produced by the fire, while the work would be done more rapidly.

Having gotten the men and material together at a point near the fire, the volume of air passing the place



SEALING OFF THE FIRE BY STOPPINGS

should be reduced by opening small holes in one or more of the stoppings outby. If it is possible to reach the crosscut next to the fire and marked *A* in the accompanying figure, this should be taken down, which will short-circuit practically all of the air at that point.

A temporary screen or brattice must now be erected to shield the workmen while building the first stopping on the return airway at *B*, just inside of the open crosscut *A*. I would build a good substantial stopping of two brick walls laid in mortar, filling the space between the walls with sand or road dirt. When the stopping is completed to the roof, the outside face of the brick wall should be plastered with clay to prevent any leakage or air or gas.

After completing the stopping on the return, a similar one should be built on the intake at *C*. This also should be a substantial stopping consisting of double brick walls laid in mortar and filled between with sand or road dirt and the face of the stopping plastered with clay. Care should be taken that the men have a plentiful supply of air while performing the work.

The order of building the stoppings here described is what is termed "working from the return to the

intake." The reason for proceeding in this manner is as follows: When the return stopping is built and closed first the smoke and gases generated by the fire will collect behind the stopping, and the space between it and the fire become filled with extinctive gases. Since the fire, in this case, is fed with fresh air, more carbon dioxide (CO_2) and less carbon monoxide (CO) will be formed, and the mixture be more extinctive than would be the case if the intake airway had been closed first.

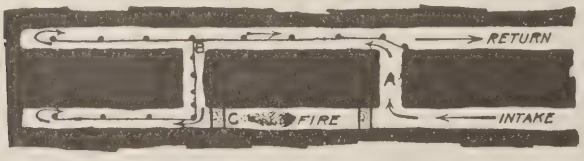
On the other hand, if the first stopping is built on the intake, not only would the supply of air to the fire be limited, which would mean a larger production of carbon monoxide (CO), but the space beyond the fire would soon be filled with poisonous gases and greatly increase the danger to the men when building the second stopping on the return. There would also be the danger of an explosion occurring, owing to the fire igniting the combustible gases, which would accumulate behind the stopping on the intake, immediately after that stopping is closed. This explosion would not only destroy the stopping but would probably do much damage throughout the mine.

In some cases, it may be advisable to build another pair of stoppings outside the crosscut *A*, in which case, another crosscut should be opened by removing the stopping just outby from the point selected and the work performed in the same manner as before.

Oakview, W. Va. WILLIAM DICKINSON.

Letter No. 6—In the case mentioned in the inquiry by "Ancora," *Coal Age*, June 22, p. 1173, the fire has gained such headway that it would seem the first thing to be done is to get the men and animals out of the nime and then slow down the fan, or short-circuit a portion of the air passing in the headings where the fire has occurred. A current of 30,000 cu.ft. per min. is too large a volume to be permitted to reach the fire.

My plan of sealing off this fire is similar to that described by W. H. Noone, *Coal Age*, July 6, p. 33. I



PLACING A STOPPING INBY OF FIRE

would build a line of brattice, as shown in the figure, starting from the outby corner of the open crosscut *A*, on the return side and extending up the return airway and through the last crosscut *B*, beyond the fire.

By this means, it would be possible to carry sufficient air forward, not only to prevent the accumulation of any dangerous quantity of gas in the headings beyond the fire, but the plan would enable a second stopping to be placed at a point further in than that described by Mr. Noone and shown in his sketch on p. 33.

Let me suggest that it might even be possible, with the help of the fresh air current conducted by the brattice, to reach a point, on the intake airway, back of the fire. In that case I would attempt to build the second stopping on the intake, just outside of the last crosscut and inby from the fire. Should it be found possible to do this, the fire would be completely isolated and quickly smothered.

MATTHEW STAFFORD.

Chase River P. O., Vancouver Island, Canada.

Letter No. 7—Although this question has been discussed in *Coal Age* before and many important points brought out, it is my opinion that there is still much to be learned on the subject. The work of building stoppings to seal off a fire that is burning in mine entries is one of the greatest danger both to life and property. For this reason, the men performing the work must take no chances, but must understand the conditions that exist and what is required to insure the greatest degree of safety.

Every mining man who has had experience in dealing with fires underground knows that each case is different and that no two fires can be treated alike. My belief is, however, that when the fire is located in a pair of headings driven in solid coal and has gained such headway that it is necessary to seal off the fire, the first stopping should be built on the intake airway. It is my opinion, moreover, that only one stopping needs to be built in this case; because, when the first stopping is built and the intake airway closed, the air is completely cut off from the fire.

SUGGESTS BUILDING ONE STOPPING ONLY

To my mind, there is no cause whatever for building a second stopping in the return airway, since no air and comparatively little smoke will be passing out by the return when the air current is shut off on the intake. This, of course, assumes that the intake stopping has been properly built and sealed. Moreover, it would be difficult for workmen to perform any work on the return side, owing to gas filling the place.

When building a stopping to seal off a fire, the work must be done by practical, experienced men and be quickly performed. All necessary material should be at hand in order that there may be no delay, which would cause the quantity of air passing over the fire to be decreased little by little. It is my belief that sufficient air should be permitted to pass over the fire while the stopping is being built, to carry off the gas and prevent its accumulating. When the air is finally shut off, this should be done quickly.

The inquiry states that these headings are producing a small amount of gas and a good air current will be required to sweep away this gas and prevent its accumulation while the stopping is in course of erection. Otherwise, small explosions will be liable to occur, in the heading beyond the fire, while the work is being done. Should that happen, it would be a warning to the foreman to withdraw his men from the place.

EXPLOSIONS CAUSED BY SEALING OFF FIRES

Two of the greatest explosions that have taken place in the anthracite region occurred while walling off a mine fire. Small explosions were heard while the stopping was being built and ten or fifteen minutes after it was closed, a heavy explosion blew out the stopping and did much damage in the mine. The reason for this was that, the air current being reduced gradually,

a very explosive mixture accumulated behind the stopping with the result I have mentioned.

My plan is, therefore, in a case such as that mentioned in this inquiry, sufficient air should be kept in circulation to prevent the formation of a firedamp mixture in the heading. The first and only stopping should be built on the intake airway at the nearest point of approach outby from the fire. This stopping should be arranged with a trapdoor that will permit a good air current to pass while the work is being performed, and which can be closed quickly when the work is done. After closing the trapdoor the men should withdraw quickly from the mine.

My opinion is that, when the air is stopped suddenly, by the closing of a trapdoor, such as I have mentioned, the fire burning within will die out for the want of air. I believe this method will insure the greatest safety in the performance of the work. FRED D. HICKS.

Kingston, Penn.

Travel of Electric Current

Letter No. 1—In response to the inquiry by "Student," *Coal Age*, July 6, p. 35, asking if the flow of an electric current in a wire conductor takes place through the wire or on the surface of it, permit me to say that it is now understood that a direct electrical current permeates the entire body of the wire and is not confined to the surface.

This appears to me to be shown clearly by Ohm's law, which makes the current, in amperes, equal to the electromotive force, in volts, divided by the resistance, in ohms. Calling the current in amperes, C; the electromotive force, in volts, E; and the resistance, in ohms, R, this law is expressed by the formula

$$C = \frac{E}{R}$$

Now, for the same material in the wire and the same temperature, the resistance, per unit length of conductor, varies inversely as the size of the wire. For example, if one wire is twice as heavy as another wire of the same length, material and temperature, the resistance of the first wire, per unit length, is just one-half that of the second wire. Such being the case it follows that, for a given voltage, the current passing in the first wire will be twice that in the second wire.

To illustrate, let me assume two conductors in the form of a ribbon, say 1 in. wide, and suppose the first ribbon is $\frac{1}{32}$ in. thick while the second ribbon has a thickness of $\frac{1}{64}$ in. It is clear that the surface of these two ribbons, per unit length, is equal; yet, the first ribbon, being twice as thick as the other, will carry twice the current, under the same pressure or voltage, the two ribbons being of the same material and temperature.

Again, a solid conductor will carry the same current as one of equal weight, per lineal foot, but having the form of a hollow tube or cable, notwithstanding the surface of the latter is evidently much greater than that of the former.

It must be remembered that the foregoing applies only to direct current. In conductors carrying alternating current, there is a "skin effect," and the current density has been found to be greater in the outer portion of such conductors. However, with small wires carrying light currents such as are employed in mines, this effect is not appreciable but, in central-station work, where heavy currents are carried in large cables, the skin effect must be taken into account. For this work, in order to give the cables a greater surface they are often made with a rope or jute center. A. W. SPAHT.

Christopher, Ill.

Blue Gem Coal in Tennessee

Letter No. 1—Referring to the inquiry that appeared in *Coal Age*, July 13, p. 80, asking if the "Morning Glory Mine," of the Oneida Consolidation Coal Co. is working the genuine "Blue Gem" coal seam, permit me to say that it is not.

Having handled coal from this mine some years ago, as well as coal from other mines in that district—the Pumpkin Hollow, Jakes Tank, and the Stanley mines—commonly known as the "Paint Rock" coal, I can state with some assurance that the coal referred to here is not the genuine "Blue Gem" coal, but the "Paint Rock" seam. It is the same as that worked by the old Glen Mary Coal & Coke Co., which was known locally as the "Glen Mary" seam.

The Blue Gem seam lies just a few feet under the Jellico seam; and geologists claim that the Brushy Mountain seam, which is being worked by the Baker Coal & Coke Co., further down the Tennessee Railroad, is the Jellico seam. While I have never been to this operation, I understand it is a lower formation than the seam that the Paint Rock mines are working. This, of course, would make the Paint Rock seam much above the Blue Gem seam.

Even if the coal referred to by this inquirer was the Blue Gem seam, it could not be marketed as Blue Gem coal, because it is altogether of a different character and quality. The Blue Gem coal is the highest grade of domestic coal mined in the South. The coal is very low in ash and a quick-burning hot coal.

The Paint Rock coal is of a good quality, but heavier in ash and a slower burning coal. It will not satisfy those who have known and used the Blue Gem coal. When conditions were normal the Paint Rock coal usually brought from 15c. to 20c. less than Jellico coal, and the latter brought from 15c. to 25c. less than the Blue Gem coal. It is quite evident, therefore, that there was always a difference of from 30c. to 50c. per ton, in the price on the market, between the Paint Rock and the Blue Gem coals. H. B. BONNEY,

President H. B. Bonney Coal Co.

Chattanooga, Tenn.

Loyalty of Foreign-Born Miners

Letter No. 1—Numerous references have been made, recently, in the columns of *Coal Age*, to the loyalty of foreign-born miners. Attention has even been drawn to the assumed menace to mine safety, in the employment of enemy-alien miners. But some writers, on the other hand, have pointed with pride to the large amounts invested in War Saving Stamps and Liberty Bonds, by foreign-born miners working in our mines.

Observation and experience have impressed me with the idea that the question of increased loyalty of this class of mine employees can never reach the supreme

height until the degree of assimilation is raised to a higher standard than exists at the present time. To my mind, success or failure hinges absolutely on our ability to assimilate this class of mine labor, in a distinctly human fashion. We must learn to appreciate more readily the things that are dear to them, and be quicker to realize the peculiarities and traits of the foreigners that come to our mines.

Ellis Island, where the large majority of immigrants to this country first set foot on American soil, has been aptly described as "one of the saddest spots in the United States." It is here that foreign-born miners first come into direct contact with American civilization. When they arrive they are absolutely devoid of the principles, hopes and ideals on which our American civilization is based. Their education is extremely limited and they come to a land of which they have heard glittering tales of freedom and wealth.

It must be admitted that the majority of Americans do not meet these people with the ready sympathy and the distinctly human attitude that their condition demands, and help them to carve their own destinies as true American citizens. This is particularly true at the coal mines. Few mine officials realize that it is possible to make genuine American citizens of these foreigners seeking work and who are more willing to be taught and quicker to obey their instructions than are American miners. Many of our largest coal corporations are practically wholly dependent on their foreign-born miners for maintaining the daily production of the mines. It is not strange that the great sense of loyalty demanded of all miners by the present situation does not appeal to the foreign-born as to the native miner.

A Suggestion Worth Following

Let me suggest that, among the employees of every large coal operation, there should be a set of men who would act as missionaries of patriotic zeal among the foreign workers, in and out of the mines. These men should be possessed of a broad vision, great patience and wisdom and deal generously. In other words, they should have a heart for the foreigner and treat him as a brother—be a true friend to him, one to whom the man would learn to confide his troubles with confidence that he would help him.

In brief, let me say that one of the first steps in the assimilation of the foreigner is to gain his confidence by sympathy and helpful advice. Strive to have him realize that American ideals are of the first importance in the enjoyment of American freedom and privileges. Many foreign-born miners who have returned to their own land, after several years in this country, would not have decided to go home had they been induced to apply for their citizenship papers and been shown what is necessary to accomplish this.

In furtherance of their work along this line, these missionaries whom I have described should have every facility given them by their several companies to assist them in their efforts among the foreign classes. They should be helped to make life worth living for the foreigner, and this should be done without ostentation and with great simplicity and kindness. Every wise management must realize that a man's productiveness, whether he be native or foreign born, is gaged largely by his surroundings, and this applies not alone to the miner but to his home and family. It goes without saying that where the living conditions and the social atmosphere surrounding the miner and his home are satisfactory, he is loath to leave the place, which becomes to him in every sense a home. Permit me to quote here a few sentences from an article that I read a short time ago, and that, to my mind, suggests the best thought on this question of our relation to the foreign worker:

> What have we got to tempt the tired workman after eight or ten hours of arduous labor? In most cases simply nothing; his only relaxation is a roadhouse or saloon. What have we got for the children? In some places a school, good or bad. Have they a playground? A strip of land perhaps, which has been generously donated, thinking that our duty ended there, and forgetting entirely that our own plant would not be producing unless we equipped it with buildings and machinery.
>
> We should furnish this playground with horizontal bars, ladders, slides and swings, where the children, the bold and the timid, may get helpful bodily exercise. We should not forget some generous flower beds and shrubs, so that the eye and artistic sense may be unconsciously directed toward the beautiful things of life. Going further, let us see that these flowers find their way into the home and garden plots, that the men and women may absorb these refining influences.
>
> But it must not end here. We must train the teachers to understand and use this equipment. We should have a physical test for the teacher just as we have for the army officer, in order that he or she may direct the children properly. A teacher's berth should not be a charitable affair; it should be an office of privilege, selection and ability and subject to regular examinations for fitness.

Let me urge that we study more closely the conditions of life and previous training of our foreign-born miners. Down in Kentucky, a short time ago, I watched through my hotel window a crowd, largely composed of foreigners, who were listening to strains produced by a band and which I had difficulty to recognize as those of our national anthem. The cornetist and base drummer were two ambitious and made the rendering of the beautiful "Star Spangled Banner" anything but what would arouse the patriotic zeal of the listener.

How many of us have not observed the mirth-provoking procession of a foreign wedding, in one of our mining camps? Generally the bride and groom lead the procession, which is attended by a cornet and base drum. Is it not true that the joy of the occasion is saddened, for us, by this display, so lacking in the higher ideals of American life?

While I might enlarge further on the necessities of the foreigner's education in American ideals and customs, sufficient has been said. Let us not forget the powerful effect of motion pictures, which should be selected to inspire the foreigner with American ideals and ambitions, rather than to entertain him with blood and thunder acts and scenes.

If mine officials would interest themselves in regard to the character of pictures shown in the mining towns and camps about them, it would go far toward increasing the efficiency of their workmen. At the present time. efforts in this direction should be to increase patriotic zeal and fervor, as much hard work remains to be done before the world is finally saved for civilization.

Philadelphia, Penn. OBSERVER.

INQUIRIES OF GENERAL INTEREST

Electric Drive for Rope Haulage

We have a pair of steam engines 14 x 18 in., geared to a drum shaft carrying two drums arranged for main- and tail-rope haulage, on a slope. The engine shaft is 5½ in. in diameter and carries a pinion that engages a gearwheel on the drum shaft, the ratio of gearing being 3:1. The diameter of each drum is 5½ ft. and the engines are making 60 r.p.m.

The slope is 2600 ft. long and has an average grade of 5½ per cent., except at one place where the grade is 10 per cent., for a distance of 100 ft. We have been using a ¾-in. steel haulage rope. The mine cars weigh 1500 lb. each and carry 3000 lb. of coal, making the weight of the loaded car 4500 lb.

It is proposed to replace the steam engines now in use with an electric drive, and to haul trips of 32 cars, making 5½ trips an hour. What I want to ask is, what power of motor will be required for this work? Also, is the 5½-in. engine shaft strong enough?

———, Ala. ENGINEER.

The first step in the solution of this problem is to ascertain the maximum load on the rope when hauling a loaded trip that has reached the 10 per cent. grade. For the purpose of this calculation, we will estimate the gravity pull of the entire trip of 32 cars, for the maximum 10 per cent. grade, although a portion of the trip only will occupy that grade at one time, the grade being only 100 ft. long.

The total weight of a loaded trip is 32 × 4500 equals 144,000 lb., and the gravity pull for a 10 per cent. grade may be taken as $\frac{1}{10}$ of this weight, or 14,400 lb. We will assume a track resistance of, say 15 lb. per ton, which gives 15(144,000 ÷ 2000) = 1080 lb. Ingoring, on this light grade, the weight of the rope itself, the load on the rope is the sum of the gravity pull and the track resistance, which is 15,480 lb. or 7.74 tons. Taking six-strand, seven-wire, steel haulage rope, the diameter of the rope required for this load is

$$d = \sqrt{\frac{fL}{37}} = \sqrt{\frac{5 \times 7.74}{37}} = say\ 1\ in.$$

Since the engine shaft has a speed of 60 r.p.m. and the ratio of gearing is 3:1 the drums are making 60 ÷ 3 = 20 r.p.m. Adding the diameter of the rope to the diameter of the drum gives for the effective diameter of winding 5 ft. 7 in., or 5.58 ft. The circumference corresponding to this diameter is 3.1416 × 5.58 = 17.53 ft. If the drum is making 20 r.p.m., the speed of winding or rope speed is 20 x 17.53 = say 350 ft. per minute.

The power required to haul a loaded trip, at this speed, on a 10 per cent. grade, assuming an efficiency of the motor of 90 per cent will then be

$$H = \frac{15{,}480 \times 350}{0.90 \times 33{,}000} = 182+\ hp.$$

In electric haulage this power would be expressed as 182 × 0.746 = 136 kw. For this power, the diameter of the engine shaft, run at the speed of 60 r.p.m. may be estimated as

$$D = \sqrt[3]{\frac{100H}{n}} = \sqrt[3]{\frac{100 \times 182}{60}} = 6.7,\ say\ 7\ in.$$

We would therefore suggest the installation of a motor capable of producing say 150 kw. The 5½-in. engine shaft should be replaced by a shaft 7 in. in diameter, and a 1-in. steel haulage rope should be used for this haulage.

Ventilating a Gassy Slope Mine

We are about to open a slope mine in a seam having a general dip of 6 per cent. and generating large quantities of explosive gas. Before deciding on the general plan of working, I want to ask for information in regard to the best method of ventilating such a mine.

Tower Hill, Va. MINE FOREMAN.

A slope mine opened in a gassy seam should have not less than three main slopes driven on the full dip of the seam. The center opening should be made the main haulage road and intake for the entire mine, while the two side openings serve as return airways for their respective sides of the mine. These openings should all be 6 x 10 ft. in section.

The mine should be ventilated on the exhaust system; and, for this purpose, a centrifugal fan should be installed at the mouth of one of the return airways, which should be connected underground by crosscuts in the slope pillars and an overcast on the main haulage road. The fan should have a capacity capable of supplying the volume of air required for the entire mine, under a water gage varying from 1 to 2 in. In order to provide against the possible failure or breakdown of the fan, a duplicate fan should be installed, either at the same opening or at the mouth of the other return airway. Only one of these fans should be operated at the same time, the other being held in reserve ready for immediate use in case of emergency. In a gaseous mine, it is always safer to provide duplicate means of ventilation, to provide for any possible emergency.

The general plan of working the seam described by this correspondent will involve the driving of pairs of cross-entries to the right and left of the main slope. The first pair of these cross-entries must be driven about 150 yd. below the mouth of the main entry, provided the roof of the seam will permit rooms to be driven 75 or 100 yd. in depth. The first right and first left entries should be haulage roads and intakes, while the second right and second left entries are made return aircourses for their respective sections of the mine. Rooms should be driven to the rise of the cross-entries. The return air is conducted by means of an overcast or air bridge over the return airway. We have only treated this inquiry in a general way and shall be glad to have our readers' comments and suggestions.

EXAMINATION QUESTIONS

Mine Foremen's Examination, Hazleton, Penn., Apr. 23, 1918

(Selected Questions)

Ques.—How may a squeeze or creep be stopped and the damage it is calculated to do be localized?

Ans.—The only practical method that will prove effective in stopping or localizing a squeeze that has already begun in a mine is the plan, now quite generally adopted, of quickly drawing adjacent pillars and all timber left standing in adjoining abandoned places. If this does not cause an immediate roof fall, some means should be adopted to produce that effect at the earliest opportunity. It may be necessary to place one or more shots in the roof to start the fall.

Solid timber cribs can sometimes be utilized at points where the pillars are weak, in order to prevent the spread of the damage in that direction. However, the plan of setting timbers to prevent the progress of a squeeze in mine workings will generally be found to do more harm than good. What is required is to produce a heavy fall of roof so as to relieve the pressure on the pillars.

Ques.—What arrangements would you make to prevent cars from running over the top of slopes or shafts?

Ans.—Safety blocks and derailing switches should always be installed at the head of a shaft or slope. These should be automatic so that they will always be set to prevent cars from reaching the shaft or slope, except as they are thrown by a lever arranged for that purpose. In addition to these devices, the top of a shaft should always be protected by safety gates to prevent persons from falling down the shaft.

Ques.—Give the reasons for putting a cap-piece on a prop and state what should be the size of the cap and the kind of wood to give the best results.

Ans.—A good cap-piece not only gives a better bearing for the top of the post against the roof and distributes the pressure, but it also affords a means of showing any increase of roof pressure, which is indicated plainly by the crushing of the cap. This also has the effect of binding the top of the post together, thus preserving and strengthening the post. A cap-piece also expedites the setting of a post.

Cap-pieces should be slightly broader than the top of the post. They should never be less than 6 or 8 in. in width and from 18 to 24 in. in length, depending on the character of the roof and the pressure. Cap-pieces should not be less than 2 in. in thickness and made of soft wood, so that they will yield more readily under the pressure and prevent the furring of the top of the post.

Ques.—What regulations would you adopt for the use of safety lamps, in a mine where gas is given off freely?

Ans.—A thoroughly equipped lamphouse should be provided on the surface, a short distance from the mine entrance. The lamphouse should be in charge of a competent man who would be responsible for the delivery of all lamps to the workmen, in good and safe condition, in return for a check indicating the number of the lamp used by the man. The lamps should be kept in a suitable lamprack, having hooks or pigeon holes numbered to correspond to the numbers on the lamps. All lamps received from the workmen at the close of the shift are first cleaned, filled and trimmed. Each lamp is then carefully examined and returned to its proper place in the rack, ready to be lit and delivered to the man, in the morning, on presentation of his check.

All lamps should be owned by the company and be of an approved type. Every lamp must be provided with a lock or fastening that will reveal any attempt on the part of a man to tamper with his lamp. Each man should be held responsible for the condition of the lamp he has used. No man should be permitted to use a safety lamp or to hold a check for a lamp until he has proved that he is capable of handling and using a safety lamp.

The fireboss should examine each man to determine whether or not he is capable of using a safety lamp. The men should be given all needed instructions to insure the safe use of lamps in the mine. If a lamp is extinguished by accident, while the man is at work, it must be taken to a relighting station, and no attempt should be made by the man to light the lamp himself. Any violation of the rules regarding safety lamps and their use should be punished by a suitable penalty.

Ques.—What kind of haulage would you recommend to replace animal haulage where the mine has been extensively developed, and why?

Ans.—Some form of mechanical haulage should be adopted on the main roads, as early in the development of a mine as practicable. This should consist of some kind of rope or locomotive haulage, depending on conditions in the mind. Where there are no grades that would prevent the use of locomotives, this type of haulage will generally prove more elastic and serviceable than rope haulage. The latter, however, will be required where the grades on the main roads would interfere with the efficiency of locomotive haulage, by reducing the number of cars that could be hauled in a trip and otherwise delaying the movement of the coal to the foot of the shaft or slope.

The use of storage-battery locomotives is rapidly increasing on gathering hauls, in large mines, and is giving good satisfaction. Their use in the workings to replace mules possesses the advantage of eliminating the refuse deposited by the mules, and thus clarifying the air. Also, a motor absorbs no oxygen and produces no carbon dioxide as does the breathing of the animals used on gathering hauls. Compressed-air-locomotive haulage, while furnishing fresh air in the workings, requires the installation of a good compressing plant and pipe lines for the transmission of the air to the working face. It is of advantage to operate the drills and coal cutters at the face with the same power as employed for haulage, which conditions alone can determine.

COAL AND COKE NEWS

Harrisburg, Penn.

Approval has been given by the Governor, the Attorney General and the Commissioner of Health of plans submitted to the State Department of Health for the establishment of model towns in two counties in southwestern Pennsylvania, the corporations which are providing housing for their employees recognizing that it is best to get started right and to seek the advice of the state's experts. The companies which submitted plans during the week were the Ellsworth Collieries Co., which is building extensions to mining towns in Washington County, and which presented plans for modern water and sewerage systems, and the Pennsylvania Rubber Co., which is starting a large addition to the borough of Jeannette, Westmoreland County, to house its workmen.

Every month the state authorities are being called upon to help in the planning of towns by corporations which want their people housed right and given healthful environment with adequate water supplies, instead of going through the old haphazard system of building houses to meet demands and then regretting the mistakes made through not obtaining the right kind of advice and the approval of state authorities.

On account of uncertain credit conditions, now that the Government supervision of coal distribution is well under way, shippers of bituminous coal are seriously considering pressing for such reforms as will guarantee payment on all shipments. War industries are said to be notably lax in paying their coal bills, regardless of the fact that the operators must pay the miners on time or have a strike on their hands.

Another uncertain condition is with the railroads, as the operators are compelled to supply the railroads with 100 per cent. of their requirements, and practically all declare they cannot get their money. The railroads argue they haven't the money, in view of the fact that the Government has not yet started rental payments. To some of the shippers the railroads have not paid a cent for two or three months, and these operators are put to extremes to get credit extensions to permit them to conduct their business.

Uniontown, Penn.

Opposing financial interests have taken their battle for control of the Thompson Connellsville Coke Co. into the Fayette County Court. J. H. Hillman, Jr., of Pittsburgh, who recently acquired more than 8000 of the company's 30,000 shares of capital stock, is seeking to oust the present officers, J. P. Brennen, president; A. G. Livengood, vice president; and W. G. Rock, secretary and treasurer. Testimony was taken this week before Judge J Q. Van Swearingen in a preliminary injunction order restraining the annual meeting of stockholders scheduled for May 6, last, until the rights of the litigants are determined. The evidence showed that a few days before the scheduled meeting Mr. Hillman acquired a block of 5750 shares placed as collateral by J. V. Thompson with the First National Bank of Pittsburgh. When he sought to have the stock transferred upon the company's books, witnesses testified, the officers declined to meet the request on the ground that the books had been closed until after the election. The litigation resulted. No decision has been handed down.

The Connellsville region had a normal week in coke production, as a normal week is now figured, with the impetus given the operation of the plants by Government supervision. The region's output of coke was 348,296 tons, according to statistics prepared by the Fayette fuel administration, or a decrease of 2000 tons in last week's output. Despite the local coal car shortage there was a record production of 168,507 tons of coal, an increase of 9852 tons over the preceding week. While not plentiful by any means, the railroads by a little juggling are providing operators with 100 per cent. coke cars, and every effort is being made to load and ship cars at the earliest possible moment after placing, to further conserve the car supply.

Altoona, Penn.

A meeting held by the Central Pennsylvania Coal Producers' Association at Altoona, Penn., on Tuesday, July 16, was the most successful meeting of coal operators ever held in central Pennsylvania. Over 350 men, representing 90 per cent. of the tonnage in central Pennsylvania, were present. The meeting was addressed by James B. Neale, Director of Production, United States Fuel Administration; A. W. Calloway, Manager of Distribution, United States Fuel Administration; G. N. Snider, Traffic Adviser, United States Fuel Administration; J. D. A. Morrow, Director of Distribution, United States Fuel Administration; Rembrandt Peale, Bituminous Adviser, United States Fuel Administration; Charles O'Neill, Secretary of the Central Pennsylvania Coal Producers' Association.

The meeting was presided over by Harry Boulton, of Clearfield, president of the Central Pennsylvania Coal Producers' Association. All of the addresses called attention to the shortage of coal and the necessity for greater production. Mr. Neale explained the campaign about to be launched by the United States Government to increase production. This campaign will include many of the features of the campaign launched by the Central Pennsylvania Coal Producers' Association several weeks ago, some of the outstanding features being pledge cards and badges to the miners for efficient service.

Attention was called to the fact that deferred classification of miners until next spring had been asked for and enforcement of national prohibition during the period of the war.

Charleston, W. Va.

The labor supply in several districts of the state is unable to keep pace now with the car supply, both because there is to some extent a less number of miners than are needed and because some miners are indifferent as to whether they work or not. Cars supplied in nearly all the districts of the state are ample for all the coal that is being mined. In short, the supply in many regions is 100 per cent.

The production of 50,000 tons of coal was lost, it is estimated last Wednesday, when all miners in the New River district supplied with power by the Virginian Power Co. were without power and consequently were forced to suspend operations. The trouble is believed to be due to defective construction of transmission lines, since whenever there is a rainstorm the power supply is curtailed. Coming just at a time when New River operators were endeavoring to push up production to top notch, the enforced shut-down was disheartening and demoralizing. Such a contingency was especially disappointing when there was a 100 per cent. supply of cars on hand. The power shortage also affected production in the Kanawha and Winding Gulf regions.

Fairmont, W. Va.

Like other districts, the Fairmont district has apparently not fully recovered from the celebration of the Fourth among the miners, since reports show that there were 528 men idle in the district; for instance, last Tuesday, although there were only 1243 cars in the region on that day, such mines as were shut down were not idle due to an inadequate car supply but because there were no miners to man such mines. The first day's supply for the region—1675 cars—was slightly in excess of normal requirements. Mines in this region, it was announced at a meeting of Kanawha district operators, will within the next few months be expected to furnish 100,000 tons of coal a month to the Government powder plant at Nitro. The mines along the Kanawha & Michigan R. R., which passes through Nitro, have been designated to supply the coal next month and will be required to furnish 25,000 tons, increasing that tonnage within the next few months until 100,000 tons are reached.

Despite many unfavorable conditions the production for the week ending July 13 in the Kanawha district reached the high point of the year, being 205,436 tons, or an increase of 60,000 tons over the previous week. The increase may be attributed to the number of hours worked—6389 in all. The car shortage caused the loss of only 148 hours, labor shortage being responsible for 537 hours. Many mines in the Kanawha district were shut down last Wednesday because of power failure. Up until July 16, 21,885 loads of coal had been shipped from the district, 20,788 empties being received.

PENNSYLVANIA

Anthracite

Hazleton—Hard-coal companies in the Lehigh region have collected the names of all mine workers who left on July 23 with the various draft quotas for Camp Lee, so that substitutes can be trained to take their positions. Keeping up tonnage is the chief aim of the coal operators, who report that their labor resources are dwindling all the time. The G. B. Markle Co. runs its mines with 51 per cent. of the staff it had in 1913, and the Lehigh Valley Coal Co. is reduced to 75 per cent. of its pre-war strength.

Millersburg—To prevent further removal of river coal from a bed in Wiconisco Creek, the Juniata Public Service Co., furnishing electric current in the upper end of Dauphin, and in Perry and Juniata Counties, has petitioned the courts for a preliminary injunction against D. W. Romberger, et al., directing them to discontinue dredging and removing coal. The company contends it purchased a tract of 19 acres along the creek in order to work the coal bed and that the line of the property extends along the opposite side of the creek. The Romberger firm has been removing about 25 tons of river coal daily.

Tresckow—A fanhouse of the Lehigh and Wilkes-Barre Coal Co. at its No. 21 colliery was destroyed by fire on July 16. The blaze was started by sparks from a passing mine locomotive.

Tamaqua—A contribution of $25,000 has been made by the Lehigh Coal & Navigation Co. to the war chests which are being established at Tamaqua and Panther Creek Valley towns in the vicinity.

Oakdale—Effective July 16, the G. B. Markle Coal Co. has placed in operation its new breaker in the anthracite coal fields near Oakdale. The plant, entirely constructed of steel, will be used for the preparation of fuel taken from the culm banks, and will provide a daily capacity of about 800 tons. The company has arranged for the temporary employment of about 200 men thrown out of work by the destruction by fire of the Harleigh-Brookwood coal breaker near Hazleton, July 13. The Harleigh-Brookwood company is planning for the immediate reconstruction of its plant.

Pittston—Considerable rivalry exists at the different collieries of the Pennsylvania and the Hillside Coal and Iron companies, between the several superintendents regarding the monthly tonnage of coal at each colliery. The Butler is one of the leading collieries and since assuming control James C. Johnson, the superintendent, has had remarkable success in increasing the daily output. For the month of June, 1918, prepared tonnage was shipped amounting to some 74,000 tons, a gain of over 12,000 tons for same month in 1917.

Bituminous

New Castle—Coal is now being mined in Lawrence County by the stripping process. A mine of considerable proportions has been opened by this method six miles north of this city.

Pittsburgh—The Ellsworth Collieries Co. has submitted plans to the State Board of Health for permission to establish a new town in its bituminous fields in Washington County. The company proposes to build a model settlement with dwellings for its employees.

Steelton—A battery of 80 coke ovens was charged July 8 at the Bethlehem Steel Co., Steelton, Penn. The new battery of ovens will be able to produce about 18 cars of coke daily, which will bring the daily output up to 45 cars of fuel. The H. Koppers Co., of Pittsburgh, erected the ovens. The work of construction covered

a period of 18 months. Due to the scarcity of materials, the work was held up at intervals; thus the job dragged over the stated time of 12 months.

Somerset—One man was killed and a dozen others were injured when the powder magazine of the Black Brothers' Coal Co., at Blackfield, three miles east of Rockwood, exploded on July 17. It is believed that a foreigner employed as a night watchman carried a lighted torch into the magazine. Windows in miners' homes nearby were broken and the occupants cut by flying glass.

Milesville—The United Coal Corporation is building a new railroad tipple at its Ella mine, near here, on the Pittsburgh & Lake Erie R. R., with a belt conveyor for river loading on the Monongahela River, to replace the old rail and river tipple. Pihl & Miller, contractors, of Pittsburgh, are doing the work.

WEST VIRGINIA

Beckley—By Aug. 1, The Board Smokeless Coal Co. expects to have its plant at Pemberton in operation, a new tipple being now under construction.

Mabscott—Much new equipment has been added to the plant of the Bower Coal Co. at this place, including new mining machines, three locomotives and 250 mine cars. A new two-track tipple is under construction.

Morgantown—From additional information obtained, it appears that the State Hill Coal Co., recently formed, has arranged to take over and operate a developed team track proposition, located at the edge of Morgantown, and will produce about 200 tons per day. The plant to be taken over is now operated by the Pollock Coal Company.

Williamson—The mining and shipment of coal will be begun by the New Howard Coal Co. before the end of the month, the new plant of the company, of which F. L. Schoen is general manager, having been virtually completed.

Hawk's Nest—Lumber has been received by the Gaymont Coal Co. to be used in the construction of a new tipple at the company's plant at this place, and work will be begun on the tipple at once. The company at present is shipping 300 tons of coal a week.

Glen Jean—The Collins Colliery Co., of Glen Jean, is preparing to have in the near future 100 ovens in blast for the production of foundry coke. The old coke ovens have been repaired and a new crusher and storage bins have been completed. It has been five years since any coke was manufactured at this point.

Thurmond—After being out of commission for some time, the mines at Beurytown, on Sewell Valley, renewed operations last week, repairs to the monitors, recently damaged, having been completed.

Logan—With the completion of two miles of railroad on Beard Mill Fork of Dingess Run Creek, the Jones Coal Land Co. is shipping coal from its Isabel Mine No. 1. The company expects to be able to begin loading coal from its No. 2 mine in a short time.

OHIO

Shawnee—A loss of $10,000 was caused and 200 men thrown out of employment by the burning of No. 3 coal chute, of the Hocking Block Coal Co. Rebuilding was started at once.

Nelsonville—The Packard Coal Co., recently incorporated with Columbus capital, has purchased from Lampman & Juniper a tract of 160 acres located near Nelsonville on the Hocking Valley Ry. It contains a good seam of No. 6 coal. The operating plant will be enlarged in order to double the output. Officers of the company are M. L. Yuster, president and treasurer; Richard Patton, vice president, and C. F. Bookman, secretary.

New Straitsville—A deal has been closed whereby Harry Spencer has secured title to a tract of 80 acres of No. 6 coal on Lost Run, in the heart of the Hocking Valley field. The tract contains a 12-ft. vein and is one of the most valuable of the smaller tracts in this vicinity. The property was purchased from the Hazelton heirs and was closed by E. E. Hazelton, of the Dean Coal Mining Co. Mr. Spencer also controls the Gem Coal Co., which adjoins.

ILLINOIS

East St. Louis—East St. Louis coal dealers have adopted a "no-credit" rule. The East St. Louis Coal Dealers' Association, at its last meeting, passed a resolution that members hereafter will not book orders unless they are accompanied by cash. More than that, consumers who still owe for last winter's coal will not be able to get any for next winter, even for cash, until they pay what they owe. J. H. Thomas, president of the association, says that delinquents will not be able to buy a single load of coal until old scores are settled.

Bethalto—Threshing is being hindered in this section by the difficulty of getting coal for the engines. Formerly the thresher demand was met by small mines scattered through the wheat belt, which stored enough coal during the spring to meet the heavy demands of the threshing season. But this spring these mines have sold all the coal that they could turn out as fast as they could turn it out, and no storing has been done. Farmers wait all night at the mines to get coal the next morning, and in many instances they have had to haul coal long distances to keep the thresher going.

KENTUCKY

Harveyton—The Hazard Jellico Coal Co. has just installed a new coal-cutting machine in its mine at this place, the machine being of a new type and the first installed in Perry County.

Hazard—The Hazard Coal Co. and the Powell-Hackney Grocery Co. are preparing to erect a large commissary store at Hazard, and will arrange for both concerns to have their offices in this building.

Madisonville—The Louisville & Nashville Railroad Co. has refused to furnish cars to four small wagon mines in Hopkins County, these being the Dixie Bee, Medlock, Hawkins and Ferguson mines, near Morton's Gap. The railroad company alleges that the mines load only about one car a day, and sometimes let cars stand for several days at a time, with the result that it can't furnish them equipment while other large mines are without cars, which can use them immediately. The mine owners have taken the matter up with D. W. Gatlin, County Fuel Administrator.

TENNESSEE

Clairfield—The Standard Jellico Mining Co., which recently filed notice of an increase in its capital to $50,000, is planning for immediate work on the development of 800 acres of coal properties in the Clairfield district. It is estimated that the works will have a daily capacity of 150 tons.

Foreign News

Nanaimo, B. C.—The Canadian Western Fuel Co.'s new mine, situated near here, and two shafts of which are being sunk to tap the famous Wellington seam, will be known as the Wakesiah mine. To reach the seam the shafts must be sunk 350 ft. The concrete collars are in and sinking has progressed to a depth of about 50 ft. in the hoisting shaft. Plans have been prepared for the various buildings and machinery and mine yards. The mine will be up to date in every respect and will be shipping coal before the end of the year. The company has three other producing mines yielding a monthly tonnage of approximately 65,000 tons and mining from three seams, —the Douglas, Newcastle and Wellington.

Personals

Ray Heller has been made manager of the Columbus, Ohio, office of the Lake Erie Coal Co., which has recently been opened in the Columbus Savings and Trust Building.

E. E. Hazelton, assistant manager of the West Virginia Rail and River Coal Co., of Columbus, Ohio, and the Dean Coal Mining Co., of Columbus, Ohio, began life as a soldier in training at Camp Sherman, Chillicothe, Ohio, July 23.

Oliver W. Ramsay, city fuel administrator, Perth Amboy, N. J., has been appointed a member of the Conservation Bureau of the Federal Fuel Administration. The Bureau has been organized by Richard C. Jenkinson, federal fuel administrator for the state, to encourage conservation of fuel.

B. F. Phillippe, of St. Davids, Philadelphia, assistant to the purchasing agent of the Pennsylvania R.R. in charge of the purchase of fuel and building materials, has been appointed fuel distributor of the central advisory purchasing committee, with offices in Washington, having been detailed to handle matters pertaining to coal distribution and contracts for the railroad administration.

Arthur H. Young, director of the American Museum of Safety since Jan. 1, 1917, has resigned to take charge of the Employee Relations Department of the International Harvester Co. He will take up his new duties immediately. Although giving up the actual direction of the museum's work, Mr. Young will continue to be closely concerned with its affairs, for he has been elected to the vice presidency, succeeding the late Dr. Frederic R. Hutton.

Obituary

Thomas F. Righter, of Mt. Carmel, Penn., one of the largest independent coal operators in the anthracite region, died at his home on July 15. He was 70 years of age. Mr. Righter was interested in a number of coal companies in the Schuylkill region.

Latelle Graney died July 13 at 7 p. m. in the Sheltering Arms Hospital at Hansford, W. Va., after an operation for appendicitis. He was prominently connected with the coal-mining industry as general manager of the Long Branch Coal Co. and the East Gulf Coal Co., besides having interests in various other mines. Interment was made July 15 in the Mount Hope cemetery.

Coming Meetings

National Commissary Managers' Association will hold its ninth annual convention Aug. 6, 7 and 8 at Birmingham, Ala., with headquarters at Hotel Tutwiler. Secretary, D. J. Eichoff, 801 Manhattan Building, Chicago, Ill.

American Institute of Mining Engineers, Colorado meeting, Sept. 2 to 7. Plans include a day at Denver, one at Cripple Creek, one day at Pueblo and one day at Leadville. Secretary, Bredley Stoughton, 29 West 39th St., New York City.

Recent Coal and Coke Patents

Coke Oven. F. Peiter, Cleveland, Ohio, 1,267,332. May 21, 1918. Filed Sept. 11, 1916. Serial No. 119,352.

Stoker Bridge. P. L. Crowe, New York, N. Y., 1,261,878. May 7, 1918. Filed July 28, 1914. Serial No. 853,625.

Mine Car Stop. W. Hartman, Mascoutah, Ill., 1,260,901. May 7, 1918. Filed Mar. 8, 1918. Serial No. 221,158.

Chimney Flue Cover. C. A. Larson, Lemont, Ill., 1,266,497. May 14, 1918. Filed Mar. 21, 1916. Serial No. 85,682.

Briquet Molding Machine. C. E. Taylor, Hillsboro, Ill., 1,265,138. May 7, 1918. Filed Mar. 11, 1916. Serial No. 83,569.

Regenerator Coke Oven. E. Lecocq, Brussels, Belgium, 1,265,684. May 7, 1918. Filed May 6, 1914. Serial No. 765,972.

Briquet Machine. E. Fernholtz, Los Angeles, Cal., 1,265,441. May 7, 1918. Filed Apr. 18, 1912. Serial No. 691,757.

Mining and Loading Machine. F. Billings, Cleveland, Ohio, 1,265,730. May 14, 1918. Filed Sept. 3, 1912. Serial No. 718,191.

Firing Chamber for Powdered Fuel. W. D. Wood, assignor to Fuel Savings Co., Allentown, Penn., 1,266,088. May 14, 1918. Filed Mar. 23, 1914. Serial No. 826,642.

Furnace Charging Apparatus. S. H Bunnell and C. G. Peterson, assignors to Griscom-Russell Co., New York, N. Y., 1,265,736. May 14, 1918. Filed Jan. 26 1916. Serial No. 74,424.

Publications Received

Annual Report of Coal Mines, State of Alabama, 1917. By C. H. Nesbitt, Chief Mine Inspector, Birmingham. Illustrated, 84 pp., 6 x 9 inches.

Maximum Base Prices, Differentials and Extras on Iron, Steel and Nonferrous Products. Penton Publishing Co., Cleveland, Ohio. Pp. 75 + index. Price, $1. A revised and amplified booklet giving the complete schedules of maximum prices on iron, steel and nonferrous products as fixed by the Government, which are now in effect. This booklet is practically the only up-to-date price manual on iron and steel now in circulation, as the numerous changes have rendered obsolete those previously issued.

Trade Catalogs

W-S-M Coke Oven Machinery. Wellman-Seaver-Morgan Co., Cleveland, Ohio. Bulletin No. 10, Pp. 8; 8½ x 11 in.; illustrated. Describes combination machines for extracting, leveling and coke pushing.

Type IL Series Transformers for Street Lighting Service. General Electric Co., Schenectady, N. Y. Pp. 9; 4 x 7 in.; illustrated. Data covering the characteristics, construction, dimensions, etc., of different types of series transformers.

Rego Welding and Cutting Apparatus. Bastain-Blessing Co., Chicago, Ill., Pp. 29; 8 x 10½ in.; illustrated. Catalog covers the Rego line of welding and cutting apparatus, lead burning equipment, regulators, etc. One noticeable feature is emphasized, and that is the flashback, the most annoying and costly habit of oxyacetylene torches, has been eliminated.

Gibbs Self-Contained Oxygen Rescue Apparatus. Mine Safety Appliances Co., Pittsburgh, Penn. Two-color folder. Describes and illustrates the "only oxygen rescue apparatus developed by Americans and manufactured in America." It is claimed that the objectionable and unsafe features found in other types of oxygen apparatus have been eliminated in the new Gibbs.

C-H Equipment for Mines. Cutler-Hammer Manufacturing Co., Milwaukee, Wis. Pp. 4; 8½ x 11 in.; illustrated. The equipment shown and described in this 4-page pamphlet consists of sectional charging equipment for miners' lamp batteries. Space is also devoted to illustrating and describing charging equipment and control apparatus for mine locomotives. A mine installation of automatic motor-driven pump control is also shown.

New Incorporations

St. Paul, Va.—The Edge Coal Co. Capital, $10,000. To build and operate a coal-mining plant. J. H. Lynch is the principal incorporator.

Willard, Ky.—The Black Raven Coal Co. Capital, $100,000. To operate coal properties. Incorporators: H. W. Norris and J. B. Walker.

Pittsburgh, Penn.—The Stanton Coal Co. Capital, $100,000. To operate coal properties near Bolivar. William S. Byers is the principal incorporator.

Clearfield, Penn.—The Morgan Run Mining Co. Capital, $50,000. To operate coal-mining properties in Morgan Run district. A. D. Bigler, Clearfield, principal incorporator.

Sassafras, Ky.—Montgomery Creek Coal Co. Capital, $100,000. To develop coal properties near Montgomery Creek. Incorporators: G. W. Smith, S. B. Snyder and J. W. Reedy, Lexington, Ky.

Nelsonville, Ohio—The J. W. Fenton Coal Co. has been incorporated with a capital of $100,000 to mine and sell coal. The incorporators are J. W. Fenton, Robert J. Smith, F. H. Hertel, M. B. Gilbert and E. F. Horton.

Columbus, Ohio—The Packard Coal Mining Co. has been incorporated with a capital of $50,000 to mine and sell coal. The incorporators are M. L. Yuster, Richard Patton, E. E. Fox, W. J. Etchen and C. F. Bookman.

Canton, Ohio—The Chestnut Ridge Coal Mining Co. has been incorporated with a capital of $5000 to mine and sell coal. The incorporators are H. J. Schory, Elmer Schellhase, Charles Jordan, Russell J. Burt and J. Schully.

Butler, Penn.—The Clover Coal and Coke Co., incorporated in Delaware, $300,000 capital. To operate coal properties in the vicinity of Butler. Incorporators: D. Ferguson, H. C. Scherf, Pittsburgh, and J. A. McCaffery, Butler, Penn.

Steubenville, Ohio—The S. M. Hudson Coal and Coke Co. has been incorporated with a capital of $200,000 to mine and sell coal and coke. The incorporators are S. M. Hudson, Mary R. Hudson, Jane L. Branyen, William J. Bertram and L. A. Whitaker.

New Straitsville, Ohio—The Southern Perry Coal Co. has been incorporated with a capital of $12,000 to mine and sell coal. The incorporators are John W. White, Charles C. White, David M. Watkins, Frank F. Thomas, Jr., Sam Spencer and Thomas Watkins.

Indianapolis, Ind.—The Owen Block Coal Co., a Delaware corporation, has qualified to do business in this state. The amount of $100,000 of its capital stock is represented in Indiana. The business of the company is to mine and ship coal. R. W. McBride, of Indianapolis, is named as agent.

Morgantown, W. Va.—There is to be further development of the coal fields of Monongahela district by the State Hill Coal Co. of Morgantown, which has been incorporated with a capital of $50,000. Those chiefly interested in the company are James R. Moreland, J. H. Wright, J. J. Yoke, L. C. Snyder and Robert E. Guy, all of Morgantown.

Birmingham, Ala.—The Liberty Coal Mining Co., of Dora, Walker County, was incorporated recently with a capital stock of $4000. J. T. Baird, Lottie Baird and O. L. Jones were named as incorporators.

Another Walker County company filed articles of incorporation, known as the Emergency Coal Co., of Carbon Hill, capitalized at $2000. Papers were filed by W. S. Thornton, M. B. Thornton and J. W. Little.

Louisville, Ky.—The Walnut Coal Co., of Louisville, capital $3000, has been incorporated by W. F. Burwinkle, Edward E. Weber, J. S. Miller and R. E. Gordon. The company will operate a wholesale coal yard in Louisville. Miller and Gordon are connected with the recently incorporated Gordon-Miller Coal and Coke Co., with mines in eastern Kentucky, and Gordon is also head of the Trace Branch Coal Co., Barbourville, Ky., operating a small wagon mine. The latter concern has increased its capital from $1500 to $5000. Offices of the company have been established in the Lincoln Bulding, Louisville.

Industrial News

Madisonville, Ky.—The Coil Coal Co. has leased about 750 acres of coal properties in the Madisonville district, and is planning to commence operations at an early date for development.

Philadelphia, Penn.—The Hunter Pressed Steel Co., the office and works of which have been located at Orthodox and Horrocks Sts., has moved into its new quarters at Lansdale, Penn.

Primrose, Penn.—The Carnegie Coal Co. is reconstructing its Primrose tipple and has contracted with the Roberts & Schaefer Co., engineers and contractors, Chicago, for another Marcus picking table screen.

New Orleans, La.—The Municipal Dock Commission is considering plans for the construction of new elevators and coal-handling apparatus for cargo coal at the city dock. E. B. Thompson is president of the commission.

Columbus, Ohio—The Coal Ridge Coal Co., which has opened a branch in Columbus under the name of the Erie Coal Co., the selling organization, will soon open a second stripping operation in the Cambridge field. The producing mine is a stripping proposition and the production is unusually large.

Ages, Ky.—The Adair Mining Co., which recently completed its organization, is planning to commence operations at once on the development of extensive coal properties in this district, to have a capacity of about 250 tons daily. The company recently filed articles of incorporation with a capital of $30,000. J. E. Adair of Harlan, Ky., is president and manager.

Chattanooga, Tenn.—It is reported that the majority of the local coal dealers have orders booked up which will take care of receipts until some time in September, while additional orders are steadily pouring in. Many of the dealers are just getting orders placed during the first part of May. A regular winter rush for coal has characterized spring and summer business.

Dora, Ala.—The Southern Cotton Oil Co., Birmingham, is planning for the installation of a quantity of mining equipment for the development of coal properties in this district for the furnishing of coal for the operation of its various mills. The company has acquired a site of about 920 acres and is planning to have a daily capacity of approximately 200 tons. It is estimated that the equipment will cost in the neighborhood of $100,000.

Charleston, W. Va.—Dr. E. B. Stephenson and James S. Lakin have recently closed a deal by which they disposed of the 1500-acre tract of coal lands at Queens Shoals, known as the Queen Shoals Land Co. property. The consideration was nearly $100,000. The land was purchased by the Fire Block Coal Co., which is controlled by Detroit and Cleveland men. J. W. Miller and A. J. Saltzer will operate the property, on which one mine already is being worked.

Louisville, Ky.—It has been reported that 3,000,000 bushels of coal are coming down the Ohio River from the Kanawha district of West Virginia, arrangements having been made to manipulate the series of locks and dams to furnish an artificial stage to carry the coal as far as Louisville. Part of the big river shipment will be dropped off at Cincinnati, Madison and upper river points, while a portion of it will go to Jeffersonville and New Albany, Indiana.

Toledo, Ohio—Considerable activity has developed in the lake trade, as is shown by the records of loadings at the Hocking Valley and Toledo & Ohio Central docks during the week ending July 20. During that week the Hocking Valley docks loaded 168,000 tons as compared with 160,000 for the previous week, making a total of 1,663,507 tons for the season. The Toledo & Ohio Central docks loaded 59,000 tons as compared with 45,000 tons the previous week, making a total of 809,000 tons for the season.

Indianapolis, Ind.—New retail prices for Indiana coal, resulting from increased rates, have been announced. An advance of from 15c. to 25c. a ton is noted. Indiana lump coal, formerly quoted at $5.50 a ton by local retail dealers in Indiana, is now priced at $5.65. Indiana egg has been raised from $5.40 a ton to $5.65 a ton, and Indiana mine-run coal is now advanced from $5.15 to $5.45 a ton. An increase of 75c. a ton is noted in the newly quoted price of Brazil block coal, but this larger increase is caused by the fact that this grade of coal comes from mines remote from the railroad, necessitating long wagon hauls for delivery.

Detroit, Mich.—Because of the increase in passenger fares on railroads under Federal control, Michigan's largest coal mine and some of the others are shut down. Some of the miners insist the operators should pay the increase in railroad fare, amounting to about 10 per cent. The No. 8 mine of the Robert Gage Coal Co., producing 1000 tons a day, is closed. The Uncle Henry mine, owned by the Consolidated Coal Co., and practically every other mine in the Saginaw district, shut down last Wednesday. W. K. Prudden, state fuel administrator, has been asked to take the matter up with the Federal Railroad Administration. Unless a settlement is speedily attained it is feared the trouble will extend to all mines of the Saginaw valley.

Cleveland, Ohio—Ohio's production of coal in 1917 was 41,677,986 tons, an increase of 5,392,500 tons over 1916, according to statistics just compiled and announced by the Ohio Industrial Commission at Columbus. In the year the number of mines increased from 853 to 1295. Twenty-six of the thirty counties in which coal is mined increased their output last year. Four reported decreased production. Gallia, Perry, Scioto, Vinton and Washington Counties more than doubled their tonnage. The four reporting losses were Guernsey, Monroe, Summit and Wayne. In total tonnage in 1917 Belmont County led with 11,156,626 tons. Athens was second with 6,313,619, Jefferson third with 5,742,240, and Guernsey fourth with 4,024,265 tons.

Louisville, Ky.—Indications are that an agreement will shortly be reached between the Government and R. C. Tway, head of the Tway Coal Co. and the James Coal Co., whereby the case to be heard by the October term of the Federal Grand Jury may be dropped. Tway got in trouble with the Fuel Administration for overcharging and violations of regulations. Expert accountants who have just completed listing overcharges during the period from October, 1917, to March 1, 1918, found overcharges of $13,855.23. In many of the cases it will be impossible to pay the overcharges to the persons overcharged, and it is planned to hand this fund over to the Red Cross. It is believed that in consideration of the refunding of this money and payment of a fine into Federal Court the prosecution will be dropped.

New York, N. Y.—Thomas W. Russell, Fuel Administrator for Connecticut, has issued an order permitting wholesale dealers as defined by Rule 24 of the Rules and Regulations of the United States Fuel Administration to add to the purchase price of any bituminous coal shipped by water to that state a charge or commission of 35c. per net ton when the coal comes from the ports of New Jersey or New York, and 23c. per net ton when shipped from the ports of any other state. On shipments of anthracite an additional charge of 25c. per net ton is allowed. The order provides that the charge or commission shall include any purchasing or selling agent's commission heretofore authorized, and that the combined charges or commissions of any number of wholesalers or jobbers who act in the purchase of a given shipment or shipments shall not exceed the maximum charge or commission allowed for one wholesaler.

MARKET DEPARTMENT

Weekly Review

All Production Records Broken in Bituminous Regions—Anthracite Shipments Increase—Necessity of Conserving Fuel Still Remains—Transportation Facilities Unparalleled—Labor Still a Problem—Market More Hopeful

PRODUCTION records in the bituminous fields are being smashed. Coupled with the cheering news of the victories of our boys and the allies at the Marne, the successful onslaught on the storehouse of Mother Nature by the mining forces at home furnishes cause for a new song of jubilation. Every soft-coal region is reporting greater output than ever before. For the week ended July 13 the total of bituminous coal shipped from the mines amounted to 13,243,000 net tons, which is more than a million tons above the average weekly requirements set by the Fuel Administration as necessary to meet essential demands. The average weekly production of soft coal from April 1 to date, however, is estimated at 11,568,000 net tons. Therefore, to make up the total deficit of 9,615,000 net tons which now exists it will be necessary to have approximately ten more weeks of production equivalent to that of the week ended July 13, or an output of 12,472,000 net tons during each of the 37 weeks remaining in the coal year, which ends Mar. 31, 1919. During the week under review shipments of anthracite amounted to 42,331 cars, which shows a slight improvement over the forwardings of recent weeks.

In spite of the large tonnage of bituminous, the supply continues too light to permit of the creation of adequate reserve stocks against the time when bad weather will interfere with the expeditious movement of cars. The requirements of manufacturing plants have been vastly increased by the magnitude of the work they are doing for the Government, and the importance of obtaining shipments substantially in excess of current needs cannot be too strongly emphasized. The efforts of the Fuel Administration, operators and miners to increase production must therefore be supplemented by the elimination of every wasteful or unnecessary use of coal.

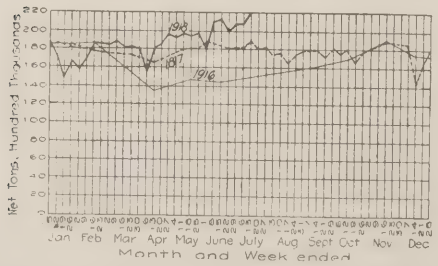
The railroads are making increasing demands for fuel, and nothing is heard of car shortage in any direction. In fact, transportation has caught up with output in a way that is really astonishing. The labor difficulties, however, multiply rather than diminish. There are restrictions now on the movement of labor from one section to another, and already there are interesting results in the coal industry, particularly in the Pocahontas and New River districts.

Developments during the past week have given the market a hopeful aspect, and consumers are beginning to believe that perhaps after all the situation may not turn out to be near so bad as was feared.

COAL PRODUCTION

A record-breaking production of bituminous coal marked the week of July 13. The output (including lignite and coal made into coke) is estimated at 13,243,000 tons, an increase over the week of July 6 (five working days) of 2,987,000 net tons, or 29 per cent., and over the current week of last year of 1,479,000 net tons, or 12.5 per cent. The average production per working day is estimated at 2,207,000 net tons as against 2,051,000 net tons during the week of July 6, or an increase of 7.6 per cent.; and as compared with the average production per working day of 1,961,000 net tons during the week of July 13, 1917.

The output during the current week of 13,243,000 net tons is approximately 1,031,000 net tons, or 8 per cent. above the average weekly requirements of 12,211,500



net tons established by the United States Fuel Administration. However, the average weekly production for the coal year to date is estimated at 11,568,000 net tons or 5.3 per cent. behind the weekly requirements. In order to make up the deficit for the coal year from Apr. 1 to date of 6,643,000 net tons per week, or 9,651,000 net tons, it will be necessary to have approximately ten more weeks of production equipalent to that of last week, or a production of 12,472,000 net tons during each of 37 remaining weeks in the coal year ended Mar. 30, 1919, a figure only twice attained—the week ended June 15 and the current week.

Reports from the carriers show increased shipments from all districts during the week of July 13. The increase in shipments from central Pennsylvania amounted to 34 per cent., in western Pennsylvania 30 per cent., in Ohio 27 per cent., in the district including northeastern Kentucky, high-volatile of southwest Virgina and smokeless fields of West Virginia 36 per cent., Tennessee and Kentucky 26 per cent., the district including Illinois, Indiana and western Kentucky 30 per cent., the district including Iowa, Texas and Southwest States 26 per cent., and the district including the Rocky Mountain and Pacific Coast States 30 per cent.

Beehive Coke—Beehive coke production in the United States during the week ended July 13 is estimated at 671,000 net tons, an increase over the week preceding of 92,000 net tons, or 16 per cent., and an average production per working day of 112,000 net tons as against 97,000 net tons during the week of July 6. The principal operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania report production during the week of July 13 at 394 000 net tons and operation of their plants at 77.2 per cent. of their present capacity. Out of the total losses of time of 22.8 per cent., 0.5 per cent. was attributed to car shortage, 18.8 per cent. to yard labor shortage, 0.5 per cent. to plant disability and 3.1 per cent. to all other causes.

Byproduct Coke—Byproduct coke plants during the week ended July 13 were operated at 89.8 per cent. of their present capacity, slightly lower than the ratio of 90.3 per cent. reported for the week ended July 6. Improved labor conditions during the week were offset by time lost in plant repairs and the cause of the slight decline for the week was not reported. Repairs to plants caused slightly increased losses in time in Illinois, Massachusetts and Ohio, while the operators in Minnesota and Pennsylvania failed to report the cause of the slightly increased losses, although in the latter state better labor conditions existed. Improvement in operating conditions in New York were due to repaired plants and in the district including Michigan, Missouri and Wisconsin to better supply of byproduct coal and repaired plants. Increased capacity in Pennsylvania during the week of July 13 is attributed to placing new ovens in operation by the Bethlehem Steel Co at Steelton and by the Carnegie Steel Co. at Clairton.

CARLOADS OF COAL ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended: June 22	June 29	July 6	July 13
Bituminous shipments, 123 roads.	212,849	219,625	180,090*	234,899†
Anthracite shipments, 9 roads...	41,170	41,641	31,493	42,331

* Revised from last report. † Subject to revision.

BUSINESS OPINIONS

American Wool and Cotton Reporter—The Government has by no means taken all of the machinery, although more or less irregularity exists in the condition of the different sellers. There has been quite a long period where the production available for civilian distribution has been approximately 50 per cent. of the available producing capacity. Few can estimate what the future may be, but the total supply of goods for the season's requirements, while undoubtedly less suitable than usual, might be in actual yardage not greatly inferior to what the market requires.

Bradstreet's—Government needs and war work dominate, and industry, despite rather more unsettlement in labor lines, is still at a very swift pace. Wholesale and jobbing trade at primary centers reflects some seasonal slowing down and is quiet in comparison with the speed in industry, but in the larger markets of the west, south, northwest and Pacific coast, the reports are that trade is large and demand eager for an ordinary dull period. Retail trade, notwithstanding a good number of midsummer sales, is quieter than for some weeks past, but even at that loses nothing in comparison with the volume of business doing at this date in other years.

Dry Goods Economist—The shortage of raw material continues acute in the woolen and worsted goods industry. In this connection it is interesting to note the latest order issued by the War Trade Board under date of July 12, which declares: (1) That all outstanding licenses for the importation of wool from Uruguay, Argentina and South Africa are revoked as to ocean shipments made from abroad after July 28; (2) that hereafter no licenses for the im-

portation of wools from the countries named will be issued for the remainder of the present calendar year, except to the Quartermaster General of the U. S. Army.

Marshall Field & Co.—Current wholesale distribution of dry goods has been in excess of the heavy shipments of the corresponding week in 1917. The majority of our general line salesmen have been in the house during the past week. Road sales for immediate and future delivery from those remaining on the road have been better than they were last year. Customers have been in the market in greater numbers. Collections for the week show a satisfactory increase over those of the same week a year ago.

Atlantic Seaboard

BOSTON

Developments the past week give the market a hopeful aspect. Improvement at Hampton Roads due to emergency action which cannot be kept up. More and more difficulty over getting full quota from Pocahontas and New River districts. Production section of the Fuel Administration begins to show grasp of the situation. Apparently transportation has caught up with output in every direction. Remarkable fact that not one coal embargo has been in effect on New England roads since Apr. 1. Movement all-rail shows steady improvement. Railroad reserves also show an upward trend. Box cars being sent forward on direct order of the fuel authorities. Anthracite receipts all-rail continue in good volume. Retail advance general because of freight increase.

Bituminous—New England has always been responsive to improved market conditions, and this season is no exception. Somewhat increased receipts all-rail, better loading at the Virginia terminals, and signs here and there of accumulating stocks of 30 to 60 days are enough of themselves to make buyers less pessimistic. Of course, such improved conditions will have to be maintained over several weeks, or even months, before this territory will be in position to slacken its effort to get coal, but the moral effect is good and fly-by-night traders are doing less business on irregular propositions than has hitherto been the case. Reports that production has lately improved have also had their effect on buyers, and just now there is a period, probably a brief period, when consumers are saying that perhaps after all things may not turn out to be so bad as feared. Doubtless it is all a part of the general hopefulness that is in the air just now.

Bottoms at Hampton Roads have met with better dispatch the past week. Steamers that were thought certain to be detained several days were loaded with a fair degree of promptness. By the trade, however, it is realized that it was only through the strong arm of the Government that this was accomplished. First a special order was issued to send 200 cars daily from high-volatile districts out of shipments that would ordinarily move west, and later, when it was seen that the 10,000 tons or so a day would not be enough, a general embargo was declared against all westbound movement, thereby throwing a large extra volume to tide. Even byproduct plants in western territory were not excepted, and just that one fact will make it plain the quantity of coal now moving east will have to be replaced. It is therefore almost inevitable that delay at Hampton Roads will follow. Steamers will be available in increasing numbers, and certainly the outlook is not favorable today for anything like budget requirements for New England.

Difficulties in the smokeless region multiply rather than diminish. For a time there was a feeling that labor shortages would be made up with less trouble than in other fields, because miners would be attracted to thick-seam districts from fields where mining is more difficult. The operation of the new system of state directors of labor is affecting this, however. There are restrictions now on the movement of labor from one section to another, and already there are interesting results in the coal industry. The Pocahontas and New River districts are therefore chiefly dependent upon the usual labor supply, and under present conditions it is inadequate. The increased output of coke is another important factor, those in charge of coke production having seen to it price was made attractive. The railroads that serve these districts are also making increasing drafts for fuel, and when to all these other demands is added the enormously increased requirements of Government service, not to mention the tremendous powder plants now in process, it will be seen how slim a chance New England has of getting its water coal in sufficient volume, the largest part of which is supplied via the Hampton Roads piers.

The remarkable thing in New England is the fact that not one coal embargo has been in force on the New England railroads since Apr. 1. Indeed, it has been freely stated by the railroads themselves that at least 200 cars more per day can be handled through the gateways than are now coming through. The receipts of bituminous are increasing, but slowly thus far. For the first 16 days of July the average daily movement through the New England gateways for New England destinations was 611 cars of commercial bituminous and 151 cars railway fuel, a total of 762 cars. It is rumored that the current week will show shipments from the central Pennsylvania district alone of 4000 cars, but there is little hope of the movement reaching the 4500 figure that was set early in June to make up deficiencies during April and May. It is evident that the statistical section at Washington set too high a mark for the Altoona district in the first place. If now the gas coal region can be relieved of the heavy railroad fuel requisitions made upon it especially for the low sulphur grades, another gain could be registered.

The New England railroads are beginning at last to show materially larger stocks than during June. Thus far most of the accumulation has been built up from water-borne shipments, but beginning the current week, from shipments already started from the mines, there should be a considerable gain in receipts all-rail. The diversion of 40 cars daily from less essential industries to help the Boston & Maine railroad is still in effect and will hardly be canceled until the reserve of that road has reached a much higher figure than at present.

Apparently the Fuel Administration in some of the Pennsylvania districts at least is looking upon box car shipments, particularly from wagon-loading mines, as free coal, and it is quite likely most of the box cars forwarded will be handled in this way. It is common knowledge that many abuses in price, etc., have crept into box-car transactions, and doubtless this present program is an effort to straighten out certain of the shippers. Certainly New England consumers will take all the box cars that are sent, although there is a little anxiety here and there as to quality. None the less orders are being filed through the district representatives and for the present a considerable movement is looked for.

The inspection force attached to the office of the Altoona district representative is doing some effective work. When a car is rejected by an eastern railroad or by inspectors working under the Tidewater Coal Exchange the case is reported back and thorough investigation follows. In some instances cars have been ordered withheld from certain mines until the operators carry out directions that their coal be properly prepared before being sent forward.

Anthracite—All-rail receipts of domestic sizes for the first 16 days of July show an average of 514 cars. On July 14 the movement rose to 837 cars, a gratifying figure. Steam sizes maintain what has been a fairly steady movement, this month thus far showing 175 cars as a daily average, although the percentage has dropped from 30 per cent. to 25 per cent. By water there is no material change. The movement of barges is still slow on account of the lack of power. More coal could be loaded if bottoms could be moved more promptly. To a surprising extent owners of barges from New York are disinclined to send them east of Providence, and today there is a marked shortage of bottoms for New Bedford and for Boston, even through the canal.

The Boston retail price was advanced on July 18 from $10.25 to $11 for broken, egg, stove and chestnut. This is an advance of 75c. a net ton, and covers shovel delivery. Where coal has to be carried 40c. extra is charged, as against the former charge of 25c. for basketing. Another trade paper recently stated this advance much more than covered the increase in railroad tolls that made the advance necessary. This statement, however, takes no account of the fact that most of the Boston retailers receive coal by water and that on coal by barge from Philadelphia the increased charge is something like 83c.

NEW YORK

Receipts must increase rapidly to prevent serious shortage here. Efforts for wage increase interest producers. Dumpings at local docks show slight increase. Shipments on city order of 300,000 tons to begin Aug. 1. Bituminous situation quiet. No free coals to be had and consumers storing little. Unnecessary illumination prohibited. Miners dissatisfied.

Anthracite—A rapid improvement in receipts of anthracite must be made if this city is to escape a near-coal famine next winter, according to some of the trade, while others look for a comparatively easy situation, expecting that the Anthracite Committee of the Fuel Administration will soon cancel their order diverting additional tonnages into New England. They expect that some similar order may be issued regarding shipments to this city, and it will be necessary, many claim, to keep homes warm. Of the five boroughs comprising Greater New York it is admitted that Manhattan is in better shape than any of the others. This is due to the small increase in additional building construction, while the larger increase in population in the other boroughs is resulting in increased need for fuel.

Producers and shippers here are watching with interest the efforts of the mine workers to reopen the wage agreement of last November, although it was stipulated that it was to remain in force until 1920. A committee of mine workers has been appointed to confer with the operators for that purpose, the miners setting forth that living conditions have changed since the signing of the agreement.

No successor to Mr. Wiggin as State Fuel Administrator has yet been announced, although promises are reported to have come from Washington that the appointment was to have been made "within a few days." The report that New York State is to be divided into two districts continues to persist.

The Lehigh Valley Coal Sales Co. has advanced its mine prices for buckwheat and barley 20 and 30c. respectively, placing them on a level with other companies shipping to the lower ports, namely $5.15 and $4.15 f. o. b. docks.

Dumpings at the local tidewater docks for the seven days ended July 19 show 7375 cars of anthracite dumped, an increase of 50 cars as compared with the previous seven days.

With the exception of barley, there is a scarcity of all sizes. Some shippers offer barley only and invite buyers to include that size in their orders for the other coals. Other shippers have nothing to offer, their entire output being provided for.

Markets Commissioner Day has announced that he expects shipments on the 300,000-ton contract made with the DeJulio Coal Co., of 220 Broadway, to commence Aug. 1, at the rate of 1500 tons daily. This coal will be taken from two culm banks near Ashland, Penn., and is said to consist of a fine grade of stove, chestnut and pea sizes, mixed. The coal is to be delivered alongside piers in Manhattan at $6.55 per ton, and it is expected that local dealers will see that it is delivered from these points.

Current quotations, per gross tons, f.o.b., tidewater, at the lower ports, are as follows:

	Circular	Individual		Circular	Individual
Broken	$6.75	$7.50	Pea	$5.20	$5.95
Egg	6.35	7.10	Buck	5.10	5.90
Stove	6.60	7.35	Rice	4.65	5.10
Chestnut	6.70	7.45	Barley	4.15	4.30
			Boiler	4.60	

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates. Prices for buckwheat, rice, barley and boiler are not fixed by the Government.

Bituminous—The local situation shows no improvement. Coal is scarce, regular customers receiving just about sufficient to keep their plants going with hardly any surplus. Free coals are seldom heard of, although there is an urgent call. The order of the local Fuel Administration prohibiting unnecessary illumination of show cases and windows between sunrise and sunset is not expected to result in much saving of fuel here, but is believed to be the forerunner of other and more drastic orders soon to be issued.

The decision of the Interstate Commerce Commission regarding the placing of demurrage charges on boats after they have been registered at the loading ports and not loaded because of frozen coal due to weather conditions is being awaited by the trade. This is an important matter to coal shippers, and if decided in their favor will result in considerable saving to them.

There were dumped at the local tidewater docks in the period July 13-19 inclusive, 7130 cars of bituminous, an increase of 41 cars over the preceding seven days. Car supply shows some improvement and operators are kept busy at some of the mines to get them loaded.

The New England situation continues to be responsible for heavy shipments from this market. There is a good movement of bunker fuels and the surplus is not large.

Current quotations, based on Government prices at the mines, net ton, f.o.b. tidewater, at the lower ports, are as follows:

	Mine Gross	F. o. b. N. Y. Gross
Central Pennsylvania:		
Mine-run, prepared or slack.....	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of-mine.....	3.08	5.23
Prepared.....	3.36	5.51
Slack.....	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite little changed. Slight improvement in spots. Promise of better deliveries soon encourages dealers. New conservation rules. List of restricted uses growing. School coal being arranged for. Miners show signs of uneasiness. Steam coals extremely active. Bituminous improvement continues. Car supply good. Wagon mines must prepare coal.

Anthracite—It is believed that some real progress has been made this week, at least in one section of the city that was most troublesome last winter and would undoubtedly need more attention this year. In the southwestern section of the city, owing to the proximity to the immense Hog Island shipbuilding plant, the increase in population has been extremely heavy. Coal can be consigned to yards from which deliveries can be made into this territory over five different branches of railroads.

New rules and regulations regarding the conservation of fuel are being made almost daily and it is certain that dealers are having trouble trying to obey the laws governing their business. The latest ruling compels them to attach a 2c. fuel stamp when filling orders for No. 1 buckwheat coal for schools, churches, hospitals, hotels, office buildings, stores, apartment houses, theaters, banks, garages, greenhouses, restaurants or saloons. It will be remembered that formerly the dealer was exempt from this tax on all No. 1 buckwheat deliveries, except those for purely domestic use, and this new expense to the dealer is not as trivial as it first appears. All this has been occasioned by the fact that with the placing of buckwheat in the exempted class as a domestic fuel it makes it necessary for these orders to pass through the fuel committee's auditing office for checking, with the consequent adding of the 2c. per ton tax.

Certain dealers have been notified by the Board of Education that they have been awarded the contract for hauling coal to the schools. In many instances these are the same dealers who made the deliveries in 1916, as it is the understanding the fuel administration is arranging for the same shippers to furnish the coal this year. Pending the arrangement of final details as to the source of supply, no definite announcement has as yet been given out. It is believed that the delay is principally due to the apportioning of the 30 per cent. buckwheat which the schools have agreed to take.

It now develops that no official authority for dumping coal on the pavements and not carrying it in the bins of the customer has ever been granted to the retail men. While the practice has been adopted to a limited extent, Mr. Lewis is now considering allowing the dealers to make an increased charge for this work, and if the customer objects to this he then has the option of doing it himself.

There continue to be some complaints of certain shippers who are not strictly abiding by the allotment as fixed by the distribution committee, and this in spite of the very pointed letter sent out recently. The dealers in certain sections point out instances of retailers not in business in 1916, who are receiving particularly heavy shipments. It is believed, however, that the entire matter will be remedied and that such instances have been due to a misunderstanding as to the exact meaning of the regulations.

It is becoming pretty generally known among the trade that the production of family sizes is not up to the record of last year, and it is this that has made them so uneasy of late. The best informed men in the trade cannot but admit that the city is bound to witness some strenuous times next winter unless some method is found whereby production can be immediately increased. In the matter of draft exemption it now appears that the army authorities claim that the local boards have had power all along to exempt mining men, but this does not satisfy those who see the serious aspect of the diminishing labor supply at the mines. It is still asserted that a general order should be issued prohibiting any man who has been engaged in work at the mines from enlisting in any branch of the service. Even in the cases where boards have exempted men they seem to have felt a stigma attached to it and have gone off and enlisted in other branches.

There also seems to be a growing restlessness among the miners in the region. Last week the question of increased wages cropped up for the first time in a semi-official way, and now this week there was a local strike at a colliery, where several hundred men went out claiming that they should be paid better wages for certain classes of work. It is the private opinion of many well-informed coal men that a definite demand for increased wages will be made before the first of the year, as the men claim to be strongly affected by the recent heavy increase in the cost of commodities of all kinds.

Steam coals continue in the extreme demand that has prevailed for weeks past, with the exception of culm locally. From outlying points the demand for this grade is actually becoming heavier each day, particularly from the New England region. The general price continues to be $1.25.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken.....	$4.90	$6.25	Buckwheat..	$3.40	$4.45
Egg.....	4.50	5.85	Rice.....	2.90	3.80
Stove.....	4.75	6.10	Boiler.....	2.70	3.70
Nut.....	4.85	6.20	Barley.....	2.40	3.30
Pea.....	3.45	4.70	Culm.....	1.25	2.15

Bituminous—The good car supply in evidence since the early part of the month continues and most mines report as many cars on hand as they are able to load. Good shipments are also coming into the city, and fair progress is being made in storing coal, although it is felt that there could probably be a more equitable distribution, as there are some important plants that do not seem to be faring as they should.

The preferential shipments to New England are still in effect and all shippers are making efforts to maintain their quota, although the feeling continues that they should be allowed more leeway in the distribution. The rumored order denying cars to the wagon mines does not seem to have been given the official stamp as yet. It is a fact, though, that several mines of this kind have been shut down for turning out an inferior product and will not be allowed to resume shipping until they are in position to prepare the coal.

The brokers still continue to be able to get quite a little tonnage, the most of which is obtained, especially by the smaller houses, by keeping men permanently in the region to negotiate for the coal right at the mine.

In tide coal, due to some new arrangements for deliveries from the pools, there is a prompter movement of fuel and quite a heavy volume of business is moving, both in bunker and tide shipments.

At this time there is a movement on foot among the soft coal men to effect a more stable arrangement with the fuel authorities when coal is seized and delivered to new consignees by their direction. Of course, this is being done only in the rarest cases now, but was quite common last winter. The shippers are asking that the authorities see that they are given advance notice in every instance of this kind, so that they can keep their records from becoming confused and at the same time make the necessary credit arrangement.

Lake Markets

PITTSBURGH

Distributing problem somewhat simplified. Consumers hope to receive stocks later. Market transactions reduced.

The matter of distributing Pittsburgh district coal has been somewhat simplified by the requirement that only current wants of consumers may be supplied, in the interest of forcing lake shipments to the maximum to make up for the required diversion to the Navy of West Virginia and Kentucky coal. No estimates are yet made as to the quantity of lake coal that will be shipped from the district this month, but hopes are entertained that the quota originally assigned for the month, 1,300,000 tons, will be greatly exceeded.

A slight improvement in labor performance is noted, due to the individual efforts of the coal operators as well as to the efforts of the Shipping Board, but there remains much to be desired in this direction.

Coal consumers are not getting all the coal they would like to receive by any means, but those engaged in the more essential lines of war work are well supplied through the efforts of the distributing agency. As to stocks to tide over the winter, consumers feel that if after the middle of October they receive extra coal at the rate at which it is to be shipped in the lake trade from now until then, minus the additional amount that will be required for domestic purposes, they may enter the period of bad weather in fairly safe position. River coal shipments are rather heavy and it is only river coal that local dealers can put into stock.

Scarcely any coal is being sold in the open market, except for such transactions as are dictated by the coal distributor. Brokers are doing less business than formerly, as it is only when their customers have a preferred claim for coal that the business is sanctioned. The market remains quotable at the set limits: Slack, $2.10; mine-run, $2.35; screened, $2.60, per net ton at line, Pittsburgh district, brokers being allowed to charge customers up to 15c. commission in addition.

TORONTO

Coal situation increasingly serious. Dealers months behind in deliveries and refuse new orders. Fair supplies of soft coal on hand. Fuel controller issues reassuring statement. Attitude of United States appreciated.

The coal situation continues to grow more serious. While deliveries of anthracite in Toronto have been so far fully equal in volume to those of last year the dealers are months behind in filling orders, and generally refuse to make sales even for future delivery. Very few new orders are being taken and great apprehension is entertained that conditions next winter will be considerably worse than those experienced last season. There is a fair supply of bituminous on hand and many consumers unable to obtain hard coal are purchasing soft coal for domestic use. R. C. Harris, Fuel Controller for Ontario, while admitting that the supply is uncertain, does not consider that a serious coal famine is probable. He says: "The Fuel Administration of Canada is alive to the situation in a greater degree than any one else in the Dominion and is straining every effort to cope with the situation." H. A. Harrington, secretary of the coal section of the Retail Merchants' Association, has just returned from the United States, where he has arranged for a further supply of coal. He expresses strong appreciation of the generous treatment Canada is receiving from the United States, but emphasized the fact that strict fuel conservation is an absolute necessity.

Quotations (largely nominal under the circumstances) for best grades per short ton are as follows: Retail anthracite, egg, stove, nut and grate, $11; pea, $10; bituminous steam, $9; slack, $8; domestic lump, $10.50; cannel, $13. Wholesale f.o.b. cars at destination, three-quarter lump, unprepared, $6.41; prepared, $6.61; slack, $5.48.

BUFFALO

Coal not as plenty as it was, especially anthracite. Fuel authorities are watching the situation closely. Extreme caution is the plan. All demand is heavy.

Bituminous—The demand for all sorts of coal is heavy, but the real situation cannot be made out from that. Consumers are taking all the coal they can get, if they can take care of it. It is believed that considerably more bituminous is in the hands of consumers than there was a year ago, but that is not the case with anthracite.

The situation is such that the operators are afraid of priority orders that will keep them from filling their contracts and cause distress in one place where it is relieved in another. This feeling is heightened by the orders coming out every few days, cutting off the supply to this or that industry or institution that is not considered essential. The breweries and the greenhouses are to have but a half supply, and the country clubs must burn wood or peat.

The prices of bituminous remain at $4.65 for thin-vein Allegheny Valley, all sizes, $4.45 for Pittsburgh lump, $4.20 for Pittsburgh mine-run and slack, $6.15 for cannel and $5.85 for smithing, all per net ton, f.o.b. Buffalo, with jobber's profit added.

Anthracite—The situation grows more complicated. The county fuel administration is demanding monthly reports from all distributors of the amount of coal delivered, to whom and the amount asked by the consumer. At the middle of the month a circular was sent out to trestle owners or others who supply retailers, giving the names of 84 concerns who had not complied

with the regulations. The claim is mostly that no monthly report had been made. In some cases the consumer was given the full amount asked for, instead of the two-thirds allowed. These dealers will get no more coal till they square themselves with the fuel authorities.

The retailers of anthracite generally complain that their orders increase while the supply falls off, but the authorities say that when the allotment that has been asked for is granted (900,000 tons for the county) a better supply will be obtained. Just now the lack of a state fuel administrator is holding the local trade up, as everything has to be referred to Washington direct.

In the lake trade the supply is also running down. It was found that the Canadian districts had been getting more than their share by rail, and now the lake shipments to Canadian ports are made very small. There is a general falling off, the amount for the week being only 80,500 tons, of which 37,800 tons cleared for Duluth or Superior, 25,200 tons for Milwaukee, 8000 tons for Sheboygan, 7800 tons for Chicago and 1700 tons for Depere.

With coal so scarce many vessels are obliged to go out light and coal freight rates are easy at $1 for Depere, 60@65c. for Chicago, 55c. for Milwaukee, 50c. for Sheboygan and 48c. for Duluth.

CLEVELAND

Movement of bituminous is all that can be expected with virtually a 100 per cent. car supply at the mines, but this is not sufficing to meet present needs, especially of the Northwest. With half of July gone and the month's lake quota unfilled so far by nearly 500,000 tons, operators are agreed that Fuel Administration officials must provide adequate labor supply and insist that no coal be stored at present.

Bituminous—Operators with mines in the Pittsburgh vein district of southern Ohio report every condition highly satisfactory except labor. Car supply continues at approximately 100 per cent. With what labor is on hand, operations are being rushed at a point not equaled so far this coal year. But a 100 per cent. car supply today does not mean a 100 per cent. output when compared with two years ago, operators claim. Instead, with men going into the army and more steady employment in the cities, a 100 per cent. car supply now means only, on an average, 75 to 80 per cent. of maximum output two years ago. One operator, who with a 100 per cent. car supply used to get out 60,000 tons of bituminous a month from one mine, now is getting only 34,000 to 36,000 tons under comparative circumstances. Less stocking of coal at industrial plants is apparent; some seems to be done despite orders to the contrary. The latest report of the Pittsburgh Vein Operators' Association for Ohio, for the week ended July 19, gives shipments to railroads as 1678 cars; to the Great Lakes, 2894; to Ohio, 1463; to Michigan and Indiana, 251, and Canada, 101. These shipments were made as follows: On the Baltimore & Ohio, 2914 cars; Pennsylvania, 1501; Wheeling & Lake Erie, 1706, and on the New York Central, 138.

Lake Trade—At a meeting of the coal committee of the Coal and Ore Exchange, which is handling the pool of Great Lakes vessel, coal and iron ore interests this season, it was decided to send Federal Fuel Administrator Garfield a letter urging him to help speed shipments of bituminous up the Great Lakes. The committee is of the opinion that if stocking of coal is absolutely prohibited until the lake season is over, and some of the industries that have large storage piles are compelled to dig into them now instead of diverting coal that should be going up the lakes, that the Northwest's requirements of 28,000,000 tons will be met, and a 100 per cent. supply next winter will afford coal for all when the need for it arises. Though fuel administration officials at Washington are reported to be banking on July proving a 5,000,000-ton month—it is scheduled as a 4,900,000-ton one—the first half of July saw only 1,791,320 tons shipped, according to the Coal and Ore Exchange's figures. This is about 500,000 tons behind. Lake carriers now are getting more cargoes than in the early part of the month, but many are going up light. Shipments in the week ended July 13 are known, by corrected figures, to have been 821,640 tons. For the week ended July 20 the first figures compiled give the movement as 19,611 cars.

DETROIT

Shipments of steam and domestic coal continue too light to permit creating adequate reserves. Anthracite supply is short. Lake shipments improve.

Bituminous—Although requirements of many of Detroit's manufacturing plants are increased by the magnitude of the work which they are doing for the Government, the supply of steam coal made available in the local market continues less than the amount regarded as adequate to supply needs in previous years. While there is enough coal arriving to provide for present use, jobbers say the supply is too small to permit a satisfactory building up of reserves, which should now be under way, and therefore is insufficient. The importance of obtaining shipments substantially in excess of current needs is emphasized as necessary to assure continued operation of plants turning out military supplies and other Government work, in case developments later in the season diminish receipts. The present supply affords little diversity in selection as most of the shipments consist of mine-run. Some slack is included, but jobbers complain that domestic stock is deficient in amount. The situation and outlook occasion much anxiety. Unless receipts are largely increased at an early date, it is feared hardship and suffering will be unavoidable for household consumers unsupplied with fuel.

Anthracite—Detroit's supply of anthracite is not increasing. With the season half gone, distribution has been held back by lack of coal and there is still no movement of sufficient size to enable the retailers to get delivery under way.

Lake Trade—There is a freer movement of bituminous coal to lake loading docks and shipments by boat during the week attained a larger volume than usual. The total, however, failed to attain the amount necessary to carry out the schedule for the month. The vessel capacity available for loading was greater than the supply of cargoes. Many boats went up light.

COLUMBUS

The coal trade in Ohio continues active in every respect. There is a strong demand for steam, lake and domestic tonnage. Production shows a light gain.

Strength is the chief feature of the coal trade in Ohio. All departments of the industry have been active and buying is on a brisk scale. Steam users, as well as retailers, are in the market for a large tonnage, while lake shippers are straining every point to move a large tonnage to the Northwest. On the whole the tone is satisfactory and special efforts are being made to speed production.

Domestic trade is one of the strongest points at this time. Dealers are in the market for a larger tonnage to replace depleted stocks caused by heavy retail buying. Most of the orders are for immediate delivery. Householders are buying actively, as they believe a fuel shortage will occur during the coming winter. Retail prices are firm at the levels which have prevailed for several weeks, but when freight matters are adjusted still higher prices will be announced. Pocahontas is a scarce article in the Columbus market. Some West Virginia splints are being received, but the main fuel supply comes from the Hocking Valley and Crooksville districts.

A large amount of screenings is reaching the market because of the heavy lake business in lump. This is relieving the steam situation to a certain extent, but on the whole the steam demand is firm. Consumers, especially those using a large tonnage, are adopting every means possible to increase their storage. The smaller steam users are following the example of the larger consumers and are also trying to secure a surplus. Railroad consumption continues large. The threshing rush is now about over, and a large tonnage was required for that purpose. Freight rate advances are expected to have a considerable influence on the steam trade.

Production is fairly good in most of the mining districts of the state. Labor shortage is reported from every field, but most especially from eastern Ohio and Massillon. The Hocking Valley produced about 85 per cent. of normal during the past week, and the same percentage is reported from Pomeroy Bend. Crooksville and Cambridge had about 75 per cent., while eastern Ohio is lagging behind with about 65 per cent. The last named field is hampered both by car shortage and labor shortage.

The lake trade is active, and the Fuel Administration is stimulating the movement as much as possible. All fields are short of pre-season estimates, and shippers are urged to move coal as rapidly as they can. Loadings at the docks continue to show up well, despite some hindrances.

LOUISVILLE

Demand for all grades of coal continues strong, with dealers considerably behind on deliveries and no surplus stocks accumulating. Somewhat better supply of coal moving in.

There has been an appreciable improvement in the movement of coal from the east and west Kentucky mining districts due to improved labor conditions and a fair car supply. The combined effects of the work or fight order, and the fact that agricultural labor is not in such big demand during the present growing season, has resulted in the mines being much better supplied than for some time past. However, in some sections, especially western Kentucky, drafts have played havoc with labor.

The St. Bernard Mining Co., operating eleven mines in the Earlington, Ky., district, has been forced to close one mine, and the balance are averaging 60 per cent. of their capacity. Over 100 men were sent from the district to the army camps on July 19.

Effects of the light production are shown in the July stocks in the four retail yards of the St. Bernard Coal Co., at Louisville, two yards having no lump coal, and the other two having four cars between them. About 15 cars of steam coal, 10 of nut and slack and four of Straight Creek gives the company a stock of slightly more than 30 cars at a season when the yards should be jammed to overflowing with surplus stock.

Coke

CONNELLSVILLE

Small gains in production. Byproduct oven building proceeds slowly. Blast furnace output unsatisfactoy. Reclassification of screened coke.

The coke situation is without important incident. Production in the region seems to be increasing, but the average gain from week to week is almost infinitesimal. The byproduct ovens are probably doing as well as could be expected, averaging an output of about 90 per cent. of rated capacity, a percentage which apparently cannot be materially exceeded. Construction of the new byproduct ovens is proceeding very slowly. At the Clairton plant of the Carnegie Steel Co., for instance, where a start was made by drawing some coke from the first battery of 128 ovens on June 25, it was hoped that the other four batteries might be completed by about the end of August; but the latest estimate is that it may be Dec. 1 before the whole 640 ovens are in operation, and completion of the second five batteries is set correspondingly farther in the future. A slight evidence of easier conditions as to coke supply is the decision of the company to blow in this week its Zanesville furnace, a small detached stack operated only when iron is scarce and coke in fairly good supply. It uses Pocahontas coke.

Generally speaking, the blast furnaces do not appear to be particularly short of coke, and yet their pig-iron output is far from what it should be considering the number of stacks in blast and the outjut per furnace that was attained in 1916.

W. L. Byers, district representative of the Fuel Administration, interprets the regulations of the Fuel Administration announced July 8 to mean that coke that is improperly screened may be sold at $4.50 if it is fairly satisfactory, otherwise it must be classed purely as "breeze" and therefore sold at not above $3, a price it would hardly bring in the market, perhaps. The new regulations make the $7.30 price for crushed coke apply to coke over ¾-in. instead of over 1-in. Clean screenings under ¾-in. are limited to $5, or $1 under furnace coke. Breeze is set at a $3 limit, or one-half the price of furnace coke, and includes unassorted coke and material left after removal of prepared sizes.

The market remains narrow, practically no furnace coke being openly offered, although some is picked up by furnace representatives in the region from time to time. There is a fair volume of foundry coke available, and sometimes operators are willing to pay brokers a small commission for disposing of it. The market is quotable at the set limits: Furnace, $6; foundry, 72-hour selected, $7; crushed, over ¾-in., $7.30; prepared sizes of clean dry screened coke under ¾-in., $5; breeze, $3, per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended July 13 at 353,470 tons, an increase of 3575 tons.

Buffalo—The demand for coke is good, and with more than 50,000 tons of iron ore coming in by lake every week the furnaces must be running as never before. Still the coke is seldom turned over to jobbers to sell in these days, the Government prices being paid to the ovens direct. These are $7 for foundry and $6 for furnace at the

ovens, with freight $2 from the ovens and no selling profit to add. Vessel owners are pleased with the ore trade, as there is less delay at the unloading docks than common, so that they can make quick trips. The supply promises to last the season through.

Middle Western

GENERAL REVIEW

Feeling of optimism among Middle West coal operators. Labor situation arouses apprehension. Car supply unusually good.

There is at present a decided spirit of optimism among the coal operators of the Middle Western district. This is all the more noticeable, because for the past three months the outlook, seen through the eyes of the average operator, has been anything but bright. This condition has been brought about by a number of facts, chief among which is the labor situation. The establishment of a Federal Employment Bureau to help the labor situation is being watched with keenest anticipation, and it is expected that very substantial assistance is to be rendered to the coal industry through this channel. This is the consensus of opinion of a number of the big operators.

Another bright spot is the probability of prohibition for the duration of the war. The operators have been in favor of this step for a long time, as it is a well known fact that alcohol has a very decided effect on coal production. The officers of the miners' unions are also for prohibition, both on the grounds of patriotism, as more coal is needed, and on the grounds of looking after the best interests of their own members. The percentage of accidents caused by drunkenness is appalling.

The car question for the past week has been unusual. Railroads like the C., B. & Q., the C. & N. W., the I. C. and others report nearly 100 per cent. supply of cars at their respective mines. Transportation difficulties at this time cut no material figure. Consumers report a rapid movement of coal from the mines to their factories.

CHICAGO

Market conditions undergo change. Easing of steam sizes. Rumor that Government is to place large order.

Market conditions have changed considerably during the past few days. There has been a slight weakening in the domestic market, as dealers are no longer satisfied with mere coal. They have a sufficient supply, either rolling to them or in their bins, to be more discriminating. Of course the demand for high grade and carefully prepared coals from southern Illinois, Indiana and the Springfield districts remains just as strong as ever, but the dealer is not tempted with 2-in. lump or mine-run as he was a week ago.

There has been a noticeable easing of all steam sizes, especially on screenings. Operators are offering freely a large tonnage from nearly all the producing districts. Some coal is selling below the Government price, but most of the better grade products are firm at "Government prices current at time of shipment."

There is a pretty well defined rumor out to the effect that the Government is about to place some large orders. The total will, in all probability, amount to 300,000 or 400,000 tons to be used at various camps and military depots in this territory. If this rumor materializes, a decided change in market conditions may be looked for at once, as the order will call for mine-run, and the tonnage is big enough to remove enough coal from both the steam and domestic market to strengthen any weakness that might develop.

Quotations in the Chicago market are as follows, per net ton, f.o.b. cars at mines:

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La-Salle, Bureau and Will
Steam lump	$2.55@2.70	$2.55@2.70	$2.95@3.10	$2.55@2.70	$2.55@2.70	$3.25@3.40
Domestic lump	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Egg or furnace	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Small egg or nut	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Stove	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Chestnut	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Pea	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Washed egg	2.75@2.90	.....	.....	2.75@2.90	2.75@2.90	3.45@3.60
Washed stove	2.75@2.90	.....	.....	2.75@2.90	2.75@2.90	3.45@3.60
Washed nut	2.75@2.90	.....	.....	2.75@2.90	2.75@2.90	3.45@3.60
Mine-run	2.35@2.50	2.35@2.50	2.75@2.90	2.35@2.50	2.35@2.50	3.00@3.15
Screenings	2.05@2.20	2.05@2.20	2.35@2.50	2.05@2.20	2.05@2.20	2.75@2.90
Washed slack	2.05@2.20	2.05@2.20	.....	2.05@2.20	2.05@2.20	2.75@2.90

MILWAUKEE

Report that breweries were to be denied coal of any nature after Jan. 1 causes commotion. New anthracite rates still held back. Cargoes arriving steadily.

With huge steamers filled to their decks with coal moving up the rivers daily, and with mountainous heaps of the fuel in constant sight from the several viaducts which span the river valleys, it is surprising that there is so much agitation and concern in Milwaukee over the prospective supply for next winter. This is due largely to the persistent campaign of alarm pursued by the state fuel bureau and councils of defense, in their efforts to stimulate the placing of orders by small consumers, and also to the fact that brewers and maltsters have been restricted in the use of bituminous coal and denied anthracite altogether. Anything affecting the breweries in Milwaukee is bound to receive the attention of the masses. Milwaukee is not so far behind in her coal supply that the shortage cannot be made up before the close of navigation if reasonable energy is employed at the sources of supply.

Anthracite continues to be delivered without knowledge as to cost. Those who claim to know say this is done to allow dealers on the outskirts of the city (who are selling anthracite received by rail at rates considerably above what the city schedule will be) to work off their stocks before the lower prices are announced. As these dealers helped the fuel situation by getting this coal, the fuel administration is not disposed to expose them to loss.

An ordinance which would permit coal dealers to dump coal in the streets in front of points of delivery and thus shirk the problem of putting it into bins was voted down by the common council of the city. There is no question but the policy of the fuel administration in forbidding full deliveries to be made at this time will greatly complicate the delivery problem during the winter, as two deliveries will now have to be made in a great many cases where formerly one sufficed.

Notwithstanding the coal stringency, there will be a great sufficiency of coke and gas for heating and cooking purposes. Both gas and coke producers are urged strongly by the Government to increase their facilities for making coke because of the need of coal byproducts in the making of high explosive shells. The Milwaukee Coke and Gas Co. and the Milwaukee Gas Light Co. are running to their highest point of production.

Cargo receipts since last week's report total 3000 tons of hard and 14,350 tons of soft coal, making 175,591 tons of hard and 1,108,707 tons of soft since the opening of navigation.

ST. LOUIS

A rather quiet market in a general way, with steam sizes heavy. Domestic demand shows some slight improvement. Equipment shortage rather acute. Labor problem serious in all districts. Carterville continues scarce. No outside shipments.

The local situation has been rather quiet on account of the car shortage, which has kept the market somewhat uniform—that is, a supply that about equaled the demand in domestic sizes, but with the steam sizes off. There still continues to be a fairly good demand for Carterville coal, and the supply coming in seems to diminish.

The labor shortage in this field is perhaps the most severe of any, for the demand for this grade of coal is greater than in any other two fields in southern Illinois. The operators are doing their very best to increase the tonnage, and as a rule the men are coöperating. The railroads continue to draw heavily from this field, and it is understood that they are going to insist that they get this coal in preference to others who have always used this in the past. Much similar conditions exist in the Duquoin field.

The Mt. Olive field continues the only stable district in the southern Illinois field. The labor supply is rather good, the car supply is fair, and the supply about equals the demand. The railroads continue to draw heavily on this section, but the domestic demand is being taken care of promptly.

The Standard district presents an entirely different phase. There is still at times to some extent an overproduction, but with the decreasing labor supply and car supply this is soon going to be a thing of the past. For the past few months there has been more coal produced than could be absorbed by the market to which this field was entitled to ship. Car supply has been unusually poor throughout the Standard field the past week and the movement of cars has dragged a little. Steam sizes continue to be heavy, especially screenings.

There is considerable railroad coal moving from this territory at the present time, nearly all mine-run, and this is going at a price of from $2 to $2.20, with here and there a report that some is being sold as high as the maximum price, but this is something unusual and cannot be verified. There is no outside coal coming in from the eastern fields and very little from Arkansas.

The new price on coke effective July 9 has caused the local market to be $10.10 f.o.b. ovens for gashouse and byproduct, and there is a shortage of both. The country demand for coal is good at the present time. Especially is this so in the South.

On the 16th and 17th Lieutenant Governor Wallace Crossley, Fuel Administrator for Missouri, had a conference with other administrators in Chicago relative to the allotment of different Illinois coals for Missouri and other states. It developed in the hearing that St. Louis got a total of 6146 cars of Illinois coal in the month of June for all purposes, and that the State of Missouri for the same month got 8908 cars. St. Louis got from the Williamson and Franklin County field for all purposes a total of 1785 cars, which is a respectable showing in comparison with the movement of some coals in the same periods in past years, and shows that St. Louis as a whole is storing coal and to a greater extent than is generally supposed. The prevailing market is, per net ton f.o.b. mines:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.55@2.70	$2.55@2.70	$2.40@2.70
3x6-in. egg	2.55@2.70	2.55@2.70	2.35@2.55
2x3-in. nut	2.55@2.70	2.55@2.70	2.35@2.55
No. 2 nut	2.55@2.70	2.55@2.70	.....
No. 3 nut	2.55@2.70	2.55@2.70	.....
No. 4 nut	2.55@2.70	2.55@2.70	.....
No. 5 nut	2.05@2.20	2.05@2.20	.....
2-in. scrgs	2.05@2.20	2.05@2.20	1.25@1.50
3-in. lump	.....	.....	2.25@2.40
2-in. lump	.....	.....	2.25@2.40
Steam egg	.....	.....	2.25@2.40
Mine run	2.35@2.50	2.35@2.50	1.85@2.00
Washed:			
No. 1	2.75@2.90	2.75@2.90	.....
No. 2	2.75@2.90	2.75@2.90	.....
No. 3	2.55@2.75	2.55@2.75	.....
No. 4	2.55@2.75	2.55@2.75	.....
No. 5	2.05@2.20	2.05@2.20	.....

Williamson and Franklin County rate is $1.10; Duquoin field, $1; Standard and Mt. Olive fields, 95c.

General Statistics

BALTIMORE & OHIO

The following is a statement of the coal and coke tonnage moved over the Baltimore and Ohio system and affiliated lines during the month of April, 1918, as compared with the corresponding month of the previous year:

	Tons, 1918	Tons, 1917
Coal	3,600,539	2,861,603
Coke	319,236	309,823
Total	3,919,775	3,171,426

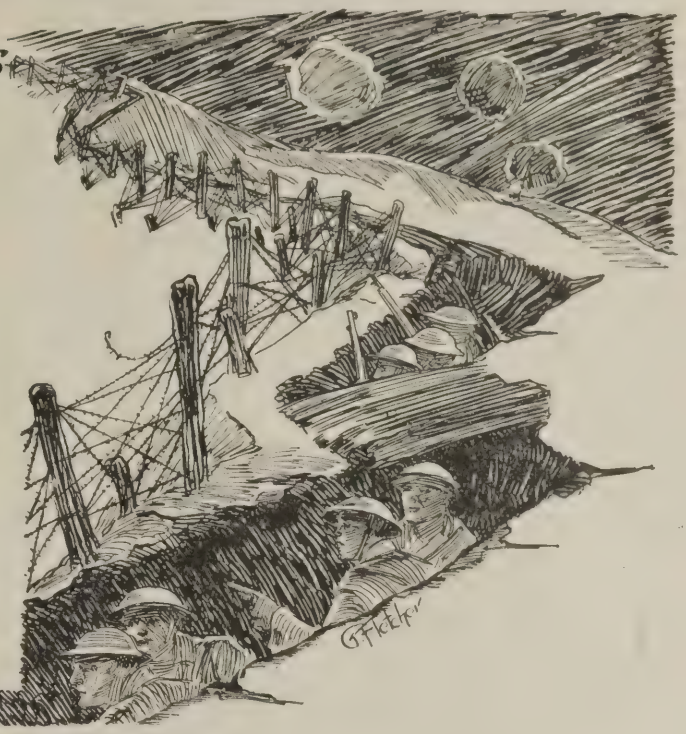
DUE to the fact that "Coal Age" has changed its day of issue from Saturday to Thursday, and also to the slowness of the mails, we have been compelled to omit from this issue the market reports from Baltimore, Cincinnati and Birmingham.

COAL AGE

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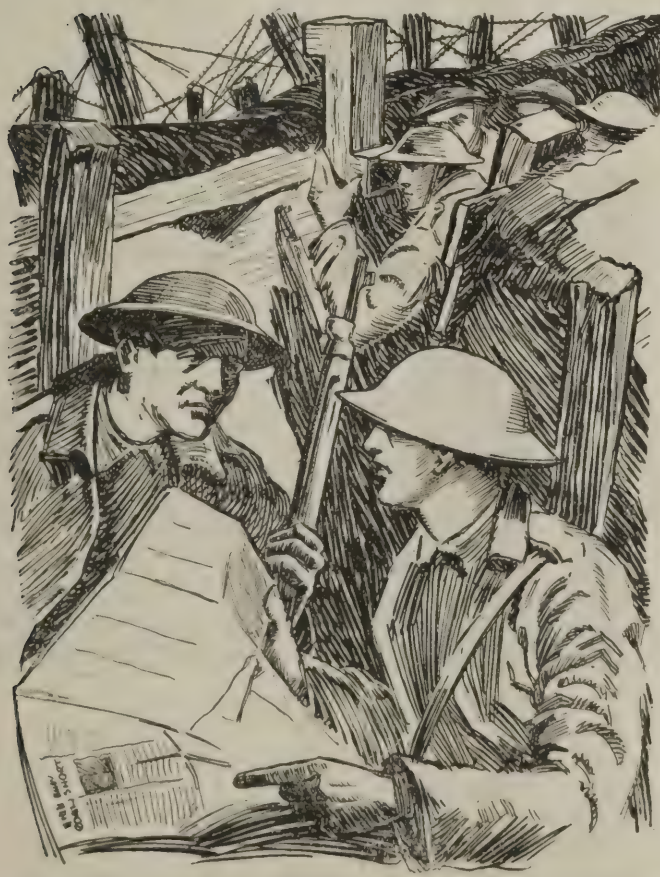
A Voice from the Trenches

Written expressly for Coal Age
by Rufus T. Strohm



For the love of Mike, pal, looky here
At the things the papers say!
Them minin' chaps must be gettin' queer,
Or at least it seems that way;
For they work three hours, or mebby four,
At the bottom of the pit,
An' they've earned enough for a day, an' more,
So they grab their pails an' quit.

Well, what do you think of that, old scout!
Now, wouldn't it jar you, hey?
They're hardly in till they're up an' out,
But they call it a workin' day!
An' the country yells, for the notion grows
It'll freeze its ears an' beak,
Yet the miner's time card seldom shows
More than thirty hours a week.



By the great gran'dad of Jehoshaphat!
Just suppose that you an' me
Went about our work in a way like that—
Where the devil would we be?
Why, Fritz would come with his sneaky face
An' his shifty, piggy eye,
An' me an' you'd find a restin' place
Underneath the wavin' rye.

No, the job we've got don't start an' stop
With the strikin' of the clock,
For we're wide awake an' we up an' hop
Ev'ry time that the Boches knock;
An' the hours come, an' the hours go,
An' the sun swings round to sun,
But we keep right on, for we never know
Any rest till the fightin's done.

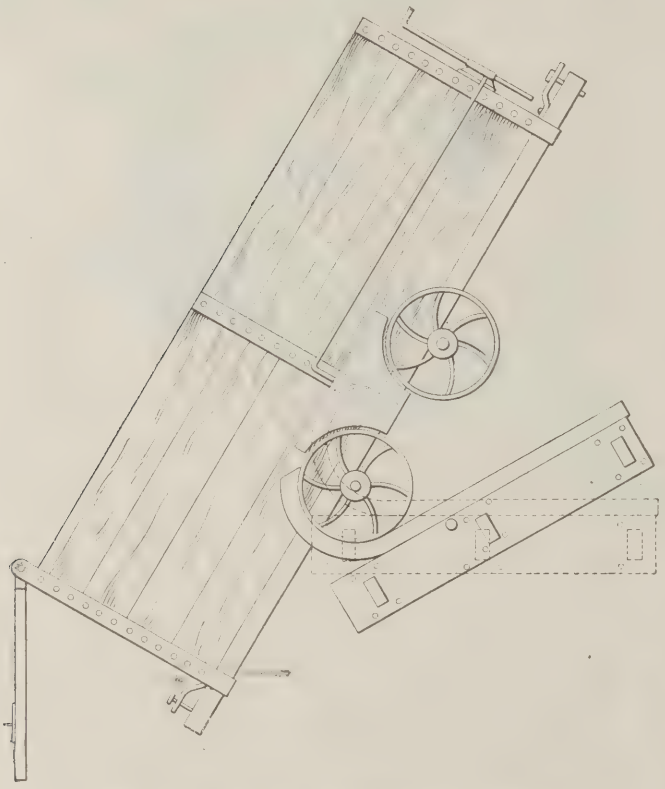
They've done good work, have the minin' guys
When they've had to meet the test,
An' I'd be the last to criticise
If they'd done their level best;
But to blow an' brag of their skill an' speed
Is a bloomin' bit of cheek,
For the war for freedom won't succeed
Workin' thirty hours a week!

IDEAS AND SUGGESTIONS

Finding the Dump Pivot

BY T. F. PRICE
San Antonio, Texas

The old style horn dump, as shown in the accompanying illustration, is still extensively used in some regions. It finds greatest application in slate dumping and in development work. The most difficult point to determine in building these dumps is the proper location of



DUMP AND CAR IN DISCHARGING POSITION

the pivoting point. If this point is properly located, the dump will discharge the contents of the loaded cars and return to normal position without manual aid.

The proper location of the pivot or dump axle may be found by the aid of the following rule: To one-half the wheelbase in inches add one-half the wheel diameter in inches minus three. This gives the horizontal distance from the rear axle of the car to the dump axle in inches.

The horizontal distance from the center of curvature of the horns to the dump axle would of course be the difference between the wheelbase and the distance found above.

A dump of this type should only be allowed to tip through an angle of about 30 deg., the car being permitted to pass on through an additional angle of about 30 deg., making a total inclination of the car bottom of about 60 deg., the first one-half of which is turned about the dump axle and the second half about the front axle of the car.

After the coal has been discharged from the car its rear wheels return to the dump rails with sufficient force to cause the dump to return to its normal position. A dump of this kind may be constructed easily in the mine shop, and if proper care is exercised in its construction such a dump may be made to work perfectly.

Speeding Up Mining in Shallow Drifts

BY G. H. KIRCHGASSER
Milwaukee, Wis.

An ingenious method of overcoming difficulties in coal haulage has been in operation for some time in the mine of the Logan Coal Co., Beaverdale, Penn. Some drifts in this mine are so low (about 3 ft. headroom) that it is impossible for mules or battery locomotives to enter them. But to mine the coal in these pockets is of course important today in order to meet the demands.

The coal bed in some places in this mine was found to be only about 38 to 44 in. thick. Underlying this was soft shale and earth. To excavate the rooms deep enough to allow mules or locomotives to be used would have meant the employment of many miners, which in the face of a declining labor supply was next to impossible. And even should enough men have been available the cost of the yardage, including the shale and earth, would have made such a method unprofitable.

To avoid extravagance in the use of men and money and still extract the coal from these beds, a scheme was



HOIST HAULS MINE CARS INTO THE ROOM

devised that has proved so successful that since the first operating unit was installed 100 others have been added and the plan adopted throughout the mine.

A pocket is constructed in a drift driven at a slight inclination and off the main heading. The empty car is brought from the main heading and hauled into the pocket by means of a cable wound on a winding drum driven by an electric motor that is automatically started

and stopped by means of an automatic controller. The cable passes around a sheave wheel located at the head of the room and thence to the motor-driven winding drum.

At the entrance to the pocket an electric switch is placed, which when closed energizes the automatic controller which starts and accelerates the motor. The winding drum thus reels up the cable and the car is

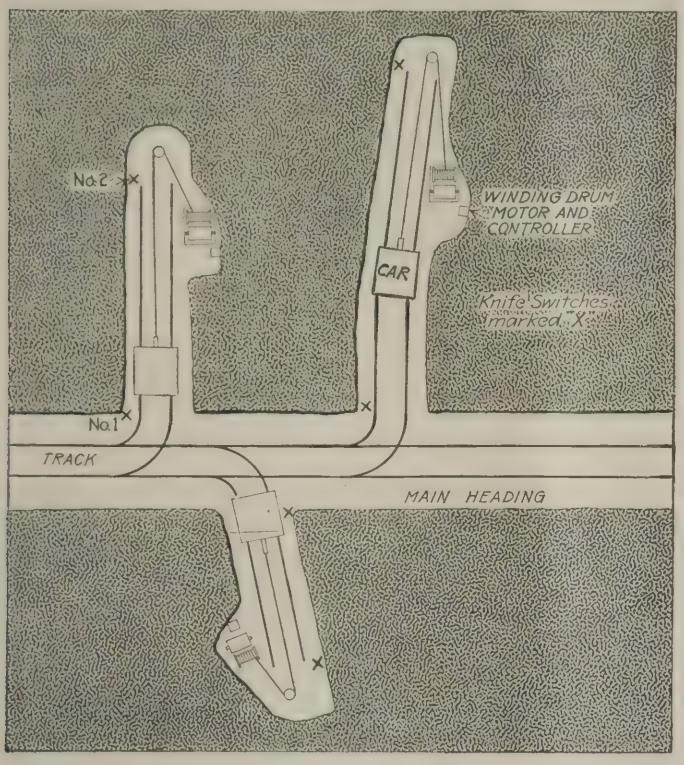


DIAGRAM OF OPERATION OF ROOM HOIST

hauled into the room, where it is loaded by the miners. As will be noted from the diagram, there is another switch which is conveniently placed for the operator in the pocket. This the miner opens to shut down the motor, thus giving easy control of the outfit at both ends of the car's travel.

When the car is loaded it is only necessary to release the brake and it quickly coasts down the grade to the main heading, where the cable is disconnected and the car is ready to be hauled out of the mine. Another car is hauled into the pocket by attaching the cable to it and closing switch No. 1 again. One miner can do this—ride on his car into the pocket, throw out the switch, fill the car and coast back to the main heading ready for hooking onto another empty. However, to facilitate the work, there are usually two men to a room. Sufficient cable is provided on each winding drum to take care of rooms of various lengths. Filled cars are assembled in the main headings and hauled away.

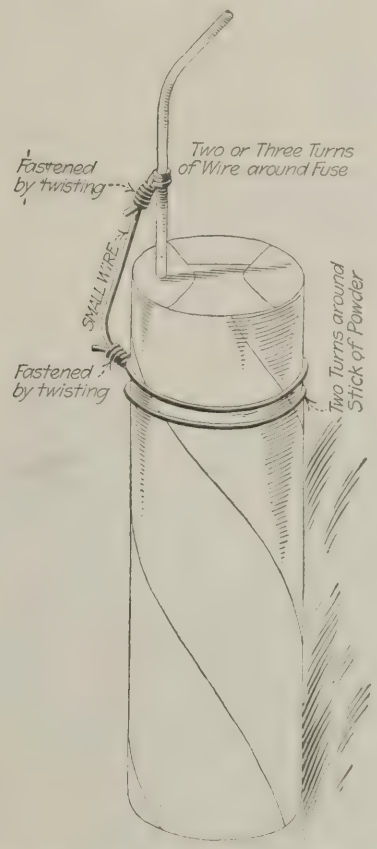
The equipment for hauling the cars by cable into the shallow drifts consists of a compound-wound, 3-hp. motor, the cable-winding drum and a C-H type automatic controller which automatically starts the motor when either of the two control switches x are closed, and stops it when they are opened. The controller is mounted on a panel secured to the motor so that the entire unit may be moved easily when work is completed in any location. Ordinarily the controller is placed in a metal case.

The cost of operating this hauling unit is small, since current is only used during the brief period when the car is hauled into the room. The current handled by the control switches x is but a fraction of an ampere, which is a big advantage from a safety standpoint because of the elimination of the danger of accidental burns, flashes or shocks.

Attaching Fuse to Primers

By William Crocker

A method of attaching fuse to primers is shown in the accompanying illustration. I have made thousands of these primers with perfect success. The fuse is anchored to the stick of powder with wire obtained from the strands of an ordinary bell cord which is cut into lengths of about eight inches. After inserting the



HOW THE FUSE IS ATTACHED TO THE PRIMER

copper fuse in the regular manner, the wire is twisted around the cartridge, embedding itself into the wax paper. One end of the wire is twisted around the fuse two or three times. Such a tie will not slip or yield. The whole operation is accomplished quickly—*Engineering and Mining Journal.*

In view of what is known of the chemistry of the various kinds of fuels and the possible advancement of such knowledge in the near future, it is questionable whether the method used in attacking the smoke problem was the best as regards fuel economy. The persistence of smokiness in burning bituminous coals shows that there is room for improvement in methods of burning.—*Bureau of Mines Bulletin No. 135.*

Concrete Foundations, Drift Linings and Reservoirs

By J. F. SPRINGER
New York City

SYNOPSIS — *Concrete foundations for machinery do not as a rule require reinforcement. Here weight and ample bearing area are prime requisites. On yielding soils piling or piers are sometimes required. Concrete drift linings are frequently used. These are usually arched and reinforced. Large tanks and reservoirs are sometimes built. If of large size these require expansion joints.*

THE coal-mine management will at times have uses for concrete where the tensile strength will be of minor consideration. In such cases the reinforcement may be reduced to a small amount or omitted altogether. One caution may be relevant, however. If the foundation, or whatever it may be, is pre-molded, account must be taken of any tensile stresses that may arise in moving it to its final position.

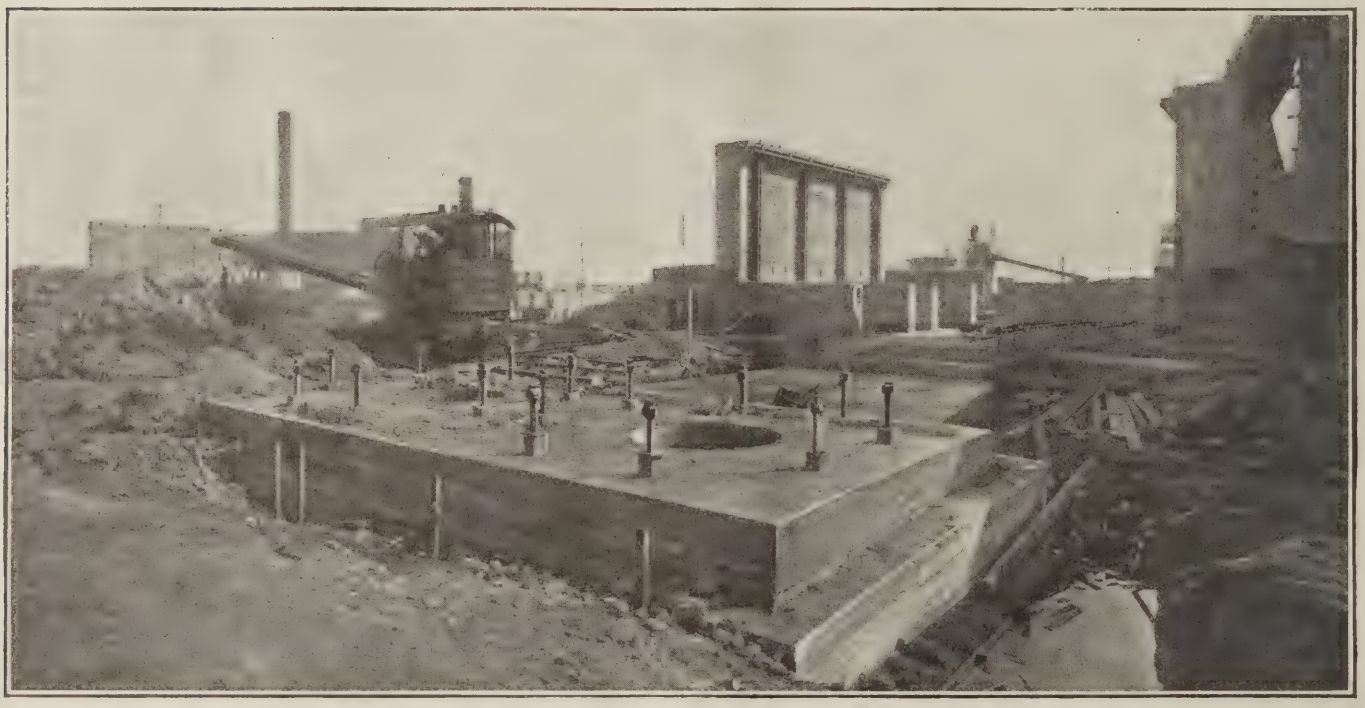


FIG. 1. LARGE CONCRETE FOUNDATION WITH HOLDING-DOWN BOLTS IN PLACE

Foundations for reciprocating steam engines, air compressors, etc., will have to withstand a certain amount of vibratory shock. Ordinarily, the foundation may be constructed satisfactorily without reinforcement. Sometimes further economies are quite permissible. Thus, if the general mass is considerable, "plums" may be used to take the place of some concrete. Such plums (boulder or other rock) should be sound and free from half-detached fragments. The surface should be clean so as to insure a good bond with the enveloping concrete. An efficient way to cleanse plums from clay and other foreign matter is to use a jet of live steam. Another economy consists in providing vacant spaces in the mass at locations where nothing is really required. A considerable cavity may at times be left running like a tunnel from one side of the foundation to the other.

Above ground it will be desirable to have smooth and regular surfaces. Forms will here be needed to give the proper general shape to the mass, so that smoothness and regularity can be obtained. Wood will generally leave an imprint, and the crevices between planks will be represented in the block. If it is desired to avoid these, one of the best means to this end is to use a steel plate lining. The metal should be free from rust and should be greased before the concrete is poured. Crude vaseline, thinned with kerosene, will provide a suitable coating, the object of which is to prevent the concrete from attaching itself. Where wood is used it may be thoroughly wetted down ahead of pouring, the same purpose being in view; or, it may be greased. Below ground the foundation block will frequently require no other form than the sides of the excavation. Irregularity will here be no serious matter.

Concrete foundations and other concrete structures may be built upon a variety of materials. Bearing piles of wood or concrete are suitable. If wood is used and water is present, the heads of the piles should be, say, 1 ft. below the water level to insure that they will not be subjected alternately to water and air. The



FIG. 2. TOPS OF CONCRETE PILES

concrete may then have its base 1 ft. below the pile heads. Concrete piles may be used instead of wood, but the latter has an indefinite life if perpetually submerged in water possessing no substantial chemical action.

If concrete piles seem necessary, there are numerous varieties that are suitable. The pile may be pre-molded and then driven after maturity. Reinforcement will be necessary to cover transportation, handling and driving shocks, and stresses. A conical sheet-steel shell may be forced down and then filled with concrete. This system is probably patented. A similar system, and one that I think is unpatented, is to force down section after section of cylindrical steel shells. At the bell and spigot ends these need reinforcing bands, which are made of moderate thickness and may well be 12 or 14 in. in diameter. They may be driven with the bottom end closed or open. Where driven with closed end, a cast steel tip is provided. Where driven with the end open, it is necessary to clean out the interior after driving. A miniature orange-peel grab bucket may be secured small enough to suit the 14-in. shell. In fact a bucket 10 in. in diameter actually has been used.

However driven, the shell may contain water. This may or may not be removed. In the former case we may close the bottom by a concrete seal as a preparatory measure. If the water is allowed to remain, we may fill in the concrete by using a bottom-dump bucket; or we may employ a tremie, which is a simple device for placing concrete under water.

The steel shells, whether conical or cylindrical, are left in place. To withdraw the shell and leave soft concrete in the soil would be a somewhat doubtful procedure. The pile might or might not be pinched in two by constrictive action of the soil.

A caution might well be given at this point relative to the difference between a pile and a pier. A pile is supported, in part at least, by skin friction; a pier derives its support from the material beneath its foot or base. If a pile is put down through material supplying no skin friction—as thin mud, quicksand, water—then we may have really a pier. This will be satisfactory if the pile will resist buckling and all wrong if it does not. Naturally, if a pile is really to perform the service of a pier it should be suitably reinforced.

In most cases piling under foundations will be unnecessary. The block is based immediately on the soil or rock. Clay is, however, not to be accepted as a satisfactory footing without knowing something more than that it is just clay. The possibility of its being partially carried away by water is to be considered.

Sand is a good support for concrete, particularly if it is clean and compact. Quicksand must be vigorously avoided. Ordinary alluvial soil will often be satisfactory. Lof and Rushmore consider 1000 lb. to a square foot a proper allowance for such soil for machinery foundations. But they also say, "For soft or alluvial soils piling is almost always required." This is, however, a question of weight of machine and block, and of area of foundation base.

The permissible pressures on concrete vary, partly because the factor of safety to be allowed is a matter of controversy. It is understood that in Boston the building laws permit only a maximum of 55 lb. per square inch; while in New York they sanction pressures up to 200 lb. per square inch.

These permissible loads probably contemplate no considerable vibrations. Where a rock crusher or similar machine is to be installed, account must be taken of the continuous shock and jar, and adequate allowance made. In all cases, whatever the underlying material, the block may be flared out so as to secure a greater total support.

Where the block rests on the surface or has only a shallow excavation, it may be necessary to tie it to the rock or other support. To do this, tie-rods or dowels are embedded in the base of the block and in the underlying material. There are, according to A. Del Mar, three most popular forms for these rods. (See Fig. 4). All have a knob at the upper end. They differ in the form given to the lower extremity. In one case the lower end is furnished with upward-

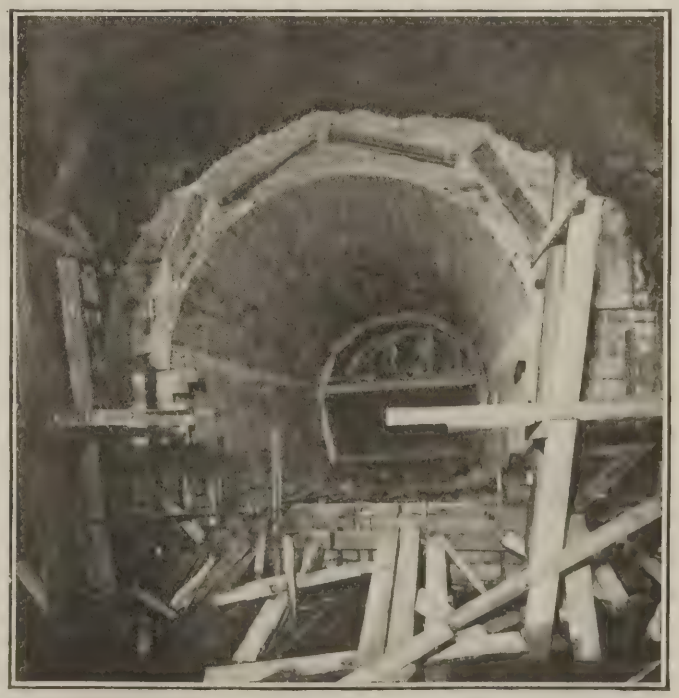


FIG. 3. END VIEW OF CONCRETE TUNNEL LINING

pointing barbs made by driving a chisel obliquely into the side of the rod. The barbs may be arranged on all sides and to cover a foot or two of the lower end of the bar. The gross diameter of the barbed portion should be larger than the hole in the bedrock; the shank should be distinctly smaller. When this bar is driven into the rock the barbs give a little, but they resist an effort to pull the bar out. One of the other popular forms is made by splitting the bottom end for a few inches and inserting a suitable wedge. The third form is made simply by upsetting the metal at the bottom end until a considerable bulge is formed.

In all cases, after the hold-down rods have been driven into place in the rock, the holes are to be filled with cement grout or mortar. In the latter case a proper formula for proportioning cement and sand is 1:1. A good foundation is said to have been secured in a stiff blue clay by means of such tie-rods. They were arranged to radiate from the foundation block and thus secured an extended area of grip on the clay.

It will ordinarily be necessary to use a rich mixture of concrete for machinery foundations. Lof and Rushmore in their recent work on "Hydro-Electric

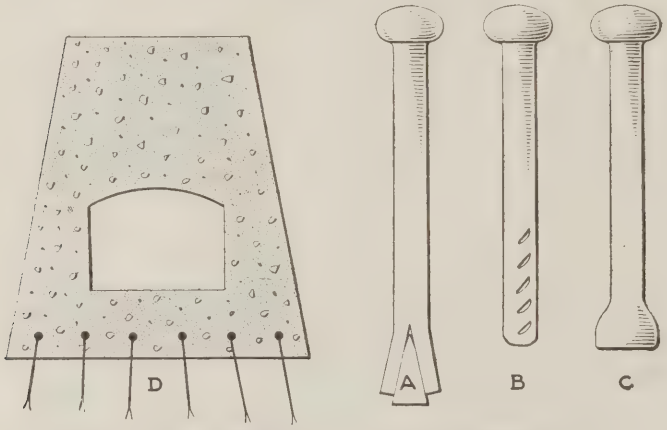


FIG. 4. VARIETIES AND ARRANGEMENTS OF FOUNDATION DOWELS

Power Stations," say: "A mixture of one part cement, three parts sand and six parts gravel or broken stone forms a concrete that is extensively used, and which has given perfect satisfaction for machine foundations." We may, of course, use this same mixture for any other similar use.

The concrete should not be brought to quite the level of the underside of the bedplate of the engine, compressor or other machine. About 1 in. is a proper vertical interval to allow. Assuming that the machine anchor bolts have already been set in position and that the machine has been placed with all the bolts in their holes or slots in the bedplate, the next step is to block it up 1 in. Steel or iron blocks and wedges or shims may be used for this purpose. These blocks may naturally be placed before the machine is let down at all, provided they are not liable to displacement. The machine is now leveled and oriented with the degree of precision that may be necessary for the particular case. These adjustments should be made as perfect as ever will be desired, as it will not be an easy matter to correct them later on when the machine has been grouted to the block and the grout has hardened.

There seems to be a difference of opinion as to whether it is better to use a thin, easy-flowing grout poured in to the proper level or a rather stiff grout well packed beneath the bedplate. The latter procedure is preferred by a large engine company. The packing is done by hand, with the aid of a metal rod or bar with a suitable flat surface to force the grout into place. A suitable tamping rod may be made by cutting off a short length, say 16 to 20 in. long, from a flat bar ¼ in. thick and 1¼ in. wide. A block may be held as a kind of backstop for the half-dry mortar when we use the tamping rod. In this way we are able to pack the mortar tightly. The rod may well be used, now on the outside of the bedplate flange and now on the inside, the idea being to get a hard, compact layer of mortar underneath the flange for its full width. It is claimed by some that a soft, easy-flowing mortar cannot be made to set properly against the under surface of the frame. In consequence "the machine is pulled out of line when the foundation bolts are tightened up. Many engine troubles are occasioned by this way of setting."

A good mortar for grouting in machines follows the formula 1:1½. The sand and cement are first to be mixed dry. A small amount of the dry mixture may then be dampened enough to make it "about as damp as molding sand, or just so it will hold together when pressed into a ball by the hand." After this dampened mortar has been used up, another batch is wetted and used immediately. The concrete surface of the foundation should be thoroughly cleaned and wetted before applying the grout. A warning is to be given here. A quick-setting cement may develop heat. This may or may not be sufficient to affect (expansively) the iron in the bedplate to an appreciable amount.

Reference has been made to the anchor bolts which hold the machine to the foundation block. In some cases it is desired to have these removable. Vertical holes are arranged and the bolts provided at their bottom with a removable head or nut which bears directly or indirectly against a shoulder in the concrete at the bottom of the holes. Essentially, these bolts are long rods threaded at both ends and provided with nuts, etc., by means of which the machine and foundation are bound together. The cavity in the concrete block where the bottom accessories of the rod are located may be accessible or inaccessible from one side of the block. Where the anchor rods are not removable, it is customary to embed the lower ends in the mass of the concrete. There may be a washer plate and nuts, as in the case where a removable anchor bolt is installed, only in the present instance these are embedded in the concrete mass and became part of it. Of course, the plate and nuts are there simply to add to the resistance to an upward pull on the rod.

Whether anchor bolts are removable or not, it is customary to provide either cylindrical or tapered holes extending down from the top of the concrete a considerable distance, thus securing a free space around this portion of the rod. The object in view is to make it possible to swing the upper end a moderate amount in any direction. There would, perhaps, be no need for bending the rods if the plan of the bedplate could be relied upon with respect to the positions of the holes or slots. It seems that in actual practice no substantial reliance can be put in any blueprint showing foundation bolt positions.

An annular space at the bolt top permitting a movement of 1 in. in any direction is good practice when constructing the foundation block. This space may be diminished to little or nothing at the bottom if a tapered hole is provided. As to the question of making a choice between a plain cylindrical hole and a tapered one, it may be said that the latter provides a better shoulder for the plate at the lower end of the rod when it is desired to have the whole thing removable. Where the lower half of the rod is actually embedded in the concrete mass and goes down into it well below the bottom of the hole, it will generally be altogether unnecessary to taper the hole.

Naturally, it is easy to provide a form for the cylindrical hole by simply using a piece of pipe. Whatever shape of form is used, it may be either left in or removed after the pouring of the concrete. If the form is not to be left in and a tapered hole is desired, a pyramidal wooden form may be employed.

The anchor bolts must be placed quite accurately before the concrete in which they are embedded is poured, and the casings must be located rather precisely with reference to the bolts. It is customary to use wooden templets as a means of suspending rods and casings and fixing their positions. After the wooden framework is ready, the exact locations of the bedplate holes or slots, as shown by the machine builder's blueprint, should be marked on it. At the proper locations holes are bored for the anchor rods. We have now a means of hanging them inside the form used for the foundation block.

The suspension of the casings will hardly be as easy a job. They must hang at a precise level, if they are to be left in, and they must be held central with the anchor bolts. The following method is perhaps one of the best for accomplishing this result. As a 1-in. space is to be left between the top surface of the concrete and the under surface of the bedplate, we may arrange blocks on the under side of the templet to reach down to, say, within ¼ in. of the level at which the pouring of the concrete is to stop. The blocks are located at the holes for the rods and are suitably bored to receive them. They are also counterbored on the under side to the depth of ¾ in. to provide seats for the upper ends of the casings.

At the bottom ends of the casings a steel washer of suitable size, when placed upon the rod to hold the casing central therewith, may be used. If the rod is to be irremovable, this washer may be left in. A washer of different metal from the rod should not be employed, as in that case electrolytic action may possibly be inaugurated later on.

In order to prevent concrete from entering the casing at the bottom and blocking up the hole more or less, this may be filled with loose material of such a nature as to be easy to remove later on. Paper, excelsior, etc., may be employed. In fact, this packing may sometimes be used to hold the casing central.

Where the rods are to remain in place the holes may, if desired, be filled with cement grout. This is not done until the machine is set in precisely the position wanted. It should be done, ordinarily, before the 1-in. space between foundation and bedplate is grouted up or simultaneously with this action. Whether to grout up the holes or not will probably be answered differently by different persons. Once this is done no slight variations in the bedplate positions can well be made. On the other hand, when grouted up, we are relieved of the necessity of paying attention to corrosive action or the like in so far as the bolt is concerned below the top of the block. Furthermore, we have undoubtedly a more rigid hold on the machine. On the whole, it appears to me that for a mine these two considerations ought to outweigh the first and give the decision to the hole grouted up to the top. The precise setting of the machine should be done at the beginning and should not need a second attempt.

What ought to be the length of the bolt in the hole and what the length of the bolt embedded in concrete? As to the former, good practice seems to warrant making it 25 or 30 times the diameter of the rod. It is simply a question of what ought to be the length of a rod which is to be deflected 1 in. by bending. As to the latter question, no such short answer can be given. Deep embedment will be advisable where strong resistance is to be provided. Generally speaking, the

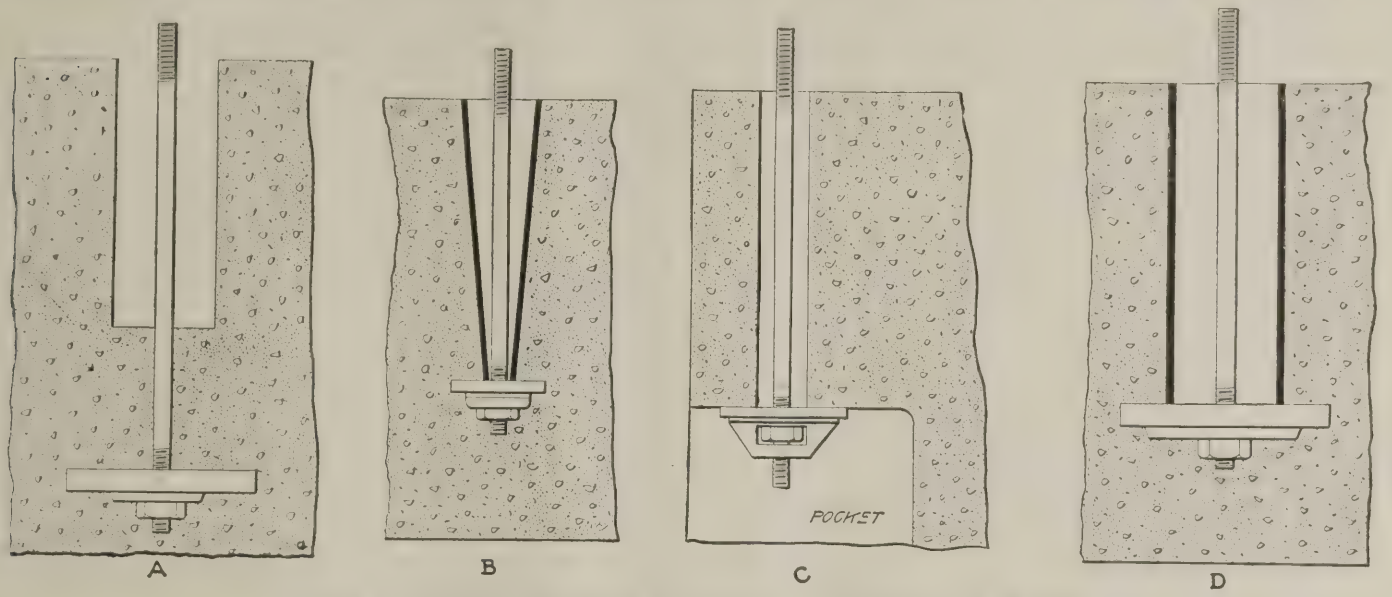


FIG. 5. VARIOUS METHODS OF PLACING HOLDING-DOWN BOLTS

depth of embedment will be at least equal to the length of bolt in the hole, and usually more.

Where bolts are to be removable, we have (1) the inaccessible cavity where the anchor-bolt plate and nut are housed or (2) the accessible cavity. The bolt will, in both cases, be naturally separated from the nut by turning from above. The thing to provide for is to get the same or a duplicate bolt in threaded engagement with the nut later on. This ought to be a fairly simple matter to prearrange when a tunnel from the side is provided. For the inaccessible cavity, however, a good solution seems to be an anchor-bolt plate provided with an open chamber for the nut. This chamber and the nut may be so dimensioned that there is little or no play when the plate is once set in place. The nut need not be subject to a horizontal displacement of more than about ⅛ in. when the anchor bolt is disengaged and withdrawn. The bolt can be returned and will find the hole in the nut if it is simply provided with a conical tip.

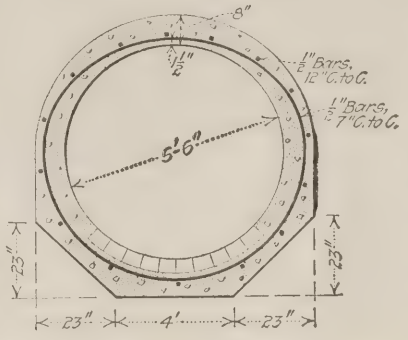


FIG. 6. CIRCULAR SEWER LINING

Concrete is exceedingly suitable for the purpose of providing anchorage for guy ropes, tie-back rods and the like. The resistance to the guy is ordinarily supplied by the weight of the block and of whatever may be loaded onto it. A simple method of getting the added resistance of a load is to bury the block under earth or rocks. Concrete made with crushed rock has a specific gravity of about 2¼, so that it will be easy to calculate the weight of an anchor block, remembering that water weighs 62½ lb. per cubic foot.

In constructing such a block it should be remembered that plain concrete is weak in tension. Consequently, we can hardly expect to develop the full resistance of a block if we simply anchor the guy in it after the manner used in securing an anchor bolt for a machine. There should be a branching out of steel connected with the anchor rods so as to involve the bulk of the block and not depend upon any tensile strength of the concrete.

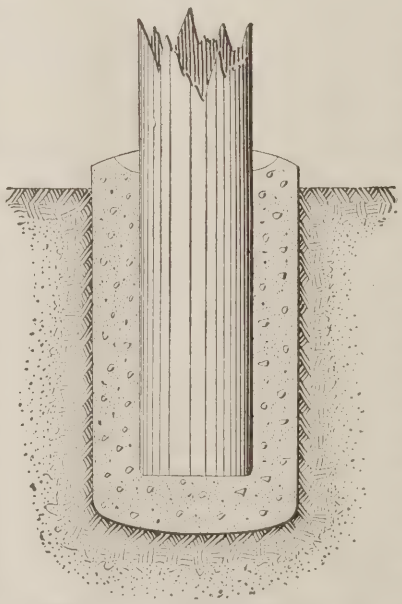
A concrete lining for tunnels and passages is often employed where permanent construction is in view. Thus a main haulage road might well be a proper location for the use of concrete. A roof only may be what is wanted. This may be put in in the form of a semicircular arch, the concrete starting on one side at or below the level at which curvature begins and ending at or below the same level on the other side. The excavation for the arch will naturally be made deep enough to take care of a sufficient bulk. The reinforcement may be both longitudinal and transverse. In many cases it will be possible to make up lengths of the combination of both kinds of reinforcement and set them in place as excavation and concreting progress. It may seem best to carry the concreting down to the floor and thus provide side walls as well as an arched roof.

A center form of some description will be needed. This may consist of a framework of wood on which wooden lagging has been nailed. Such centers may be made in short lengths and used again and again. The material on which the ends of the arch test should be quite substantial, as the effect of using an arch is to concentrate and transfer the overhead load to this material. Where the arch is to terminate on the sides at about the level of the commencement and end of curvature, it has been recommended that the sides provided by nature be given a thin facing of concrete as a protection against weathering.

The position of the circular reinforcement has much to do with the strength of the arch. The top region of the arch is much like a cross-beam. The upper part is under compression while the lower part must bear tensional stresses. Consequently, the circular reinforcement should be located low at the top of the arch. On the sides it may be placed further from the center of curvature. At the level of the center of curvature the reinforcement may be set near the excavation surface. In consequence of the foregoing dispositions, the circular reinforcement will not be truly circular, but rather elliptical.

In the construction of circular concrete sewers and similar conduits it is approved practice to set the curved reinforcement elliptically. (See Fig. 6.) Above and below the center the reinforcement is close to the inner surface of the tube; on the sides it is near the outside surface. Where it seems advisable a steel form may be used. One or two patented systems of collapsible steel forms for just such work as arches are also available. In any case some method of preventing the adhesion of the concrete to the form will be necessary.

The placing of the concrete will at times require close attention. There is no great trouble in filling in the sides. If the form is too long to permit this to be done from the end, the arch lagging may be left off until the sides have been placed. In fact we may have set at one time only just the proper height of lagging to retain the amount of concrete then to be placed. It may be necessary, however, to secure the lagging to the ribs from the inside. The most difficult part of the work will doubtless be that of placing the concrete in, say, the top 60 deg. of the arch. If the mine has a compressed-air equipment, it may be advisable to get a pneumatic transmitter for placing tunnel concrete, especially that which goes into the crown of the arch. When a practicable type is employed the concrete may be piped from the transmitter to the point of use. Transmission may be effected around curves and up to levels


FIG. 7. A CONCRETE POST FOOTING

100 ft. above the transmitter. The pneumatic transmitting machines are not to be confused with sprayers.

As to the kind of reinforcement, steel bars are usually employed; but other material is, it appears, being used abroad. I wish neither to recommend nor discourage the use of strands of old wire rope. Prof. George Knox seems to be, if not an advocate of wire rope reinforcement, a countenancer of it, for he says: "The cheapest reinforcement for this kind of work is the strands of old steel haulage and winding ropes. Under normal conditions it may be only necessary to put the strands in longitudinally, but where extra support is required it is advantageous to have them crossed with transverse strands; and with very bad roof weights two sets of longitudinal and transverse strands may be put in together, with a few extra longitudinal wires between the sets. An important point to note in connection with the reinforcement is that the ends of the strands should terminate irregularly, so as to overlap the next set at different points and prevent anything in the nature of a 'joint' being formed."

The following formula is in effect the one recently recommended by Professor Knox for use where great strength is required: 1 : 1⅝ : 5⅝. The coarse aggregate consists of granite in two sizes, 1½ in. and ½ in. I rewrite this formula, dividing the coarse aggregate in accordance with the amounts used and represented by two numbers connected by a plus sign. The first of the two numbers represents the smaller aggregate. The rewritten formula is: 1 : 1⅝ : 2⅝ + 3.

If the underground roadway is dry, the following formula is given as permissible: 1 + 8 : 0 : 24. This is to be interpreted as follows: There is, first of all, 1 part of cement; to this are added 8 parts of freshly burned lime; no sand as such is employed; there are 24 parts of hard shale (from ripping), varying in size up to 1½ in. There will doubtless be in the shale a percentage of an equivalent of sand.

The wooden pole is used in many places in or around coal mines. I am not now speaking of props. Such poles, whether employed as supports for lighting fixtures, electric wires or for some other permanent use, are apt to rot at the base. Moisture and fungi are said to be "the two prolific causes of decay and shortened pole life." The plain cementing of the base of the pole seems to have been tested out and found inadequate. The failure to prevent bad effects seems to be attributed to the insufficiency of the joint between the pole and the inner surface of the cement coating.

It is conjectured that water gets into the joint and remains there. It is understood that some poles with cemented bases set in soils which permit the escape of water really rot faster than others set in what appear to be bad soils. The trapping of water inside the cement shell would appear to explain this. Water is not necessarily an enemy of wood. If a piece of wood is perpetually submerged in water having no chemical action, its life will probably be excessively long It is the change from wet to dry and back agair that seems to work the damage.

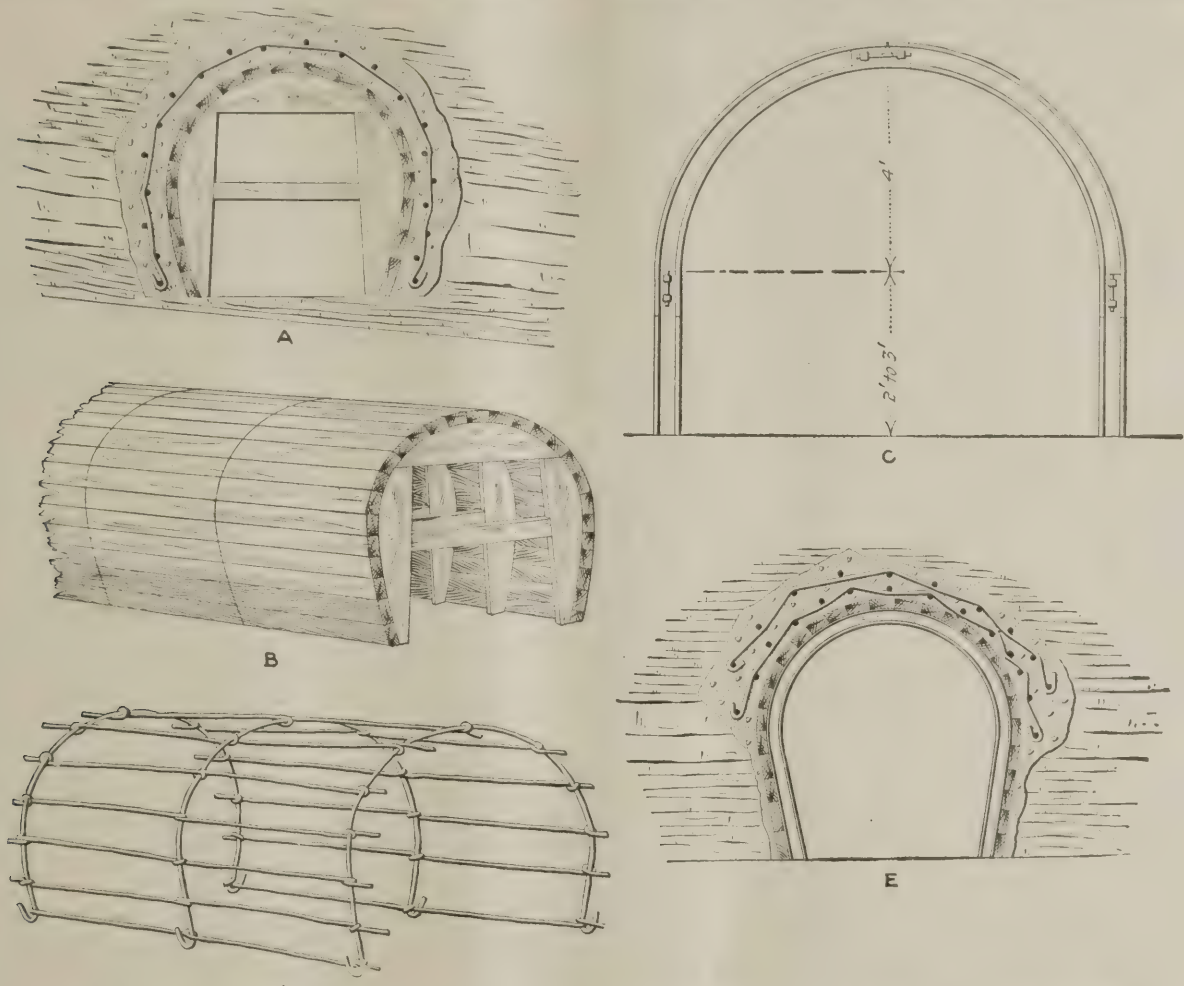


FIG. 8. ARRANGEMENT OF REINFORCEMENT AND ARCH CENTERS FOR TUNNEL LININGS

It has been proposed to use a tar seal to prevent the entrance of moisture into the space between the concrete cup in which the pole stands and the pole itself. That is to say, the concrete is poured in the usual way to make an envelope all around the base of the pole and beneath it. The top of the cup may be brought up a little above the general surface and rounded. When this concrete is still soft, a gutter may be cut out all around the top next the pole. Hot tar is poured into this annular depression and forms a seal against moisture. (See Fig. 7.) This may be expected to be effective until the pole cracks. The crevices in the wood now form new avenues for the entrance of water. These may be stopped up with tar and the seal again made effective.

Concrete-lined pits are often used as containers or reservoirs. Such pits have been constructed of large size for the purposes of retaining house water and also coal in wet storage. A sloping side is a convenient design. The floor may be level; or, if drainage is desired, approximately so. Compact sand having no tendency to flow forms a good foundation. Clay should be investigated before being rated as all right. The amount of concrete can often be reduced markedly by using steel reinforcement. Steel bars supplemented with wire mesh are usually most suitable. If it is desired to make the shell impervious this may be approximately done by providing a rich, dense layer of concrete for the inner lining, while the remainder of the shell may be constructed of a more economical concrete. However, if the pit stands in water and the head has any substantial value, the complete emptying of the pit may be accompanied by the breaking away of this inside lining. This is a chance that may sometimes have to be taken.

The steam spraying system is adapted to putting on a dense layer. As to the pneumatic sprayer, I do not know. The layer may consist of a rich, cement mortar, 1:2 or 1:1½; or a pebble concrete, the coarse aggregate being rounded pebbles of small size. Some such formula as 1:2:2 may be followed. There are various waterproofing compounds which may be incorporated with the concrete, but I cannot give a thoroughly reliable word as to their efficiency. If it is desired to make the pit absolutely impervious to water from the outside, a brick and mastic combination may be used for the outer shell.

If the floor area, considered in connection with the extensions up the oblique walls, has a length or a breadth in excess of, say, 40 ft., it will be advisable, generally, to use expansion joints. These may run both lengthwise and transversely.

Vancouver Island Production in June

The Vancouver Island collieries produced 137,895 gross tons of coal for the month of June, a little over 5000 tons less than the quantity produced in the month of May. The tonnage produced by the various companies was as follows:

	Tons
Canadian Western Fuel Co., Nanaimo colliery	61,685
Canadian Collieries (D) Ltd., Comox colliery	47,926
Canadian Collieries (D) Ltd., Extension colliery	18,367
Pacific Coast Coal Mines, Ltd., South Wellington	8,417
Nanoose Collieries, Ltd., Nanoose colliery	1,500
Total	137,895

For the first six months of the year the Vancouver Island collieries produced 857,131 tons, a decrease of 24,881 tons as compared with the same period last year. The producing mines are three less than was the case in 1917—namely, the Jingle Pot mine, South Wellington mine, Pacific Coast Coal Mines, Ltd.: and No. 4 mine, Canadian Collieries (D), Ltd., Extension colliery. The Jingle Pot mine alone produced 48,885 tons during the first six months of last year, so that in spite of the loss in tonnage from this mine and the others since closed down the tonnage has been well maintained.

The tonnage produced by the various companies for the first six months follows:

	Tons
Canadian Western Fuel Co., Nanaimo colliery	389,984
Canadian Collieries (D) Ltd., Comox colliery	280,151
Canadian Collieries (D) Ltd., Extension colliery	118,148
Pacific Coast Coal Mines, Ltd., South Wellington	51,181
Nanoose Collieries, Ltd., Nanoose colliery	17,667
Total	857,131

The Canadian Western Fuel Co., at its Nanaimo colliery, has made a gain of 63,515 tons for the first six months of the year. The Canadian Collieries (D), Ltd., at its Comox colliery, has made a gain of 21,233 tons thus far, but has lost 32,014 tons at its Extension colliery. This is accounted for by the closing down of No. 4 Mine as previously mentioned. The Pacific Coast Coal Mines has a loss in output of 36,816 tons for the first half of the year. This is explained by the abandonment of the South Wellington mine.

The Nanoose collieries has made a gain of 9086 tons, while the Jingle Pot mine of the Vancouver Nanaimo Coal Co., as stated, has produced no coal this year while for the first half of 1917 its output was 48,885 tons. The No. 5 mine of the Canadian collieries is not producing about 100 tons daily from development work.

The new mine at Cassidy's Siding, Esquimalt & Nanaimo Ry., which is being opened by the Granby Consolidated Mining and Smelting Co., is now producing coal from the development work. Some 1000 tons has been dumped at the surface of the mine but no shipments have been made as yet. The Island tonnage should be somewhat augmented by the production of this colliery before the end of the year.

A pair of shafts are now being sunk for the purpose of opening up a new mine on the company's farm near Nanaimo by the Canadian Western Fuel Co., and coal will probably be reached by October of this year and shipments made before the end of the year.

The coal produced by the mines of the Nicola-Princeton District for the first six months of the present year was 19,972 tons in excess of that produced in the same time in 1917. The tonnage to the credit of the several companies the first six months of 1918 follows:

	Tons
Middlesboro collieries	54,698
The Fleming Coal Co.	12,637
Princeton Collieries, Ltd.	22,148
Total	89,483

The Middlesboro collieries has made a gain of 19,152 tons over last year and the Fleming Coal Co. (formerly the Inland Coal and Coke Co.) has exceeded last year's showing for the same period by 5198 tons. The Princeton collieries has made a gain of 355 tons. The Merritt collieries has not been operating this year, while last year for the first six months its output was 4782 tons. Despite this handicap the district shows an increase of 19,152 tons.

Lubrication of Air Compressors

By W. H. CALLAN
Chicago, Ill.

SYNOPSIS — *Oil salesmen seem to believe that a heavy oil is necessary to the efficient lubrication of air-compressor cylinders. Practical experience would indicate, however, that a fairly light oil might be used with entire success.*

THE lubrication of the air compressor, steam cylinder, main bearings, crankpin, crosshead pin, crosshead guide, etc., does not differ from that of the ordinary steam engine. The means and methods employed are well known and understood; hence the discussion in this article will be confined to that of air cylinder lubrication only.

A number of years ago, when the compressor business was young, considerable trouble was experienced in procuring a suitable oil for lubricating the air cylinders of compressors. After considering the matter for some time, it was decided by the company by which I was employed that an expert on the subject should be consulted. Accordingly, the matter was taken up with a well-known oil company, whose representative called upon us and, after making a careful examination of the conditions, reported that the trouble was entirely due to using an oil of too light body and too low viscosity to withstand the high heat of the compression. He stated that the oil used was gasified, due to the high temperature of the air, and that it passed off in vapor, leaving the cylinder wall without lubrication. The expert thereupon recommended an oil which he considered suitable for our use. The particular grade happened to be of 26 Beaumé gravity with a flash point of 515 deg. F., a fire test of 555 deg. F., and a viscosity of 130 S at 212 deg. F.

No Increased Efficiency Was Secured

After using this oil for some time, we found no improvement in the operation of the machine; in fact, it appeared to be laboring and the temperature of the discharge air was high. After several days of operation with this new oil, the cylinder heads were removed, the valves taken out and a careful examination made. The cylinder wall seemed to have a sticky, plastic coating; the air passages and discharge cavity of the cylinder showed signs of dark deposits, while the faces of the valve seats were covered with a black, hard coating. This hard formation on one side of the valve seat caused the valves to leak, hence the increased temperature of the discharge air. The sticky coating on the wall of the cylinder was responsible for the increased friction.

The respresentative's attention was called to this condition, whereupon he suggested that a little lighter oil be used. This time he recommended one with 27½ Beaumé gravity, a flash point 450 deg. F., a burning point of 500 deg. F., and a viscosity of about 125 S at 212 deg. F. We asked him if he did not think this was a little too heavy a grade for air-cylinder lubrication. He assured us it was not, and stated that, in order to withstand the high temperature of the compressed air, it was necessary to have a rather low gravity and high viscosity oil, with a flash point above the temperature of the air.

After we had used this grade of oil for some weeks, a further examination was made; and while the cylinder wall appeared considerably better, the valve passages and discharge cavities of the cylinder were badly coated with a hard deposit. When this matter was again brought to the attention of the expert, he suggested that we reduce the amount fed into the cylinder. This was done with great care until we were only using three drops a minute in a 14 x 14-in. cylinder running at 150 r.p.m. But even under these conditions the deposits in the valve passages and the discharge cavities of the cylinder continued to form as long as this oil was employed.

The expert happened to come our way several months afterward, and I called his attention to the condition experienced with his oil. In regard to the amount we were feeding into this cylinder, he said this was reduced to a point that he thought was the minimum. His reason given for the formation in the passages was that the residuum of all oils is carbon, and that it therefore was no doubt due to carbon deposits. At the same time he assured us that the oil he had recommended was the best procurable for the purpose, and that we should go ahead and use it without any fear.

Deposit Built Up Rapidly

This was done, but the formation in the discharge passages seemed to be building up rapidly despite the fact that only a small quantity of oil was being fed into the cylinder. These formations finally collected to such an extent that it was necessary to clean the passages in order to avoid the hazard of an explosion. The passages were accordingly cleaned, and some of the material removed was analyzed and found to contain about 1.5 per cent. free oil, 11 per cent. rust, 5 per cent. decomposed oil, 30 per cent. mineral ash, 10 per cent. coal dust, while the remainder was foreign matter, or residuum. A further investigation revealed the fact that our intake was exposed to such material as coal dust, mineral ash, shavings, water, etc., as well as some air.

After cleaning the compressor, and safeguarding the intake against dirt and dust, we procured another grade of oil which in our own judgment was more suitable for the work, since in the meantime we had made investigations and studied the question to some extent. This time we procured an oil of 31 Beaumé gravity, a flash point 375 deg. F., a burning point 420 deg. F., and a viscosity of 200 S at 100 deg. F. We started by feeding three drops per minute. Finding the cylinder copiously oiled, we reduced the feed to two drops a minute. The compressor was operated in this condition for a considerable length of time with practically no trouble from carbon deposits.

Experiencing such good results from this light oil, and by this time disbelieving in many of the virtues claimed for low gravity, high flash point and heavy viscosity, we were prompted to try another grade of oil, selecting this time one having a gravity of 33 Beaumé, a flash point of 380 deg. F., a fire test of 420 deg. F., with a viscosity of 140 S at 100 deg. F. We used the same quantity as before—namely, two drops per minute in a 14 x 14-in. cylinder running 150 r.p.m. This oil was used for years without any trouble from lubrication, valve leakage or carbon deposits.

The oil representative made his regular calls on us, and each time we told him what we were doing; but he assured us we were on the wrong track and that sooner or later would get into trouble. After continued tests, however, and careful observation of all conditions, we became satisfied that the latter oil is the most suitable for air-cylinder lubrication when working against a 100-lb. pressure, with either single- or two-stage compression.

An Old Friend Calls

One day an old friend of mine called, who also happened to be an expert representing one of the leading oil companies. I related to him my experience with air-cylinder lubrication and, somewhat to my surprise, he too assured me that we were using the wrong oil and said, "You know you get not less than 400 deg. C. F. in your air cylinder when working against 100 lb., single stage." With this I agreed. I then asked him how he knew we were wrong, and what means he employed for ascertaining the proper grade of oil for air-cylinder lubrication. He then proceeded to explain the method his company's engineers use in determining the proper oil for different kinds of service.

He explained this in part:

You have agreed that the temperature of the air is 400 deg. Our test would be conducted as follows: Take a block of cast iron 6 or 8 in. square and 2 in. thick, place this block on a layer of sand in a shallow iron pan and pack the sand closely around the cast-iron block, then put a gas burner under the pan and turn on the heat slowly. The top surface of this block is polished and is provided with a drilled hole into which a thermometer is inserted. Heavy steam-cylinder oil is poured into the hole around the thermometer bulb so as to make a close heat contact. When the thermometer rises to 400 deg., lower your gas burner until the thermometer remains steady at this temperature. Then take your different samples, dip the point of a lead pencil into the oil, hold the pencil 2 in. from the surface of this iron block and allow a drop to fall on the hot polished surface.

When such a test is made with the grade of oil from which you say you are getting successful results, we find the drop spreads out to about 1⅛ in. in diameter, smokes a little, dries up, and is evaporated in ten seconds time, leaving the surface perfectly dry. With a higher grade of oil having a flash point of 450 deg. F. and heavy viscosity, when the drop falls on the surface of this polished block it spreads out to about 1¼ in. in diameter, smokes a little, but after five minutes the surface is still oily. Thus we have proof that this is the proper oil to withstand such service as you get in your air-compressor cylinder.

Then I asked him what he thought the temperature of the surface of the cylinder wall was when the air in the cylinder was at 400 deg. F. He hesitated a little, then said he believed it would be about 25 deg. F. less than the temperature of the air. I disagreed with him here, saying this did not seen right, as the water-jacketed wall should be much cooler than the air. After some discussion we went into the office and consulted some authorities on the subject; we found some tests had been made abroad on the temperature of the cylinder walls in an internal combustion engine, where, with an explosion temperature of 2700 deg. F. and an average temperature through the cycle of 950 deg. F., and the water in the jacket at 200 deg. F., the inside surface of the cylinder wall did not go above 267 deg. F.

When my friend was shown these figures he was nearly speechless, and admitted that he had never thought that the temperature of the wall of an internal combustion engine cylinder, with an explosion temperature so high, could remain as cool as this authority stated. However, since the character of the authority was such that it could not be questioned, it was accepted by the oil expert. I then asked what he thought the temperature of the air cylinder wall should be when the air does not exceed 400 deg. F., in answer to which he said he did not know, but did not believe it would be much above the temperature of the water in the jacket.

As a matter of fact, the temperature of the inside of a water-jacketed cylinder wall is not more than 30 deg. F. higher than the temperature of the jacket water, as long as the water does not boil; and, since this is the true condition, what is the use in employing oils of low gravity, high fire test and high viscosity to meet a condition such as this? The temperature of the inside surface of the cylinder wall on an air compressor is little, if any, above the temperature of the surface in the main bearing of the ordinary Corliss engine.

High Viscosity Is Not Essential

From this it appears that the ordinary oil expert who lays much stress on high viscosity and high flash point has not considered the true conditions. Furthermore, it has been shown in this article that the cause of carbon deposits in the passages of an air cylinder is not always entirely chargeable to the residuum of oil, but in many instances is due to using a lubricant of too heavy a body, which adheres to the passages of the cylinder. Also, when the inlet is not properly protected from foreign matter, all such material as coal dust, fine ashes, shavings, waste, etc., is drawn into the cylinder and deposited on the sticky surfaces coated with this heavy oil. This foreign matter, with additional oil, gradually builds up until the passages become choked. The air valves now begin to leak for some reason, thus increasing the temperature, until finally this sometimes reaches a point as high as 500 deg. F. when compressing to 100 lb. single stage. If there are many shavings or much coal dust deposited in the passages, this is apt to char and become incandescent. When this takes place the temperature of the air rises rapidly, and as a consequence the pressure increases quickly to a point beyond the strength of the receiver, and results in what is generally called an explosion.

It is my opinion that no violent explosion ever takes place in the ordinary air compressor, unless kerosene, gasoline or some such material is introduced into the compression space.

In my personal experience some years ago with a two-stage compressor where the intake had been neglected and also the wrong grade and quantity of

oil had been used, the high-pressure discharge valves became leaky, thus allowing the air to churn in and out of the cylinder at each stroke, and heating it until it became so hot that the heavy deposits in the passages actually took fire; the whole system burned out, like a chimney from an old-time wood stove. Fortunately, however, there was no explosion because the safety valve on the receiver relieved the sudden pressure caused by the burning material in the discharge passages and the compressor was promptly shut down.

From the foregoing it will be understood that in the selection of an oil for air-cylinder lubrication, nothing should be used but a pure mineral product having a gravity of from 31 to 33 Beaumé, a flash point of 375 to 390 deg. F., and a viscosity of 140 to 150 S at 100 deg. F. Under no circumstances should a heavy grade be used, despite whatever claims may be made by the oil salesmen as to the virtues of heavy viscosities or high flash points. It should also be borne in mind that when the surface of the cylinder wall is once glazed over, little oil is required to properly and adequately lubricate the working surfaces.

Too Much Oil Forms Carbon Deposit

The film of oil on the cylinder wall is understood to be less than 0.00025 in. in thickness. The piston rides back and forth on this film, which requires little oil to be added in order to maintain the necessary quantity. Should a greater amount of oil be used than just enough to keep up the required film, it will be plowed up ahead of the piston and be forced through the valves and into the cylinder cavities, where it will collect in the low places and solidify by reason of being mixed with foreign matter taken in through the inlet. This forms deposits commonly called carbon.

As has been shown, a 14 x 14-in. cylinder can be adequately lubricated with two drops of oil per minute when the compressor is operated at 150 r.p.m. This is the equivalent of one drop of oil for each 800 sq. ft. of cylinder surface swept by the piston. The oil herein referred to happened to be made from a paraffin base petroleum. However, it is believed that an oil of about the same consistency, refined from an asphalt base natural oil, would serve as well, if not better.

Soft Coal Exports in May

Exports of bituminous coal in May of this year increased markedly over those of the corresponding month of last year. In the table following the revised figures covering the exports for May, 1917, are given for purposes of comparison. The returns to the Department of Commerce are as follows:

COAL EXPORTS FOR MAY, 1917, AND MAY, 1918

	May, 1917	May, 1918
Anthracite, tons	429,137	425,110
Bituminous, tons*	1,830,439	2,119,700
Exported to (in part):		
Italy, tons	41,139	
Canada, tons	1,401,158	1,766,785
Panama, tons	45,111	50,108
Mexico, tons	12,484	14,181
Cuba, tons	153,750	137,048
Other West Indies	37,282	25,717
Argentina	23,888	14,750
Brazil	44,281	79,400
Uruguay	1,329	4,529
Other countries	70,017	27,182
Coke	134,091	146,740

*Does not include fuel or bunker coal laden on vessels engaged in foreign trade, which aggregated during May, 1917, 629,010 tons and during May, 1918, 425,796 tons.

Minecdotes

The Tendency of the Times

When coal mines first started to electrify their power equipment, the coal operator was practically at the mercy of the equipment salesman. The result was that some mines are a veritable museum of all the kinds of electrical equipment ever built. Today, however, the average coal operator is well versed in matters pertaining to electrical equipment, and a salesman must be equipped with more than the usual line of hot air to obtain any consideration.

An amusing but instructive incident took place a short time ago at a meeting of salesmen and engineers representing several manufacturers of electrical equipment. The object of the meeting was to establish, if possible, some standard ratings as regards speed and capacity of mine equipment. A salesman from one company suggested a questionable method of rating the capacity and speed of mine locomotives, stating that there could be no objection to the method since the customer had no way of making a check. An engineer from one of the other companies immediately jumped to his feet and, pounding his fist on the table, said in forcible language, "Gentlemen, the time has past when you can stick your finger in the customer's eye and when the tears roll down his face make him believe it is raining."

Legal Department

Notice of Condition Imputed to Employee—A mine employee who had passed through an entry 66 times in 11 days must be presumed to have known the fact that the entry was too small to enable him to alight from a car therein, as affecting liability for injury occurring to him while driving an ungentle mule through the entry. (Kentucky Court of Appeals, Mahan Jellico Coal Co. vs. Bird, 201 Southwestern Reporter, 306.)

Authority of Coal Company's General Manager—Holding that the operations of coal-mining companies are such that the general manager of such a corporation may be deemed to have implied authority to contract for the sale of the entire output of his company for a given year, the West Virginia Supreme Court of Appeals said recently in the case of Producers' Coal Co. vs. Mifflin Coal Mining Co., 95 Southeastern Reporter, 948: "A corporation acts only by and through its officers and agents, and Deal was an agent of defendant, held out by it to the public, by virtue of his position, as representing it in the general management of its business, one important feature of which was the sale of the product of its coal mine. Coal-producing companies do not store their coal, but usually sell it before it is mined, and to be delivered at a future time. * * * The general manager of a corporation has authority to bind it by such contracts as are reasonably incident to the management of the business intrusted to him. It was therefore not incumbent upon plaintiff to prove that Deal was expressly authorized to make the contract sued on, in order to hold the defendant liable. His apparent authority, as general manager of its business, to make the contract was sufficient ground to create liability."

Coal, Explosives, War—II

By H. J. BROUGHTON
Wilmington, Del.

SYNOPSIS—Various methods may be employed for exploding powder or other explosive in boreholes for which both the electric squib and electric primer are entirely satisfactory. Proper placing of shot holes, adequate and careful tamping and prompt detonation are as essential to the best results as is the quality of the explosive.

IN USE, blasting powder is exploded by a spark from fuse, electric squib or miner's squib, or by a primer of some high explosive, the last being employed only in heavy charges on open work. In mining, and sometimes in light charges on open work, blasting powder is made into cartridges by means of a paper tube or cylinder sealed at one end, which is known as a tamping bag. Sometimes the paper cylinder is made by the miner, by coiling a section of heavy paper, known as blasting paper, around a wooden pin, called a cartridge pin, and securing it with what is called blasting soap. The removal of the pin leaves a cylindrical cartridge open at one end, into which the powder is poured, the top being then folded and sealed with blasting soap.

The cartridge form increases safety by eliminating loose powder about the borehole, protects the blasting powder from moisture when in the hole, and makes the charging much easier and quicker.

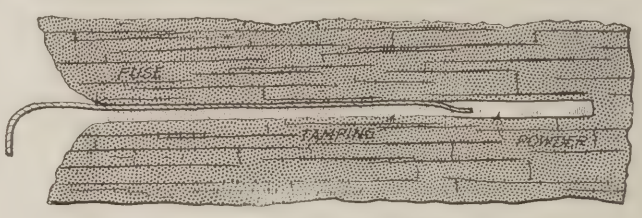
The cartridge pin should be but little smaller in diameter than the borehole so that the cartridges will fit snugly therein without appreciable air space around them. The air space is usually objectionable because it tends to reduce the breaking effect and the results given by the explosive. It is not advisable to make the cartridges longer than 18 in., because they are then heavy and bulky and likely to break or become unsealed in handling. Any length that may be required less than 18 in. can readily be made. One or more cartridges may be used in each borehole.

Best Method of Exploding Cartridges

The best way to explode blasting-powder cartridges is with an electric squib or with a high explosive primer. The latter should not be used in coal mines. Other methods are with fuse, miner's squib, electric blasting cap or delay electric igniter. The electric blasting cap is an efficient blasting-powder exploder, but is no better than the electric squib, which costs less, although when a high explosive primer is employed to explode large charges of blasting powder an electric blasting cap is necessary.

The advantages of the high explosive primer detonated by an electric blasting cap are that it can be lowered into a deep hole and properly placed in the charge more easily than an electric squib, electric blasting cap or blasting cap and fuse; that the flame given off and the heat generated by the detonation of the high explosive primer cause the blasting-powder charge to explode more quickly and therefore to do more work, and that the explosion can be started in the middle of the blasting-powder charge. A blasting cap or fuse may be used for detonating the high explosive primer, but where this is done the advantage gained by placing the primer in the center of the powder charge is lost, because the "side spit" from the fuse almost invariably ignites the blasting powder before the fuse has burned to the blasting cap in the high explosive primer. These are the same difficulties that occur when the blasting-powder charge is exploded by a fuse or squib from the outer end.

In the use of fuse or miner's squibs, the charge cannot be first ignited in the middle. When the explosion of a charge of blasting powder in a borehole commences at the outer end, the gases evolved by the first portion of the powder exploding blow away the resistance, so that the latter part of the charge practically burns in the open and much of its value in breaking the surrounding material is lost. Also, when a long charge begins to explode at one end, the shock of the first part of the explosion may break the outer part of the powder entirely. Or again, the explosion of one end of

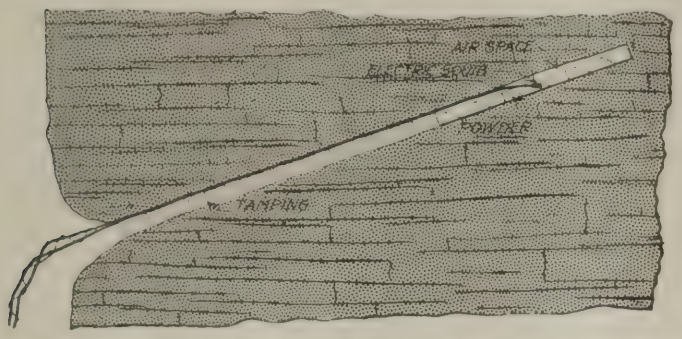


A LOADED HOLE PRIMED WITH A FUSE

the charge before the other may result in throwing partly exploded and burning powder into the open air in places where it might cause disastrous results. It must be understood that the time required for the explosion to travel from one end to the other of even a long charge of blasting powder is short indeed, but a much longer period is required than for the detonation of a high explosive to travel the same distance, and takes enough time to cause the results already described.

Other advantages in the use of the electric squib or the electric blasting cap, either with or without a dynamite primer, are the elimination of smoke from burning fuse and the ability to explode a number of charges simultaneously, which results in greater execution. Furthermore, the shotfirer has absolute control of the time when the shot explodes, making it possible to fire when everybody is in a safe place, thus eliminating the danger resulting from persons inadvertently entering a chamber after a slow-burning fuse has been lighted. Still another advantage in electrical ignition of blasting-powder charges is that the possibility of misfire is reduced to a minimum and that of hangfire entirely eliminated. Misfires, hangfires, and quickfires occur not infrequently with the use of fuse or miner's squibs. Hangfires have probably caused as many accidents as anything else connected with the use of explosives.

When the electric squib is used to explode blasting-powder charges in cartridges, the paper shell already referred to is filled half full of powder, the electric squib put in, and then the remainder of the shell is filled with powder above the electric squib and about the



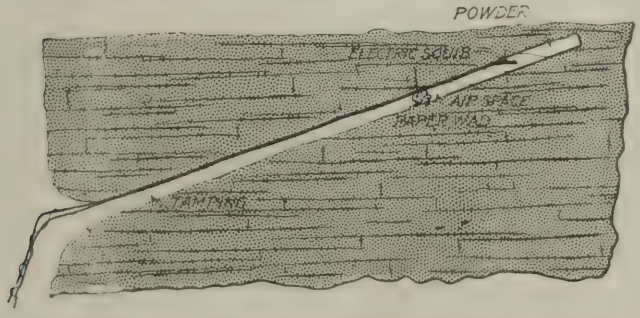
LOADED HOLE WITH AIR SPACE AROUND CHARGE

wires. Enough empty shell is left at the top to tie securely about the wires. The cartridge is primed in this manner, and if the charge is to consist of more than one cartridge, this one, known as the primer, is placed at or near the center of the charge.

When exploding bulk charges of blasting powder chambered in boreholes on open work with electric squibs, the squib should be lowered into the borehole after half of the charge has been poured in. The remainder of the charge is then poured on top of it.

To lower the squib into the borehole, a blasting-powder cartridge should be used or a short stick of heavy wood tied to the wires just above the cap. This will supply the weight necessary to lower the squib easily to the bottom of the borehole. Metal or stone or anything else that could strike a spark should not be used for this purpose.

Pushing the electric squib into the borehole with the tamping stick, by spreading the wires just above the cap and catching the loop thus made on the end of the tamping stick while the wires are held taut, should never be resorted to. The objections to this are that the pressure on the wires necessary to hold the electric squib in place is quite likely to break them apart in the cap; the probability of destroying the cap by striking the end of the tamping stick against some projection on the sides of a borehole, made irregular by springing, and the difficulty of withdrawing the tamping



LOADED HOLE WITH AIR SPACE IN FRONT OF CHARGE

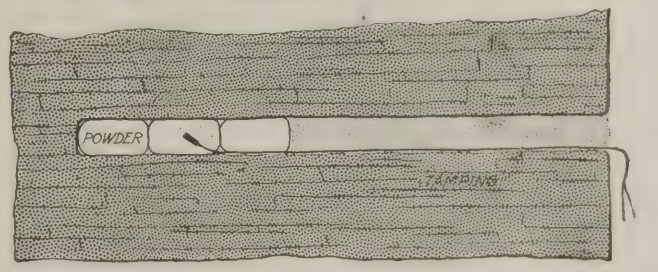
stick and leaving the electric squib in proper position in the charge.

An easy way to prime a charge of blasting powder in bulk is to make a blasting-powder cartridge primer with electric squib, as already described for blasting in mines, then lower this primer into the bulk charge of blasting powder. This primer, being heavy, can be readily lowered into place without aid from a weight or the tamping stick in the same manner as that employed with a high explosive primer. If a primer consisting of high explosives and an electric blasting cap be used for exploding a charge of blasting powder in bulk, it also should be located somewhere near the center of the charge.

When fuse is employed for igniting charges of blasting powder in cartridges, it should be tied into the cartridge just as the electric squib is, but it is not necessary to have it extend more than a couple of inches into the powder. If the charge consists of more than one cartridge, the one containing the fuse should be loaded last. The best way to prime a charge of blasting powder in bulk, with fuse, is to tie the fuse into a cartridge and lower it onto the charge.

The miner's squib is employed only in mine blasting and when the charge is in cartridge form. Although the blasting-powder charge is not truly primed with it, the miner's squib is the means of igniting the charge. Accordingly the method of using it will be here described.

When using the miner's squib, the copper-tipped or brass miner's needle is pushed 2 or 3 in. into the end of the blasting-powder cartridge or the outside one, if the charge consists of two or more. The cartridge is then put into the borehole with the point of the miner's



EXPLOSIVE CHARGES SHOULD BE IGNITED AT OR NEAR CENTER

needle remaining in it and the other end of the needle extending from the mouth of the hole, the needle having first been carefully coated with soap. Tamping is then packed tightly about the needle from the charge to the mouth of the borehole.

Careful removal of the needle leaves a hole about ¼ in. in diameter from the mouth of the borehole into the powder. In this hole the miner's squib is laid, with the "slow match" end extending. This is lighted, and when the fire burns to the powder train in the squib, the squib shoots like a rocket back through the needle hole into the powder and explodes the charge.

The miner's squib method of exploding blasting powder charges is the cheapest, so far as first cost is concerned. Besides having the disadvantage of starting the explosion at the end of the charge, like fuse, it is probably the most uncertain method in its result, because if the needle is carelessly removed the hole in the tamping may close up in places and prevent the miner's squib from shooting into the blasting powder.

In order to prevent this, a piece of ½-in. gas pipe, called a blasting barrel, is sometimes used instead of the miner's needle. One end of this is embedded in the end of the outside powder cartridge, while the other end extends from the mouth of the borehole, and the

tamping is packed around it just as when the needle is employed. The blasting barrel is not withdrawn, however, and the squib shoots back to the powder through it, the blasting barrel being thrown out with the material blasted when the explosion takes place. It is then recovered, and sometimes is used a number of times before it is destroyed. This is a much more certain method than the use of the miner's needle, but is almost, if not quite, as expensive as the use of fuse. This, however, depends on the number of shots the blasting powder will withstand.

As a general rule, it is necessary to press the charge compactly into the back or bottom of the borehole and to tamp tightly above it to the mouth of the hole, if the maximum efficiency of the explosive is to be developed. Sometimes, however, in easily shattered coal or other material, greater execution will result if an air space remains around the powder charge, or preferably between the last cartridge loaded and the tamping. The former is accomplished by making the cartridge shells on a pin materially smaller in diameter than the borehole, and not pressing the cartridges so hard in the back of the borehole that the shells will be crushed or break.

How to Provide the Air Space

The air space between the charge and the tamping is provided by pushing a wad of paper back to within several inches of the charge, and then filling outside or above this with tamping material, first pressed lightly in order not to push the paper wad any closer to the explosive. When the explosion takes place the air space back of the tamping acts as an elastic cushion, causing that part of the force of the explosion, which is first exerted forward or upward along the line of the borehole, to rebound and expend itself, to a considerable degree, laterally. This sometimes results in sufficient side-spreading of the explosive force to bring out a great quantity of coal or stone in large lumps, when, without the air space, the charge would expend the major portion of its energy forward or upward along the line to the face or surface, resulting only in blowing out a comparative small quantity. This method of blasting applies principally to coal mining, where it is known as an "air shot."

Charges of all blasting explosives must be closely confined to be effective. This applies particularly to blasting powder, because on ignition it changes from a solid into a gaseous state slowly as compared with most other blasting explosives. It can be easily understood that if there be one or two places in the material confining the charge that are materially weaker than all of the rest, such, for example, as insufficient tamping in the borehole, the gases formed by the rapidly burning powder will blow out through the weak spots, often projecting large quantities of flame with them. "Blow-out" and "windy" shots in coal mines are examples of insufficient resistance to the charge of blasting powder, due to shots being badly located because they are improperly balanced in resistance.

These arise from overcharges of powder when the resistance in several directions is not great enough, and to insufficient tamping, which permits a large part of the force of the explosion to waste itself through the borehole. As the gases given off by a partly tamped charge are much more poisonous than those from a thoroughly tamped one, the desirability of filling the hole to the face with tightly packed material can be readily understood.

The best tamping material is damp clay, free from pieces of stone. Sharp scraps of stone in the tamping are likely to cut or abrade the fuse or the insulation of the electric squib or the electric blasting-cap wires. Coal dust is poor tamping, not only because the heat generated by the explosion burns it, but also because it does not pack well. Tamping bags are recommended as containers for the tamping used in all horizontal or pitching boreholes and in "uppers." It is practically impossible to tamp uppers and difficult and inconvenient to tamp horizontal or pitching boreholes without containers for the tamping. If regular tamping bags are not at hand, cylinders for this purpose should be made out of paper, like those used when making the powder into cartridges.

For pressing the tamping into the borehole a tamping stick is used. This is a straight rod of hard wood, a little smaller in diameter and a few feet longer than the borehole. There must be no metal whatever about it. It is absolutely unsafe to use a drill or any metal bar



PROPER PLACING OF ELECTRIC SQUIB

to tamp any explosive. This is particularly true if the explosive be blasting powder. When metal comes forcibly in contact with rock, or even with sand or any other very hard substance, it may strike a spark, which would easily ignite any grains of blasting powder that it might fall upon. Loose grains of blasting powder are often distributed along even those boreholes in which the powder charge is in cartridges, although an attempt may have been made to fold down and seal the ends of the cartridge shells. A few grains of powder would quickly carry the explosion from the grain accidentally ignited by a spark to the charge proper.

Dangerous to Use Metal in Tamping

In vertical boreholes through rock which have been chambered, the walls are nearly always more or less ragged and seamed, with ledges and points. When the borehole is charged the powder lodges on these, and even a wooden tamping stick must be used carefully to avoid knocking together two pieces of hard rock with sufficient force to throw a small spark into the powder. For tamping in this work it is exceedingly dangerous to use a metal bar, a pipe with wooden plug in the end, a wooden stick spliced with nails, wire or tin or anything that has any metal whatever about it.

The first 3 or 4 in. of tamping should be dry and pushed gently against the powder. The remainder ought to be packed in with as much force as can be given to the tamping stick used by hand, but particular care must be taken not to kink, cut or abrade the fuse or the wires of the electric squibs or electric blasting caps. When the tamping is not packed tightly to the mouth of the borehole a part of the force of the blasting powder is wasted. The electric squib wires, electric blasting-cap wires or the fuse must always be long enough to extend well out of the mouth of the borehole.

(To be concluded)

Testing for Gas in Mines

By H. E. GRAY
Confluence, Penn.

SYNOPSIS—*Crude practice of firebosses, in testing for gas in mines. Choice of a suitable lamp for testing. Important features and requirements. Principle of all safety lamps. The lamp flame, its formation, size and quality. Flame caps; the "fuel or oil cap" often mistaken for a gas cap when the lamp burns a volatile oil. The "Sight Indicator" for reading percentage of gas present avoids guesswork and brings all firebosses' reports to the same base of measurement, which is important in testing and reporting gas.*

MANY men have given their time and attention to ideas, schemes and suggestions from which might be formulated some fixed method or plan to guide the fireboss or mine examiner in doing his work, enabling him to obtain positive results and eliminate the fatal guesswork in determining the gaseous condition of the mine air.

In his splendid work on "Mine Gases and Explosions," J. T. Beard says, in describing the method of measuring gas in the mine, page 345, "Strange as it may seem, the common practice of determining and reporting the quantity of gas found in a chamber is even more crude than the method of its detection."

It is evident to all acquainted with the work that the methods commonly used in mines to-day, for testing gas, are strangely in keeping with the rule of "By guess and by gosh." *By guess*, you are right; but *by gosh*, you are wrong. If we would avoid the pitfalls of the past and cut out all guesswork in gas testing, we should begin by selecting a suitable lamp.

The lamp must be constructed on principles that will enable a fireboss to make a satisfactory test for gas, under the varying conditions existing in mines. Whether the mixture is explosive or inexplosive, one must be able to make the test safely and withdraw his lamp without losing his light. The extinction of the lamp would seriously interfere with the completion of the work within the time allowed by law.

While other firebosses may prefer lamps of different types, my choice is a lamp of the Marsaut pattern. In order to secure a steady fixed flame, it is important that all inside dimensions shall be such as to avoid any offset or projection on the inner surface of the lamp chimney. The lamp must be bonneted so as to strengthen the motive column formed within the chimney, as that will greatly improve its illuminating power, which is an important feature in the work of examining a mine.

To the student of mining, the term "safety lamp" is misleading, and many miners, even, are prone to think that such a lamp is safe under all conditions. But, in truth, the so-called "safety lamp" is only safe when in the hands of a competent man.

The construction of the lamp is such that its flame is isolated from the atmosphere surrounding the lamp chimney. The gas-charged air enters the combustion chamber and burns within the lamp, but the flame of the burning gas is prevented from passing out by the cool wire gauze forming the chimney.

The principle of the cooling effect of wire gauze on flame was discovered by Sir Humphry Davy. He found that as long as the wire gauze is kept clean and cool, flame will not pass through the mesh of the gauze, unless propelled by a strong current of air. It is important that anyone handling a safety lamp should be acquainted with these facts.

As shown in Fig. 1, an ordinary lamp flame has three zones. The inner zone *A* is dark, being filled with the vaporous and solid combustible matter distilled from the oil drawn up in the wick. No air has reached this zone and no combustion is taking place in it. The next outer zone, marked *B* in the figure, is the zone of

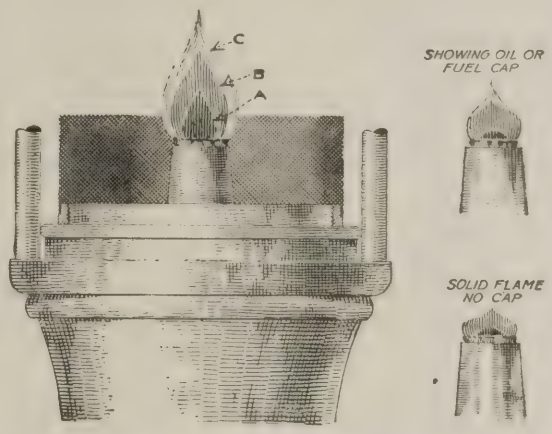


FIG. 1. SECTIONAL VIEW OF PART OF TESTING LAMP

incandescence, where the combustible solids, vapor and gases mixed with air are being consumed. The supply of air to this zone, however, is not sufficient for complete combustion and the combustible matter is rendered incandescent. The outer zone, marked *C*, is nonluminous, the combustion here being complete owing to an excess of air.

In testing for gas, the lamp flame should have the appearance of being glued to the wick, so to speak. It should be a steady, tenacious flame, with a clearly defined outline. Three features must be considered; namely, the size, brilliancy and quality of the flame used for testing.

The *size* of the flame will depend largely on the height of the wick, the kind of oil burned, and the supply of fresh air. The *brilliancy* of a flame interferes with the delicacy of the test and, for this reason, when desiring to make a test, the wick should be drawn down until the flame is only about ¼ in. in height and is nearly nonluminous, as illustrated in the lower right-hand corner of Fig. 1.

The *quality* of the flame is an important factor in making a test and depends chiefly on the fluid burned in the lamp. A light, volatile oil, such as naphtha, benzine or gasoline, gives a more brilliant and less tenacious flame than sperm or cottonseed oil. For this reason, the last

mentioned oils are much to be preferred for the purpose of testing for gas.

Either sperm or cottonseed oil gives a solid flame that is not readily extinguished when proper care is taken. The products of combustion when these oils are burned form a more extinctive atmosphere in the top of the lamp chimney than when a volatile oil is burned. This tends to reduce the force of an explosion should one occur within the lamp, which is thus rendered less liable to fail in gas.

On the other hand, if a light volatile oil is burned the tendency of such oil to vaporize under the heat of the lamp generates an inflammable vapor more rapidly than it is consumed, and materially increases both the force of a possible explosion within the lamp and the chance of failure of the lamp in gas.

The flame of a lamp burning a volatile oil is surmounted at all times by a faint halo. This, as shown in the upper right-hand corner of Fig. 1, has been termed an "oil or fuel cap." In a few instances, I have known gas to be reported by the mine examiner when there was no gas present, the examiner being deceived by the oil cap on his flame. In the use of a heavier oil, as sperm or cottonseed oil, no oil cap is formed and there is no opportunity for the fireboss to be deceived.

I have mentioned the fact that there should be no interior offset or projection in the lamp chimney. A smooth surface gives a greater rigidity or fixedness to the lamp flame. A surface that is not uniform may cause a slight sidewise motion of the flame, which might be taken as an indication of the presence of firedamp. The same effect may be caused by the conflict of ascending and descending currents, in the combustion chamber, when air is permitted to enter the lamp at a point above the flame.

In regard to the wick I much prefer a flat to a round wick. It should be a little wider than the wick tube, so that when completely saturated with oil it will be self-sustaining. When inserted in the lamp, the wick should be perfectly dry and just long enough to reach the bottom of the oil vessel. A short wick, frequently renewed, will give much better results than a longer wick used for some time. The latter is apt to become gummed and clogged so as to prevent the flow of oil to the flame.

To insure a more uniform flame and better illumination, a flat wick tube should be corrugated. The pricker should be so arranged as to sweep over the full width of the wick tube. It should operate at a slight angle with the top of the tube. To prevent extinguishing the flame, the crust should be sheared from the top of the wick, at one end first. The flame should then be allowed to ignite that end before shearing the crust from the other end of the tube. The pricker should work easily and yet not be so loose that it will fail to maintain its position when raised and turned.

The bonnet is one of the chief features in the construction of a good testing lamp. It serves as a chimney, affording a fixed inlet and outlet of the air and gases circulating through the lamp, whereby a good motive column is maintained within the chimney.

I have now described what have seemed to me to be the more important features of a good testing lamp. There only remains to consider some means that will enable a fireboss to measure correctly the height of the flame cap he observes when the lamp is raised into a body of gas. The simplest and most certain means of determining the percentage of gas indicated by a given height of flame cap is that designed some years ago by Messrs. Beard and Mackie, and known as the sight indicator. This device, shown on the right of Fig. 2, consists of an upright standard secured firmly to a circular disk that fits over the wick-tube in a safety lamp. As shown in the figure, seven platinum wires are mounted on this upright. The lower or standard wire is straight, while the upper percentage wires are looped at the center, which enables them to be more clearly seen and not confused with the wires of the gauze chimney of the lamp. On the left of the figure, the device is shown inserted in a common Davy lamp, which is the favorite lamp with firebosses, in testing for gas.

In the use of the sight indicator, the height of the flame is so arranged that the lower standard wire shows a slight incandescence in fresh air. When the lamp is then exposed to air containing gas, the percentage of

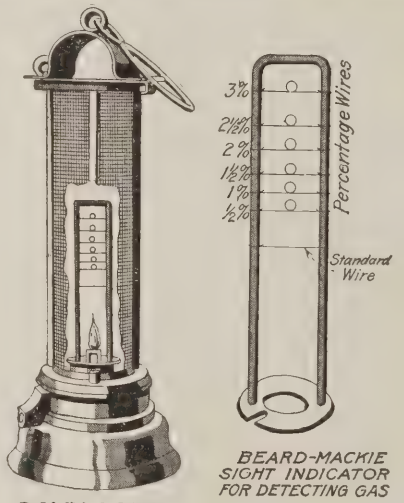


FIG. 2. TO MEASURE PERCENTAGE OF GAS IN AIR

gas present is indicated by the incandescence of one or more of the percentage wires. The uppermost one of the wires thus incandesced marks the percentage of gas present.

For example, if two of the loop wires are incandesced there is 1 per cent. of gas present; but if the third wire also shows an incandescence there is 1.5 per cent. of gas, etc. Should all the wires show incandescence, there is at least 3 per cent. of gas present in the air, and steps should at once be taken to avoid disaster, owing to its possible ignition. When between 4 and 5 per cent. of gas is present the lamp will generally fill with flame and must be promptly though cautiously removed from the body of the gas.

The sight indicator is the most accurate and speedy means of detecting the percentage of gas present in mine air that has been devised and should be used by all firebosses, in order to standardize their reports and bring these to the same basis of measurement. This is very important in reporting gas found in the air splits circulating in the different sections of a large mine. In testing for gas with this indicator, the incandescence of the wires reduces the danger of an explosion occurring within the lamp's chimney, and renders the lamp flame less liable to extinction.

Mine-Car Axles

By B. P. LIEBERMAN
New York City

SYNOPSIS — *The suitability of iron or steel for use as mine-car axles depends upon both its chemical analysis and physical structure. A steel of proper analysis may be improved for use as an axle by mechanical working or by proper heat treatment. This latter method is rapid, positive and under easy control.*

A FAMILIAR sight around some coal-mine repair shops is the large number of discarded mine-car axles. Some of them are bent or broken, while others are excessively worn at the journals. Some of these axles doubtless failed in service, causing a wreck somewhere along the haulageway. The discarding of these axles is in itself an item of expense, but far more serious is the delay in production caused by wrecks and the necessary repairs, not to mention the element of danger to the miners.

Why do axles fail, and why is not something done to eliminate failures of this kind? Axles fail on account of overload or abuse, or they may be made of material unsuitable for the purpose. Their failure is often considered a necessary evil and something that cannot be avoided. Some mine operators try to remedy the difficulty by replacing such axles with ones of larger diameter. Such a procedure is quite expensive, as it affects also the wheels and axle boxes and in addition materially increases the dead weight of a mine car.

Coal-mine operators are bound to have trouble with their mine-car axles as long as they continue to specify in their purchase orders just "axles." If they follow this practice, they do not know whether they get an axle made of wrought iron, a poor grade of steel or a steel too low in carbon. It is evident that one kind of steel must be most suitable for the purpose. This kind does not necessarily have to be the most expensive material.

The Proper Size of Axle

An axle is properly proportioned when it is capable of standing the load to which it is subjected without being permanently deformed and with a reasonable margin of safety to take care of extraordinary conditions. In addition, the material must be such that the axle performs under these conditions without showing undue wear at the journals and without being affected by fatigue or crystallization, which would cause it to break unexpectedly and before it has given full service.

The ability of an axle to withstand bending action is proportional to its cross-section and to the allowable working stress of the material from which the axle is made. The working stress is the ultimate tensile strength divided by the factor of safety.

The figures in Table I illustrate plainly the difference which exists between the different materials from which mine-car axles may be made.

Table I shows that the strength of different grades of steel varies between wide limits. In other words, of two mine-car axles of the same diameter, and alike in all respects except material, one axle may stand four or five times the load which the other one will endure, and this in spite of the fact that the axles look exactly alike from the outside.

In the table, as will be noticed, the different kinds of steel are listed simply according to the amount

TABLE I. DIFFERENCE IN MATERIALS ENTERING INTO THE CONSTRUCTION OF MINE-CAR AXLES

Material	Ultimate Tensile Strength, Lb. per Sq.In.
Wrought iron	45,000
Low carbon steel, about 0.08 per cent. C	55,000
Low carbon steel, about 0.20 per cent. C	65,000
Medium carbon steel, about 0.30 per cent. C	75,000
Medium carbon steel, about 0.50 per cent. C	90,000
Nickel steel, 3½ per cent. nickel	100,000
Heat-treated steel	110,000 to 230,000

of carbon which they contain, and no reference is made to such names as machinery steel, openhearth steel, axle steel, etc., under which designation the material of axles is sometimes familiar to mine operators. The figures in the table show plainly that it is mainly the amount of carbon which controls the properties of the steel, and therefore such general names as machinery steel, etc., are meaningless and misleading.

Even such material as cold-drawn or cold-rolled steel may possess properties varying between wide limits unless the amount of carbon is specified. Cold working, as will be shown further on, improves the physical properties of steel to a certain extent. As far as cold rolling is concerned, this process is little used at the present time, and steel which goes under this name is cold finished either by cold drawing or cold turning and polishing. The cold-drawn grade is used in the smaller diameters of axles or those up to 2 in., as well as the lower carbon steels, while the cold turned has been supplied for larger diameters and higher carbon steels above 0.25 per cent. C.

The fact that the hardness of steel increases in the same proportion as the ultimate strength, as given in Table I, has been utilized for testing purposes. By means of a simple testing device the surface hardness is measured, and this bears a direct relation to the physical qualities of the material.

It is customary to designate hardness either by Brinell number or by scleroscope number. The Brinell instrument forces a steel ball of standard size under a standard load into the metal under test. The Brinell number then equals the pressure on the ball in kilograms divided by the area of indentation surface in square millimeters. In this test the diameter of the steel ball is 1 cm., the pressure on the ball is 3000 kg., the area is determined by measuring the diameter of the indentation with a microscope and by reading from a table the corresponding hardness number.

With the scleroscope instrument, hardness is indicated by the rebound of a small steel weight with a diamond tip from the surface of the test piece. The weight is allowed to fall about 10 in. and the distance it rebounds is taken as a measure of the hardness of the sample. A scale is provided which is divided into 140 equal parts, and the hardness is expressed



FIGS. 1 TO 5. MICROPHOTOGRAPHS OF THE CROSS- SECTION OF IRON AND VARIOUS STEELS

as the number on the scale to which the weight rebounds.

It should be remembered that the scleroscope number in itself does not mean anything at all. It is simply a means for comparing the hardness of different grades of steel and for specifying the hardness desired for a certain axle or other part. With the Brinell instrument the hardness number is an absolute value, expressing kilograms per square millimeter which the metal withstood. Table II gives the average hardness number of a few grades of material used for axles.

One property of steel which must be considered is its ductility. Ductility is measured by the amount a steel elongates or stretches before breaking. The more brittle a steel, the less ductility it possesses. A certain amount of ductility is required to make an axle stand up under shocks, and with an increase in hardness the ductility rapidly decreases. This is the reason why, for instance, an axle after heat treatment has to be drawn or tempered. This naturally decreases its hardness; but it has to be done as otherwise the axle would be hard, like glass, and would snap off when running over rail joints or switches.

TABLE II. AVERAGE HARDNESS NUMBER OF DIFFERENT MATERIALS

Material	Hardness Number—Brinell	Hardness Number—Scleroscope
Wrought iron	85	13
Low carbon steel, about 0.08 per cent. C	110	16
Low carbon steel, about 0.20 per cent. C	125	19
Medium carbon steel, about 0.30 per cent. C	150	23
Medium carbon steel, about 0.50 per cent. C	175	27
Nickel steel, 3½ per cent. nickel	200	30
Heat-treated steel	220 to 460	33 to 69

Steel may be considered primarily as an alloy of iron and carbon, and while it always contains impurities which have some influence on its physical

properties, carbon is its most important ingredient and regulates and controls its chief qualities. Pure iron is extremely soft, very ductile and of low tensile strength.

Besides carbon, other elements are sometimes introduced into steel, such as nickel, chromium, vanadium, etc. Such additions are desirable either on account of their deoxidizing power or because they improve the physical properties of the steel. For mine-car use nickel steel is perhaps the best known of these alloys. Nickel imparts to steel a high elastic limit and great toughness under shock.

Structure Is As Important As Analysis

The composition of steel can be determined by chemical analysis, but its structure or anatomy can be ascertained by the use of the microscope. Chemical analysis calls for the complete destruction of the anatomy of the steel; micrographic analysis is based on the anatomy itself. In the microscope a highly effective tool is placed in our hands for observing with our own eyes the structure of the different kinds of steel in their normal condition, as well as to observe the effect of heat treatment and mechanical working, such as cold rolling. Looked at under the microscope, light and dark particles can be distinguished. The light spaces show the crystalline grains of carbonless iron or free ferrite, while the small dark masses contain the carbon in the form of carbide of iron, together with some iron. No pure carbon ordinarily exists in steel in the free state. The dark masses are called perlite. The perlite possesses considerable hardness and is therefore more desirable than the ferrite. On account of its softness the ferrite wears off quite rapidly.

Fig. 1 shows a sample of wrought iron which is representative of the material put into wrought-iron axles. The absence of dark spots proves that there are no more than traces of carbon contained in wrought iron. The dark bands are slag, which gets into the wrought iron during the process of manufacture. The absence of carbon makes wrought iron extremely soft, while the layers of slag cause it to flake off at the journals.

Fig. 2 shows a sample of low-carbon steel which was taken from an axle that failed. This piece of steel contains about 0.10 per cent. carbon. Such an axle will soon become rough at the journals and will rapidly deteriorate. This is exactly what happened in this case.

Fig. 3 shows a sample of steel containing 0.40 per cent. of carbon which was taken from the surface of a hot-rolled steel axle that stood up without excessive wear. The larger percentage of carbon is clearly illustrated by the increased number of dark masses.

Fig. 4 shows how an axle looks which contains the same amount of carbon as that shown in Fig. 3, but which has been subjected to a process of mechanical working, such as cold drawing or cold rolling. This process has broken up the particles and has caused a finer structure, particularly on and near the surface, where the effect of rolling is most pronounced.

A much finer structure than it is possible to secure by mechanical working can be obtained by heat treating. It is a peculiarity of steel that it changes its structure when heated to a certain temperature. When this change is arrested by quick cooling, such as quenching, the fine structure is retained.

Fig. 5 shows a sample of the same axle as shown in Fig. 3, but after heat treatment. The constituents are now so thoroughly intermixed that it is hard to distinguish the individual particles any longer. Such an axle necessarily possesses a considerable degree of hardness, depending chiefly on the amount of carbon.

Inasmuch as the amount of carbon contained in wrought iron and low-carbon steel is negligible, it is obvious that neither wrought iron nor low-carbon steel can be hardened appreciably.

No picture of nickel steel is shown; it would look somewhat similar to Fig. 5. Such steel, with proper heat treatment, is practically a homogeneous mass showing no grain or fiber. It has a somewhat better wearing quality than carbon steel and possesses extraordinary power to resist shocks.

The process of heat treating is quite simple, and comparatively little equipment is needed for the various operations: a furnace, whose temperature can be regulated, a pyrometer for measuring temperatures and a tank with oil for quenching.

An axle with a carbon content of about 0.45 per cent. would, for instance, have to be treated as follows: Heat from 15 to 30 minutes at 1490 to 1510 deg. F., quench in oil, reheat for 30 minutes at 400 deg. F. and cool in air.

Ductility Is Secured By Tempering

The first treatment produces a hardness that would be far too great for mine-car service. The axle is therefore tempered somewhat to obtain sufficient ductility. This is accomplished by the second treatment. The higher the reheating temperature is made the softer the steel will be. A reheating temperature of 400 deg. F. produces a hardness of about 300 Brinell (42.5 scleroscope), while a reheating temperature of 800 deg. F. would produce a hardness of about 25[illegible] Brinell (37.5 scleroscope). Compare this with the hardness of the axle in its original condition, which was about 170 Brinell (26 scleroscope). In other words, the heat treatment has raised the tensile strength of the steel from about 85,000 to about 150,000 lb. per square inch in the first case, and to about 125,000 lb. in the second case. In addition, the particles in the steel have been so thoroughly intermixed as to offer the greatest possible resistance to wear on the journals. A hardness of approximately 250 Brinell has been found ample for the severest requirements of mine-car service.

An axle does not necessarily have to be heat treated throughout its entire length, but only on the points where breakage or wear are most liable to take place, which is on the ends. This method can be successfully carried out with a much smaller heat-treating equipment.

A heat-treated axle, therefore, has quite an advantage over ordinary axles and is desirable for the following reasons:

1. It has many times the strength of an ordinary axle. The chance of bending or breaking in service is comparatively remote.

2. Its ductility, if properly tempered, is sufficiently great to make it withstand the shocks and abuse of ordinary mine service.

3. On account of the thorough intermixing of the carbon with the iron, the wear at the journals is negligible without necessarily causing additional wear in the wheel hubs or bearing boxes.

The advantages to be derived from heat-treated axles for mine cars were not appreciated until a few years ago, when the ever-increasing demand for greater load capacity, for greater speed and quite often for longer trips, set up a demand for better axle material. The advantages arising from their use is well illustrated by the experience of a prominent producing company which stated that "before using heat-treated axles, we sold about a car and a half of scrap axles every year; but since using heat-treated axles we have not sold one in seven years."

Generally speaking, it is preferable to utilize heat-treated axles from the standpoint of ultimate life and freedom from possible failures. But under net loads of from 1 ton to 3½ tons of coal, cold-turned and polished axles of 0.40 to 0.50 per cent. carbon content have been used successfully. The use of the untreated axles must, however, be fully reconciled with the load on the bearing surfaces, as the lack of a suitably hard wearing surface superinduces disastrous wear.

The use of any kind of an axle is an engineering problem that should be submitted to the mine-car manufacturers or other specialists for their approval. Such a course will tend to bring about greater economies in many directions.

Axles Should Be Made of Proper Material

All these qualifications which a successful axle should have apply equally well to mine cars equipped with ordinary plain-bore wheels or boxes, as well as to cars equipped with flexible roller bearings. While the life of axles in connection with plain bearings would be considerably increased if they were made of proper material, a combination of the same axles with flexible roller bearings would last practically forever if reasonably well housed and taken care of. The rollers of these bearings operate directly on the surface of the journals without an extra sleeve, and the axles in such cases have been found neither to bend, break, nor wear down at the journals.

As the advantages of heat-treated, alloy and higher carbon axles are becoming better understood and appreciated, the demand for such axles is rapidly increasing; and several axle manufacturers have installed the equipment necessary to furnish such axles of first-class quality at short notice. As far as the size of the axles—that is, their diameter—is concerned, the following dimensions are generally preferred:

Capacity of Mine Car Tons	Size of Axles at Bearing Seat in Inches Bituminous	Anthracite
1	2	
2	2¼@2½	2⅜
3	2½@2¾	2⅝
4	3	3
5	3	3

In the majority of bituminous mines the bearings are located in the wheel hubs, while in the anthracite region and portions of the bituminous fields it is standard practice to use inside or outside self-aligning journal boxes. In the latter case the axles are usually ¼ in. in diameter, larger in the middle than at the wheel and bearing seats, thereby giving additional strength through increased cross-sectional area.

Central Pennsylvania Miners Go "Over the Top"

The production of coal in central Pennsylvania for the week ended July 13 has exceeded the production for any single week in the history of central Pennsylvania. The officers of the United States Fuel Administration and the Central Pennsylvania Coal Producers' Association are jubilant at the showing made for this period. They state that the figures are beginning to show the results of the campaign to increase the production of coal launched by the Central Pennsylvania Coal Producers' Association several weeks ago.

During the week ended July 13 central Pennsylvania produced 1,327,500 tons of coal. During the week ended July 6, 854,613 tons of coal were produced. This was the week of the Fourth of July. The week ended June 29 was a full week. The production was 1,142,420 tons, or an increase over the week ended June 29 of 185,080 tons. In this manner the miners are attesting their loyalty and patriotism to their country.

Central Pennsylvania being one of the most important fields in the United States, this increase in production of coal will be heartily welcomed by the United States Fuel Administration officials at Washington.

Rembrandt Peale, of the United States Fuel Administration, on a recent visit to Altoona, stated that it is the wish of the United States Fuel Administration that the mining towns, if possible, hold all their celebrations of the great victories of the American and French armies over the German armies in the evening, to the end that the production of coal may not be hindered at this most vital moment of the war and that the armies in the field may be kept in the supplies, guns and munitions necessary to continue the offensive to its conclusion —the absolute and complete defeat of the German armies. In other words, celebrate by increasing production rather than by cheers.

The splendid coöperation of the international officials of the United Mine Workers of America, President Frank J. Hayes, Vice President John L. Lewis, together with many district and local officers of that organization, is chiefly responsible for the wonderful showing, and where the miners and operators have not taken up this proposition seriously this showing should be an inspiration to them of what can be accomplished and their duty in the premises.

The Central Pennsylvania Coal Producers' Association states that the goal set for central Pennsylvania, namely 1,300,000 tons production per week, has been exceeded and the figures raised to 1,400,000 tons.

Teamwork Between the Engineer with his theoretical training and the mine foreman with his practical experience would obtain the maximum success. In a great many cases the success or failure of the mine hangs on the teamwork of these two men. Ofttimes the engineer looks down on the suggestions of the mine foreman, thinking his lack of theory does not give him the proper view of the situation, while the mine foreman thinks the engineer too theoretical. The engineer should temper his theory with the mine foreman's practicability, and vice versa, to obtain the best results.

BOOK REVIEWS

A Comprehensive Work on Mining

MINING ENGINEER'S HANDBOOK—Written by a staff of specialists under the editorship of Robert Peele, Professor of Mining Engineering in the School of Mines, Columbia University. Pages X + 2307 + 98 index; 4½ x 7¼ in.; adequately illustrated. John Wiley and Sons, Inc., 432 Fourth Ave., New York City, publishers. Flexible Fabrikoid binding. Price $5 net.

In quality and quantity of material, "Peele's Mining Engineer's Handbook" stands probably first among all the books on mining in general, especially technically and in relation to metal-mining costs. It is a worthy companion of the handbooks of Trautwine, Merriman, Fowle, Kent, Marks and Kidder, in kindred engineering fields. Its aim is, of course, to cover every phase of mining. Coal receives a place somewhat larger than that afforded other minerals, but not the place which would be given to it, of course, in a volume with a less extensive scope.

However, after all, the differentiation between the work in the coal mining and other fields has been largely the cause of the slow advance in both. There are so many likenesses between metal mining and coal mining that we cannot conceive anything which would make more definitely for scientific progress than for engineers in the two branches to replace one another for a few years.

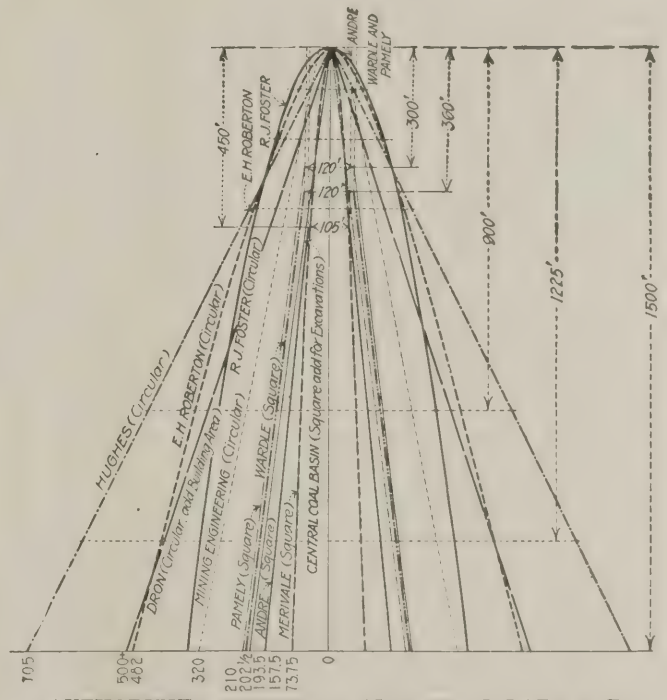
The engineers of each form of mineral are separated locally and industrially. They solve their problems separately. They resolutely contend that the solution of a problem in one line of work would be impossible in another line. They rarely study one another's methods and problems. A book like the one under consideration brings the two realms of mining together. Wider apart than two separate nations in their methods of work, here is a chance for one to learn from the other.

When one looks at the 2307 pages of fine typed material —for there is that number without the index—when one notes how important are all the subjects treated and how condensed is their treatment, one feels little disposed to regret that something is omitted. No one will contend that "Geological and Mineral Deposits," so ably reviewed by J. F. Kemp, professor of geology at Columbia University, did not deserve many more pages than forty, of which coal itself has but two or three. There is room, however, for little more than general principles, and the reader may be assured that what is spared in this department gives space to strengthen all the rest. After all, geology is so varied as to be local, and to study it rightly one must have a local interpreter.

The principles of earth excavation, explosives, rock excavation, tunneling, shaft-sinking, boring and even prospecting, development and exploitation of mineral deposits are more general. They have an appeal as universal as mining. If any systems are peculiar to any one industry—and they are good systems—there is some reason to believe that it is a reflection on the progress of coal mining or some other form of mining that they have not been introduced there under the special conditions likely to be favorable to their use.

The traditions of mining are hard to break. They are the outcome of special environments, conditions and sociological necessities, and being long established they rule us and not we them. We put new men into the field, but we first train them into the ways of the region and into the system of the special branch of the industry to be entered. Eventually, these would-be innovators become obsessed with the fear of the past. They hesitate to break the tradition by following the lead of men in another branch of the industry or in another field, even when they recognize that the men in these other fields are facing similar problems. Other matters treated in Peele's handbook and having a somewhat common application to all forms of mining are underground transport, hoisting plants, shaft pockets and ore bins, mine drainage and ventilation, compressed-air plants and electric power for mine service.

Much has coal mining done to improve transport in metal mining, and in return shaft pockets that originated in the metal mines are now almost the latest thing in coal mining. Many coal operators are already wondering if the mine car has to be hoisted on a moving scaffold to the dump when a skip will do the work as well and a pocket will aid to make the work continuous, and some are not only wondering, but are preparing to hoist in skips. In recalling the indebtedness of the two branches of the service to one another, it may be noted that ventilation has almost been invented and patented by the coal mine. The metal mines hung far behind, as if they did not want to infringe. Even the flexible conduit as a mine device came to light in the coal mines, but it appears to have had its most wonderful development in the metal-mining industry, due largely to



AUTHORITIES DIFFER ON SIZE OF PILLARS FOR VARYING SHAFT DEPTHS

the lack of due appreciation in the industry which first welcomed it and for which it has an almost unlimitable field of usefulness.

Other sections of the handbook being reviewed cover surface and underground surveying, mine geological maps and models, mine organization and accounts, mining costs, wages and welfare, mine air, hygiene, explosives and accidents, mining law, mine examinations, valuations and reports, aërial tramways and cableways, mechanical conveyors, ore dressing and sampling, assaying, ore testing, purchasing and treatment, gold amalgamation and cyanidation, mathematics and mechanics, chemical notes and tables, hydraulics, engineering thermodynamics, steam engines, boilers, pumps, turbines, gas engines and accessories, electric engineering, structural design, mineralogy and tables.

Purposely we have omitted the preparation and storing of anthracite "coal" by Paul Sterling and the preparation and the storing of bituminous coal by H. McKean Conner, both interesting presentations of the problems presented.

Protest may be made against the persistence with which A. M. Bateman in this volume, and other writers in other places, have clung to the questionable theories of subsidence promulgated by earlier writers. A little concession is found in the illustration 548, on page 738, but how futile it is to put the tensile stresses at the edge of the pillar. If the pillar gives at its edge (and what pillars will not do so?), pillar and roof will remain in contact, the pillars rounding to conform with the undulations in the roof. The main bend, and therefore the tension, will be back over the pillar and not at its edge. True we have to the contrary the illustrations of "main break" and "after break" perpetrated by the unimaginative Hausse (see Fig. 559), and the illustration of fracture normal to bedding of Callon (see Fig. 560). But sometimes it is impossible to bow to authority however profound.

Nothing is said about real arching and doming in the pages on subsidence. The only reference to be found is to the pseudo-arches of the early textbooks. Mysterious indeed is the disposition to ascribe to the roof of the underworld laws peculiar to itself. As in the days of Kirchner, theorists can imagine anything in a mine. But after all the roof after being separated from the top of the coal seam is an elastic beam, or rather plate, and this when broken forms an arch, or rather a dome. That the marvelous sketches on pages 732 and 743 can still find their way into scientific treatises shows how a subject not yet looked upon as economic and therefore vital to business success can continue to be misunderstood.

It may be added that Fig. 562, on shaft pillars, is full of errors both of scale and fact. Moreover, part of it is based on an assumption of coal thickness which assumption is not stated. The subsidence pages are merely digests of the well-known Young and Stoek bulletin on that subject. Our illustration on the preceding page shows a diagram of the shaft pillars proposed by the various authorities for different shaft depths. It is based, where the coal thickness is regarded as a factor, on a seam 9 ft. thick.

Key to Recent Engineering Literature

ENGINEERING INDEX FOR 1917—Compiled from the Engineering Index, published monthly in "Industrial Management" during 1917. Pp. 360. 6½ x 9½ in.; no illustrations. The Engineering Magazine Co., 6 East 39th St., New York City, publishers. Cloth boards. Price, $3.

Engineers rarely see more than just a few journals and technical publications, and so a great deal of engineering development passes them unnoticed. Moreover, the articles that they glance over and regard as unimportant today may seem tomorrow indispensable to fill needs that have changed. In consequence, all engineers must depend on the work of the patient cataloguer, who keeps them in touch with the advances of the times and tells them just where they can read about the progress of any special line of engineering endeavor.

To those who live where libraries are not (and most mining engineers are thus circumstanced) there is always the opportunity of getting articles photostated and translated at a reasonable figure by the library in the Engineering Societies' Building, 29 West 39th Street, New York City. Service such as this makes a book like the "Engineering Index" extremely valuable. Just at present left-over copies are not numerous, and the collector of such copies for resale is perhaps not over-stocked; but still there are a few such men and their services can be drawn upon at a figure that discounts even the photostat. For this reason, it is interesting to note that, as far as is possible, the Engineering Magazine Co. is prepared to perform this service to the great advantage of industry.

The Index classifies the articles on current technical literature appearing in some 25 publications published by 17 nations and colonies and in six languages. About three-fourths of these journals are printed in English, the others being principally French, Spanish, Italian and Dutch. There are no German references, except as found in a Zurich paper, the *Schweizerische Bauzeitung*.

Many of us seeking enlightenment are asking our neighbors where we can get information. This volume gives, for the year 1917, complete and ready answers to our questions.

Developments of the Granby Consolidated Mining and Smelting Co. on Vancouver Island

By R. Dunn
Victoria, B. C.

In view of the position in which the Granby Consolidated Mining and Smelting Co., Nanaimo, B. C., finds itself through the Dominion government's attitude on the settlers' rights issue, it is interesting to show what it has done on the coal lands the title to which now seems doubtful.

A standard-gage railway has been built to the mine site, a distance of a mile. Part of this has been laid through sandstone rock, necessitating heavy cuts at places. At the end of the spur the necessary grading for the different tracks at the mine yard is completed and some of the tracks have been laid. A temporary tipple has been constructed at the mine yard, a little to one side of where the main tipple will be erected, and all preparations are complete for the shipment of coal at any moment. Some 700 tons is lying at the mine mouth for shipment.

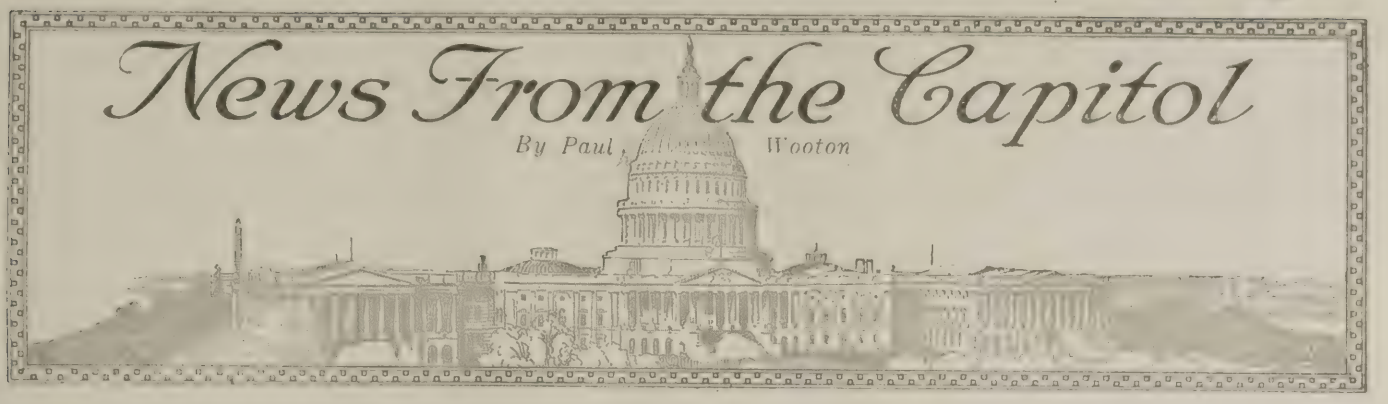
Fifty acres of land have been cleared and graded for mine buildings and dwellings to accommodate employees. Nineteen substantial dwelling houses are under construction and almost completed, and foundations are in for a large number of permanent mine buildings including office, messhouse, store, lamphouse, etc.

A good substantial saw-mill has been erected capable of turning out 12,000 ft. per day. A large brick smokestack and foundations for two 250-hp. boilers have been completed and two Stirling water-tube boilers are on the ground ready for installation. Three slopes are in course of being driven. The slope for the manway is now down a distance of 196 ft., and at the face the coal is 11 ft. in thickness and of good quality.

At a point 175 ft. down a level has been driven to the right at right angles to the line of the slope, and places are being driven back from the level to connect with the other two slopes which are being driven from the surface. This level has been driven in a seam which averages 11 ft. in thickness, so that it may be said that all three slopes have 11 ft. of coal at the faces.

Three hundred thousand dollars have been spent to date on this development, and the mine will be ready to ship 300 tons a day within two months and by the end of the year should be producing 700 to 800 tons daily. When the investment at the mines is added to that at Anyox, the company's smelter center, where by-product coke ovens are being installed, it will total in the neighborhood of $1,000,000.

In most of the common types of mechanical stokers the distillation of volatile matter occurs in the presence of oxygen, whereas in hand-fired furnaces the distillation takes place in almost entire absence of oxygen, all of the latter being consumed as it passes through the fuel bed. Even if there should be some tendency to decomposition with the mechanical stokers, the presence of large percentages of oxygen at the point of distillation makes it possible for the hydrocarbons to react with oxygen before the deposition of carbon can really take place.—*Bureau of Mines Bulletin No. 135.*



Weekly Production Statistics

Production figures for the week ended July 20 are as follows: Bituminous, 12,956,000 tons; anthracite shipments, 40,664 cars; beehive coke, 668,000 tons; byproduct coke, 567,500 tons.

While bituminous coal production fell 2.4 per cent. below that of the record accomplishment of the week ended July 13, it came as no surprise. It was known in advance that it would be improbable that so heavy a production could be duplicated during the succeeding week. The production, however, looks especially good when compared with the 11,230,000 tons for the corresponding week of last year.

Anthracite forwardings slumped 4.3 per cent. and with the exception of the week which included July 4 went lower than at any time for many weeks.

While beehive coke production decreased slightly during the week ended July 20 the rate of production in the Pennsylvania districts remained practically the same with labor shortage forming the only retarding factor of importance. The car situation has a negligible bearing on production at this time.

Byproduct coke production continues to climb slowly into new high records. The byproduct ovens of the country were operated at 91.2 per cent. of full time capacity during the week ended July 20. If plant repair could be obviated, this industry could be operated at the present time at 95 or 96 per cent. of full time capacity.

Bunker Coal

Further steps were taken last week by the Fuel Administration to improve the quality of coal for the use of ships in the Atlantic and the Gulf trades. The Tug River field of West Virginia has been designated as a field separate from the Pocahontas field. All coal originating in the Pocahontas, New River and Tug River fields, which may be classified by the Tidewater Coal Exchange for consignment to pool No. 1 or pool No. 2 at Hampton Roads, will be admitted as permissible bunker fuel. Coal in pool No. 44 at Hampton Roads also has been specified as permissible for bunker use. At New York, Philadelphia and Baltimore, coal from mines on the Navy's list, which classifies for pool No. 1, when not mixed with coal from any other pool, is to be used for overseas trade. Coal for that purpose also will be drawn from mines on the Pennsylvania, the Baltimore and Ohio, the Western Maryland and their connecting lines which take pool No. 9, when not mixed with coal from any other pool. Coal from the New York Central and connecting lines classified for pool No. 4 or pool No. 10, as well as coal from the Pennsylvania, the Baltimore and Ohio, for consignment to pool No. 10 as well as pool No. 1 and pool No. 9, is admitted for coastwise trade.

No slack or sizes smaller than mine run may be accepted for bunkering purposes except by special permission by the Fuel Administration.

Bituminous Supplants Anthracite

More than 200,000 tons of anthracite have been stricken from Army requirements for posts, camps and cantonments, as a result of the activities of the fuel and forage division of the Quartermaster Corps. The anthracite has been substituted by bituminous coal and coke, which is available much nearer by. As a result, a saving of 33,000,000 ton-miles has been effected. The Army appropriation has been saved $300,000 in the cost of the coal and $200,000 in the cost of its transportation, to say nothing of the advantages which have come by releasing so large a tonnage for domestic consumption and by saving railroad transportation for other purposes.

Pushing Production

James B. Neale, director of production for the United States Fuel Administration, is encouraged greatly by the success which is attending his campaign for greater production. The work is rapidly being reduced to a systematic endeavor.

At each mine a production committee of six is to be appointed. Three representatives of the mine workers and three of the management will comprise this committee. The committee will do all in its power to spur production to its maximum. These production committees act under the immediate direction of a production chief who will be appointed in each fuel administration district.

Mr. Neale is preparing a letter setting forth some of the more important features of the campaign. He will make it clear that there are plenty of workers to send the coal production to unprecedented amounts, despite the draft, if each miner will work eight hours a day and six days a week. He will also point out that there are many ways in which the operators must do their part.

Mr. Neale points to the achievement of southwestern Virginia as an indication as to what can be done. That district during the week ended July 13 operated at 94 per cent. of its full time capacity. During that week it produced 193,626 tons, which was the greatest weekly

production in the history of the field. Increased labor efficiency was largely responsible for the showing which was made.

Another example of a practical outgrowth of the campaign is the return at the mines of the Mercer Iron and Coal Co. at Stoneboro, Penn., of 150 miners, who had retired from active work as a result of having passed the age limit. These men again are actively mining coal and are enthusiastic over the fact that they are having an opportunity to contribute directly to the winning of the war.

Ralph D. Paine, a writer of national reputation, has been drafted by Mr. Neale to assist in the production campaign.

Smokeless Price Adjustments

Brokers' commissions continue to be one of the most active matters under study at the Fuel Administration. This was the subject of conference last week between Fuel Administration officials and smokeless operators from West Virginia. Price adjustments in the Pocahontas, New River and Tug River fields also were discussed. At present there are nine prices applying on the coals originating in the smokeless area. When the different grades and different allowances and the commissions are considered, there are 48 different prices on the existing schedule. A means of simplifying this schedule is under consideration, but it is probable that no new plan will be announced until the smokeless operators have been given an opportunity to complete new cost sheets which are being compiled.

Brief Washington Notes

Prices covering anthracite mined in Virginia have been announced as follows: Egg, $5.40; stove, $5.75; nut, $5.75; pea, $4.60; buckwheat, $1.55; culm, 90c.; briquettes, $5.30. The prices are subject to a general reduction of 30c. until Sept. 1.

Coke from beehive or byproduct ovens screened and cleaned for domestic purposes, in mixed sizes, is to take a price $1 less than that fixed for selected foundry coke. This schedule was made necessary by the recent rise of the practice of screening and cleaning breeze piles.

While Lake shipments are far from being in as bad shape as they were last year, it has been found necessary to take special steps to expedite the movement of coal for the Northwest. All district representatives interested have been instructed to give preference to Lake shipments. Of course railroad fuel and coal for byproduct and gas uses move ahead of the fuel destined to the Northwest.

In the hope that the delay may be reduced in securing priority orders for coal mine supplies, Roy A. Rainey, of New York, and David D. Bush, of Chicago, have been placed in charge of a bureau which will look after this matter carefully. The work will be done in conjunction with the priorities section of the War Industries Board.

While the section of the Federal Trade Commission charged with determining the cost of coal production has been transferred by executive order to the Fuel Administration, this in no way interferes with the power of the Federal Trade Commission to make investigations and inquiries along the same line. As a result, the Commission now is launching a new inquiry into the cost of coal production to ascertain if profiteering or irregular trade practices exist.

Five cents per ton may be added to the price of run-of-mine, ten cents to prepared sizes and fifty cents to slack if the coal is thoroughly clean. To get the increase, a special permit must be secured from the Fuel Administrator.

Peat Industry Breaks Record

The peat industry in the United States was prosperous in 1917, for the quantity of peat sold exceeded that sold in any preceding year. According to statistics compiled by C. C. Osbon, of the United States Geological Survey, Department of the Interior, the peat sold in 1917 amounted to 97,363 short tons, a quantity greater by 44,857 tons, or about 85 per cent., than that sold in 1916, and by 42,220 tons, or nearly 77 per cent., than the record annual sales, 55,143 tons, established in 1911.

The average price received for peat in 1917 at the point of consumption was a little more than $7.29 a ton, and the gross market value of the output was $709,900, a gain over 1916 of 26c. in average price per ton, and of $340,796, or about 92 per cent., in market value.

The following table shows by years the output and value of peat marketed from bogs in the United States each year since 1908:

PEAT SOLD IN THE UNITED STATES, 1908–1917

Year	Quantity (Short Tons)	Value
1908	*24,800	*$136,610
1909	29,167	127,042
1910	37,024	140,209
1911	55,143	272,114
1912	47,380	228,572
1913	33,260	197,200
1914	47,093	309,692
1915	42,284	288,537
1916	52,506	369,104
1917	97,363	709,900

* Estimated.

The total number of plants producing peat in the United States in 1917 was 18, an increase of five over 1916. All the producers operating in 1916 except two contributed to the output in 1917, and seven companies that were not represented in that year reported commercial production. Many new companies were organized in 1917 that did not complete their plants in time to contribute to the year's output. The plants known to be at work in 1917 were distributed as follows: California, 2; Florida, 2; Illinois, 2; Indiana, 1; Massachusetts, 1; New Jersey, 5; New York, 3; Pennsylvania, 1; and Virginia, 1.

All the producers reported that the demand for peat exceeded the supply, and some stated that, on account of railroad embargoes and the scarcity of labor, they were unable to meet the demands of their regular customers. Improvements designed to increase production in 1918 were made to substantially all the peat plants operated in 1917.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

Dr. Garfield was much heartened by the wonderful response of the mine workers to the appeals of the Fuel Administration for steadier work and larger output. He said that the passing of the 13,000,000 ton mark on the week ending July 13 would warrant the giving of a service stripe to everyone of those taking part in the production of that tonnage. The output in the corresponding week of the year before was 1,479,000 lower. Unfortunately the output of the week ending July 20 was 300,000 tons less than in the week before, though car shortage was only 3.9 and labor shortage 4.2 per cent.

The Fuel Administrator has created a Bureau of Labor which will be charged with the settlement of controversies between coal miners and operators for the period of the war. This is not a radical departure, but it marks the final decision to let mine-labor problems be settled by a Fuel Administration board and not by the War Policies Board of the Department of Labor.

LABOR DISPUTES TO BE SETTLED BY COAL MEN

John P. White, the former president of the United Mine Workers of America, and Rembrandt Peale, a coal operator of central Pennsylvania, are named joint heads of the bureau. Probably no duties different from those they have been recently performing on behalf of the Fuel Administration will be given them. The announcement of the decision to establish the bureau is dated July 23.

Michael Washko's death in the Beaver Meadow Colliery made it necessary for the Lehigh Valley Coal Co. to announce its intention to stand by the *extra vires* declaration of the Anthracite Conciliation Board. That company promptly announced its intention to pay the $150 to the family of the deceased and to comply with the other terms of the dictum relative to the funerals of men killed in the mines. The Brookside colliery of the Philadelphia & Reading Coal and Iron Co. also had a death, but for the first time for many years work continued as usual.

It has always been a cardinal feature of the United Mine Workers of America to keep such persons as are engaged in the selling of intoxicating liquors from membership in the union. When the latest button drive was made in district No. 9 a half dozen saloon keepers who work in the mines were, in accordance with Article 14, Section 2, page 3b, refused buttons on making application for them. The Liquor Dealers' Association has made a complaint, but the by-laws are fixed. The saloon keepers will have to leave the union, and without union membership they cannot work in the mines. The companies in District No. 9 are unofficially urging their men to continue "buttoned up."

MEN AT GREENWOOD COLLIERY RETURN TO WORK

On Saturday, July 20, the Greenwood Colliery mine workers returned to work, agreeing to leave their grievances to the action of the officers of District No. 1. If these officials cannot get a settlement, then the matter will be brought before the Conciliation Board. The Greenwood miners are said to be getting $3.83 per day, whereas other company miners are getting $4.25. If this is a fact an evening up is desirable even though it is clear that the contract does not call for it. No concern can get and keep desirable men if it pays less than the current wage. Mines with less than the usual scale gather, as a rule, all the undesirable men in the community and keep them discontented. The best men are none too good for successful operation, and every concern should seek to have men of at least average quality.

Petty strikes recently occurred at the mines of the Lehigh Coal and Navigation Co., which operates in the Panther Creek Valley, but they have been settled. A strike at the No. 4 colliery of the Lehigh and Wilkes-Barre Coal Co. was soon ended, work being resumed on July 22. Apparently it was a button strike. The men who refused to pay their union dues were aliens, and they were accused of pro-Germanism. They have now left the district.

The men of the Carleton Coal Co. near Dunmore, Penn., a suburb of Scranton, went on strike Friday, July 19, to protest against an increase in the price of house coal. On Saturday the men were confronted with a bulletin reading, "This colliery will be idle until further notice." This notice was soon removed and another replaced it naming Monday as the day of resumption. The men returned to work Monday but they purposed to meet again to discuss the matter Thursday. They threatened that if at that time they were not, or had not been informed of a restoration of the former price they would go on strike again. About 90 men were involved.

The employees of the Lehigh Valley Coal Co. have been talking of striking in the event that the company does not speedily supply their bins with coal. The Lehigh company decided July 25 to give the mine workers the preference in deliveries and to stop all local sales of fuel except those to its own men. The company and local haulers are now busy filling the mine workers' orders.

The Hazleton draft board has decided that it would not regard stenographers and clerks in the purchasing departments of coal companies as essential employees or give them deferred classification in the draft. Howard Zullick, who was engaged by Pardee Brothers & Company in this capacity was the man refused such classification. Edward V. Summers was also refused deferred classification by the Ironton (Ohio) board, which so notified the Hazleton authorities. It had been represented that he was an essential employee of the Cranberry Creek Coal Co., Hazleton, Pennsylvania.

NOT ABLE TO FIGHT, VETERANS GO BACK TO MINES

In central Pennsylvania efforts still continue to induce every man to sign a pledge card to do his best during the continuance of the war. A new source of labor has been unearthed near Stoneboro, Mercer County, Pennsylvania. Stoneboro lies on the edge of the coal field. It is one of the time-honored fields of the state like the Huntingdon and Broad Top region and the Tioga County field. It has a lot of hard-headed Scotch and English miners, who made money by patient, steady work and bought homes. When they reached competency and declining years they left the mines, the coal being high grade, but thin, and somewhat hard to mine.

The call "More coal, more coal" has brought these miners back to the mines to the number of about 150. They have mined so far about 4000 tons and expect to mine 500,000 tons a year. So far the coal is being stacked waiting for railroad communications. The mine will be worked by the Mercer Iron and Coal Co. The spirit of these veterans of the pick is admirable and their example should be followed throughout the mining regions.

At the Pipe Creek mine of the A. J. Morgan Coal Co., in the Belmont field of Ohio the mine workers were idle for two days fearing that pro-Germans would blow up or otherwise injure the mine and its occupants. Twice the mine workers saw strangers lurking near the mine before the whistle blew. Vice President Ledvinka of the United Mine Workers of America with a committee of the employees searched the mine thoroughly but found no evidence of an intruder, so the men returned to work.

In Tennessee, W. E. Myer, the state fuel administrator,

has been much troubled by the threat of a strike at the mines of the Battle Creek Coal and Coke Co., Orme, Tenn. The mine lies near the southwestern end of the Tennessee coal field in Marion County not far from Chattanooga, and where the narrow lens of coal is about to enter Alabama. The men claim they are not getting as much as mine workers in other places. Rembrandt Peale is to act as arbitrator. About 150 men are employed at the Orme mines. As soon, however, as the fuel administrator had made his plea and proposition they decided to keep at work.

In Kansas, 50 foreigners are endeavoring to stop operations in the important Cherokee field, according to word received by Governor Capper from Sheriff Bob Frazier.

Hecla Company Gives Service Medal

By W. L. Affelder

General Manager Hecla Coal and Coke Co., Oliver Building, Pittsburgh, Penn.

The man who stayed at home and did not do his utmost toward helping his comrade who had gone to war will have many unpleasant questions to answer when the war is won and the maimed and crippled soldiers return; but the stay-at-home who did his utmost to supply the necessary sinews of war need have no misgivings.

In order to promote a feeling of pride for duty well and faithfully done among the two thousand employees of the Hecla Coal & Coke Co., of Pittsburgh, Penn., I have devised an Honor Medal for Industrial Soldiers, which is illustrated herewith. A notice printed in five languages—English, Italian, Slovak, Hungarian and Italian—was distributed among the men, and it fully explains the way in which the medals and bars are to be used. The alternation in colors of the bars—silver-plated and bronze—is not really essential, but it enables a person to see at a glance whether or not a man's string of bars is uniformly continuous; whereas, if all bars were of the same color, the omission of a month would not be so readily noticeable. The notice and medal are reproduced below:

"Beginning with the month of July, we will give to each outside or inside employee a medal like the one shown in the illustration, with a bar bearing the date of the month in which he first works every day. For each month that he works every day a bar, engraved with the proper date, will be added. When your buddies come back from the war, you will be able to show them by your badge and monthly bars that you have helped to win the war by working every day. The war cannot be won without coal and coke. You can be of just as great service toward winning the war by working every day as an "Industrial Soldier" at our mines and coke plants as by fighting in Europe.



"Remember that the soldiers do not lay off on account of drinking and holidays. Show them by your badge that you were as good a soldier as they were. If you do not win a medal in July, be sure to get one in August. Then be sure to get a new bar each month." The design of the medal has been patented, but both the medals and easily attached bars can be obtained from the Mine Safety Appliances Co., of Pittsburgh, Penn.

We Will Settle Our Own Disputes

At a recent conference held in the city of Washington, D. C., between the United States Fuel Administrator, Harry A. Garfield, and the international officials of the United Mine Workers of America, a complete understanding was reached whereby all questions pertaining to labor in the coal-mining industry will remain under the jurisidiction of the United States Fuel Administrator. This is in accordance with an understanding previously reached between the Secretary of Labor and the Fuel Administrator.

In order that this arrangement may be made effective, the United States Fuel Administrator has created a Bureau of Labor, to which all matters relating to labor controversies will be referred for settlement. He has appointed John P. White, former president of the United Mine Workers of America, and Rembrandt Peale, a coal operator of Central Pennsylvania, joint heads of this bureau, with power as his deputies to consider and dispose of all labor matters relating to the coal-mining industry which would come in the ordinary course of business before the Fuel Administration, the decisions to be made being subject to the procedure prescribed in existing joint agreements.

The following statement of principles was made by H. A. Garfield, United States Fuel Administrator, at conferences at which were present Frank J. Hayes, president, John L. Lewis, vice president, William Green, secretary and treasurer of the United Mine Workers of America, and also John P. White and Rembrandt Peale of the Fuel Administration, all of whom acquiesced in the statement as expressing their understanding of the principles followed by the United States Fuel Administration and by the United Mine Workers in settling questions relating to labor in the coal-mining industry, it being understood that wherever the Federal Government is called upon to intervene or of its own motion intervenes in the settlement of such questions, whether in organized or unorganized fields, jurisdiction shall remain for the present and until otherwise arranged in the hands of the Fuel Administrator.

"The United States Fuel Administrator understands

(a) That no strike shall take place pending the settlement of any controversy until the dispute has been reviewed and decided by him.

(b) That recognition of the unions shall not be exacted during the continuance of the war except where now recognized by collective bargaining.

(c) That where, by joint contract between employer and employed, machinery is provided for the settlement of controversies, the United States Fuel Administrator shall not be required to intervene or to mediate until such means have been invoked and the remedy exhausted without reaching adjustment.

(d)) That where the United States Fuel Administrator intervenes, substantially, the principles, provisions and practices laid down in the Maryland and Upper Potomac Settlement of May 6, 1918, shall be accepted by the workers and employers and their chosen representatives as sufficient.

(e) On the basis of the foregoing understanding, which he regards as just and imperative in the present crisis, the United States Fuel Administrator has insisted and will continue to insist that any adjustment of labor questions in the coal-mining industry, whether by joint agreement between operators and mine workers or by agreements severally made with the United States Fuel Administrator, shall embody wherever applicable, and substantially, the principles, provisions and practices laid down in the Maryland and Upper Potomac Settlement of May 6, 1918, and recognizes the authority of the International Union of Mine Workers (sic) in the organized fields and their jurisdiction over controversies arising in said fields. More specifically, the United States Fuel Administrator has insisted and will continue to insist on all such settlements.

(a) That employers will be required to relinquish the right to discharge employees because of affiliation with labor unions.

(b) That employers will be required to recognize the right of their employees to organize by peaceful methods that do not interrupt production.

(c) That the so-called automatic penalty clause now in force, being regarded by mine workers as a cardinal principle of collective bargaining during the continuance of the war, will be included in all agreements as a condition precedent to the allowance of increased price permitted to operators.

(d) That where the union shop now exists, the same shall continue, and where union and nonunion men work together, the continuance of such condition shall not be deemed a grievance."

Exemption of West Virginia Miners

The production of high-grade coal such as West Virginia produces has caused the Provost Marshal-General to take action to prevent a depletion in the ranks of the mine workers. Local draft boards of the state have been given authority under the selective service regulations to exempt miners, and according to an announcement from the office of the Provost Marshal-General diggers of coal can now be placed in a deferred class.

The draft has demoralized the coal industry of the whole state, but especially of the southern half. Coal operators have hesitated to interest themselves in seeking the exemption of mine workers both for the broadest patriotic reasons as well from a desire to avoid even the appearance of interfering with the free action of their mine workers. They felt, however, that it was most important to get out coal and that it could not be mined and loaded without men.

It is now decided that in the future men employed in and about the coal mines of West Virginia will not be accepted for service in the army.

Major Stuart, of Huntington, in charge of recruiting for the army in West Virginia, received instructions from the War Department July 23 to discontinue all recruiting activities in the coal-mining regions and to scrutinize closely enlistment applications filed by mine workers. The following is a copy of the telegram Major Stuart received:

"It is reported essential coal workers being enlisted. Direct all your parties cease activities at once in or about coal-producing centers. Exercise greatest care in accepting any applicants who have been in any way connected with output of coal. Each case of a man who claims to have severed connections with such occupation with a coal company with no intention of resuming connections with such occupation must be carefully investigated by communication with former employer, and if it appears that the applicant has recently left such employ without the consent of the employer he should be rejected. The coal industry must not be interfered with through enlistment."

Reports received here from the coal-mining centers are to the effect that a number of miners are not working regularly and Major Stuart is making an investigation.

Operators and Men To Work Together*

By JAMES B. NEALE

Director of Production of the United States Fuel Administration

During the past month I have had interviews with and have received letters from many coal operators and labor leaders, and, as a result, I am firmly convinced that sufficient coal can be produced by the men, the development and the equipment now available, provided every man and boy from the highest official to the smallest trapper will put forth his very best effort. The operators and their staffs alone cannot do it; nor can the mine worker alone achieve it. It can only be done by the coöperation of both parties in interest, working hand in hand with grim determination to rid the country of the coal shortage, which may be confidently regarded as the greatest menace we face in the winning of the war.

The operators must work as they have never worked before. They must be in and about their mines, thus showing in a way which can be seen their deep interest in the Government's determination for increased tonnage. They must take up with their superintendents and mine bosses questions of efficiency and working conditions so that the best opportunities may be afforded to the workers. I am confident that much benefit will come if the operators themselves and their superintendents will keep inquiring of the mine bosses in regard to what can be done in order that the mine workers may produce more coal. The operator must take away from the mine workers every excuse for days absent or short-hours worked. The miners cannot work if pit cars are not furnished, if the miners are gassed out, if the colliery is wanting timber, etc. These small details must now assume large proportions and must be looked after with the greatest care.

The mine worker must report for work each day and must actually work his full eight hours and produce more coal than ever before. The mine worker is much more likely to do this if he sees that the mine management is making almost superhuman effort to enable him to work day after day under the best possible conditions. There is no doubt that in very many cases the miner has lost many days and has frequently worked short hours. This has caused a great loss of production. But, at the same time, there is also no doubt but what a large tonnage has been lost by the carelessness and inefficiency of the mine management.

This country is facing an exceedingly serious crisis. Increased coal production is absolutely necessary to success. The winning of the war then lies with coal operators and coal miners. There are two powerful controlling elements and one cannot work separate and distinct from the other. One element is the man power and the other is the owners, managers and superintendents. I am sure it will be an inspiration to the mine workers to see the operators with their coats off. The men about the mines should know the big boss. The director of a coal mine who does not direct is a menace to the country at this time. No matter how earnest a pit boss may be the edge is taken off his service when he sees that those above him are not interested.

The coal operator must not pass the buck to the men. Don't lay the blame altogether on the mine workers. Don't think things are just right and let it go at that—look into your operating conditions. Lots of days have been lost by mine workers for which they were not responsible. Results we must have and in such a crisis nothing is too petty to receive the personal attention of the mine owner.

*Abstract of address to Fairmont Country Club, but summarizing also some remarks made to a representative of "Coal Age."



PRAISED FOR THEIR EFFORTS, FAIRMONT OPERATORS ARE TOLD TO HELP THEIR MINERS PRODUCE COAL

EDITORIALS

Size of Shaft Pillars in Mines

A GLANCE at the many empirical rules now being used for the determination of the size of shaft pillars is enough to convince anyone that no considerable progress has been made in the science of roof breakage and subsidence. All we have learned is that somehow, when coal is extracted, the roof over the undisturbed mineral suffers with the roof over the disturbed mineral. That is something, of course. In fact it is much, because it lays entirely aside the assumptions that the roof breaks between the pillars or arches between them, or again chokes up tight because loosely piled fragments occupy a larger volume than unbroken measures. When we realize that the strata surrounding the shaft are mysteriously pulled apart by the destruction taking place around them, we part with all belief that the principle of shear explains roof failure.

Something, therefore, has been learned even if the formulas based on depth and coal thickness are not just exactly reliable; even though one authority insists on a pillar with about 100 times as many square feet as seems necessary to another; and even though Merivale would have the pillar for an 1800-ft. shaft only 165 ft. square, whereas Hughes demands one 1800 ft. in diameter.

Imagine the roof of the mine as a plate of iron. When it bends over the shaft pillar the point of maximum tensile stress will be over the heart of the shaft pillar, which is usually the location of the shaft. This will be the case unless the stiffness of the roof is insufficient to enable the iron to bend in a common arch over the shaft pillar. When the roof is weak, or the pillar large, the iron may sag in the center and form two folds over the pillar. Let us term the single arch an "anticline" and the dip into the excavated area a "syncline." The anticline may be as broad as the synclines on either side, provided the shaft pillar is wide enough to accommodate it. But if the pillar is too broad, there will be a sag on the top of the shaft pillar. The maximum breadth of the syncline is, of course, determined by the strength of the roof; in other words, its breadth depends on the number of feet that will stand unsupported. The size of the anticline is similarly determined, unless the pillar is smaller than the syncline. A shaft pillar just as wide, or less wide, than the breaking span of the syncline will tend to fracture on the top of the anticline or at the shaft location. Thus, if you want to protect the shaft, make its diameter larger than the breaking span. This span depends on the depth of the roof and not on the coal thickness.

Perhaps the size of the pillar should not be schemed so as to prevent surface breakage of the pillar at the shaft. That may be too rigid a requirement. We may content ourselves with requiring merely that the action at the shaft shall not be made too severe by the breaking of the roof over too narrow a pillar, for a small pillar will break the roof more severely than a large one. In the event that we are not solicitous about all breaks at the shaft, but only that the breaks shall be followed by only moderate movement, then we are justified in considering coal thickness; for the movement on breakage where the coal is thick is more considerable and the general distortion of the measures greater. The horizontal shears, for instance, are more marked where the roof is subjected to a greater depth of collapse. The tilting of the measures is also greater, for with a given length of tilting strata a greater tilt has to be afforded. As the span of an unbroken roof varies with numerous indeterminable strength factors in the roof material, it is hard to say offhand how big a shaft pillar should be. The experience of mines in the neighborhood is the best criterion, especially if the manner of working is uniform.

The thickness of the coal has little to do with the problem if you intend to support the roof over the whole area mined, as in Illinois; or if, as said before, you intend to make the shaft pillar so big that the breakage cannot reach the shaft or adjacent buildings.

Reclaim the Sulphur

"THE peaceful ages of history have seldom been the productive ones." War causes many rude awakenings. A few months ago most people considered this country almost, if not entirely, self-supporting. Of course, it was recognized that certain articles of commerce and consumption—such as tea, coffee and rubber—necesssarily could not, on account of climatic conditions, be produced in continental United States. But of minerals we believed that we possessed an abundance of all except the more rare ones, such, for instance, as vanadium and molybdenum. Few, if any, of the ordinary run of people ever dreamed that even under the stress of war we would face a shortage of such a common substance as sulphur.

However, a shortage in sulphur has developed, and it has already assummed such proportions that the Government has commandeered the supply, both as to stocks and mines. The existing sulphur mines of Louisiana and Texas are being worked to capacity, and the stocks accumulated in past years are being drawn upon heavily. It is essential, therefore, that additional sources of sulphur be found, and found quickly.

At present sulphur is secured from the reduction of pyrite ores and from smelter gases, but the amount thus available is not sufficient to meet the present demand. Probably at least half a dozen "peace" industries, as well as the vast explosives program necessitated by our participation in the world war, demand the use of sulphur. Thus the rubber industry, the manufacture of news print paper, fertilizer, and the manufacture of storage batteries require the use of sulphur either raw or

in the form of acid. Black gun or blasting powder contains ground sulphur as one of its three ingredients, while smokeless powder almost universally used as a propulsive for military projectiles requires sulphuric acid for its manufacture. The same is true of gun-cotton, piric acid, dynamite, nitroglycerin, lydite, cordite, trinitrotoluol and tetranitrophthalein.

Sulphur is in nature fairly widely distributed. It occurs free in certain localities, the largest and best known of such deposits probably being that in Sicily. It also occurs combined with iron and copper in the form of pyrite. This mineral is found in many regions and is probably the most widely distributed of any of the natural sulphur compounds. The "sulpur diamond," with which people in the anthracite region are familiar is a crystalline form of pyrites, while the "brasses," well known to miners of bituminous coal, are formed of the same material.

Brasses, as is well known, are a detriment to any coal. The presence of sulphur in coal always tends to produce clinker on combustion. In metallurgical processes sulphur in the fuel is liable to unite with the metal being treated, rendering it impure and not suited to certain purposes. Thus high-sulphur coke produces a hard, brittle iron much inferior to the purer product made with low-sulphur coke or charcoal. Furthermore, brasses or a high sulphur content in coal exert a potent although possibly an imperfectly understood influence upon the spontaneous heating and possible ignition of the coal when stocked.

In certain localities and in certain coal beds brasses are much more numerous than in others. In some beds in Novia Scotia, in West Virginia and in Illinois pyrite in one form or another is found in such quantity as to be ordinarily considered a nuisance. If, as is often the case, this mineral is found mixed with coal from which it cannot readily be separated, the mixture will not stand shipment for any great distance on account of its liability (almost certainty) of firing upon exposure to the air.

A means or rather process has been devised whereby sulphur may be extracted from coal brasses. The equipment necessary is comparatively simple and inexpensive, and it would appear that the erection of a plant for the recovery of sulphur would be commercially justified wherever pyrite in sufficient quantity may be secured from a mine or group of mines.

The treatment to which the pyrite is subjected, known as the thiogen process of sulphur reclamation, is comparatively simple. The pyrite is roasted or burned, forming sulphur dioxide gas. This is then mixed with a certain proportion of fuel gas (either natural or producer gas) in a reaction chamber containing a catalytic mass. The sulphur in the gas is thus liberated and condenses or sublimes in an extension or cooling chamber. By this means practically pure sulphur is secured from a waste mine product. Under reasonably favorable conditions it is estimated that the cost of producing sulphur by this process should not exceed $7 per ton, about 2½ tons of pyrite being consumed per ton of sulphur produced.

It has been estimated that in the coal fields of the United States it would be possible within a few months (necessary for construction) to produce by this process 1000 tons of sulphur per day. While this would not be sufficient to anywhere near meet current demands, it would help greatly in that direction. Furthermore, the reclamation of a valuable product from what has heretofore been considered a nuisance, a necessary evil, and a waste, is a step in the right direction. This is true conservation.

Railroads Make Raid on Production

THE PUBLIC is disposed to make snap judgments. Last winter, when it found itself short of coal, it blamed the producer and Dr. Garfield. Then slowly it veered round to the idea that the railroads were to blame, and so it condemned the railroads and Dr. Garfield. But now the Government has the railroads, and there is a strong disposition to argue that they must therefore be more efficiently run than when in private hands; and as evidence accumulates that the production of the mines now but barely exceeds the capacity of the car service, the public is beginning to chide the operator and Dr. Garfield—always Dr. Garfield, be it noted—for the coal shortage, past, present and prospective. The operators and Dr. Garfield are accused of not being forehanded. The public asserts that their production campaign was not started early enough.

As a matter of fact, they have been forehanded. They started their hue and cry just as soon as it seemed possible that a car supply adequate to justify their campaign might somehow materialize, if only for a few brief weeks. The operators and Dr. Garfield talked production so long, loud and persistently to the miners left them by the draft and by the labor recruiters that they were overheard by the public. The public shook its head, said these lectures showed something was wrong, and if something was wrong why had it not been corrected before?

The public always acts in this illogical manner. No one can convince the dear people that anyone has ever shown any judgment or foresight. When the railroads were day after day laying the mines idle no one could talk production without exasperating the miners. No employer can scold his men for being idle when no work is provided. At some places he cannot scold today with any good grace.

We wager it is not an easy matter to preach a large production in the Hazard field in Kentucky, where in the week ending June 29 production was 36.5 per cent. short of capacity because of car shortage. The week following it was still 20.7 per cent. short. How would the average American take to a lecture on working hard and steadily if he was only allowed to operate his factory four or five days a week? The car shortage in those two weeks was in the Fairmont region of West Virginia 28.4 per cent. and 9.9 per cent. respectively. In northeastern Kentucky it was 19.8 per cent. and 8.5 per cent. In the Westmoreland field it was 16.6 per cent. and 6 per cent.

It is always difficult to make preparations for a prospective psychological condition. Propaganda to be popular and appear practical must have reference to an existent, not to a hypothetical, condition. If for months men have been working short time and have been highly incensed at that fact, it is hard to lecture them on the duty of working steadily without giving offense; and it is extremely hard to swing them into line when con-

DISCUSSION BY READERS

Travel of Electric Current

Letter No. 2—Referring to the inquiry of "Student," *Coal Age*, July 6, p. 35, permit me to suggest that experiments have proved that direct-current electricity permeates the entire body of the conductor, which is not the case with alternating current. In alternating-current practice, there is what is termed a "skin effect" in the conductor. This term is used to describe the condensation of the current on or near the surface of the conductor.

To one who cares to investigate, it will be of interest to see how the character of these two kinds of current has been provided for in the construction of the bus bars of switchboards, for direct and alternating current. In the former instance, when direct current is used the bus bars are made solid, while in the latter they are constructed in the form of tubes.

The higher the frequency of the alternating current, the thinner the walls of the tubes may be made, which shows that a tube having the same outside diameter as a solid rod or wire will carry the same current, under the same pressure, in alternating-current practice

Camp Jackson, Columbia, S. C. W. J. GRAHAM.

Letter No. 3—In the issue of *Coal Age*, July 6, p. 35, "Student" asks whether an electrical current flows over the surface or through a wire conductor.

Little is known of the real nature of electricity, and we must judge of its action by the effects produced. We read of a current flowing in or through a conductor, and, while it is natural for the mind to picture to itself a material quantity of something we call "electricity," one quickly realizes that the idea finds expression in the thought only. Experiment has enabled us, however, to determine the strength of an electric current or the so-called quantity of flow, and to measure the electromotive force and determine approximately the velocity of a current flowing in a conductor.

These measurements, however, throw no particular light on the mode of transmission, except as pointed out in the editorial reply to this question, where it is shown that the allowable current capacity of a conductor, as determined by the heating of the wire, bears such a relation to the diameter of the wire as to suggest that the entire mass of the wire is affected.

STATIC CHARGES DIFFER FROM VOLTAIC ELECTRICITY

It would seem that the idea of a current flowing over the surface of a conductor, rather than through the body of the wire, originated from experiments on *charged* bodies. These experiments showed that an electrical charge resides upon the surface of such a body. For example, when a metal cup is placed on an insulating stand and charged with electricity derived from an electrical machine or other source, there is found to be no effect produced if a metal rod or ball is brought in contact with the inner surface of the cup. If, however, the ball or rod is brought into contact with the outer surface of the cup it at once becomes charged.

While this is true of a static charge of electricity, it does not prove that a similar condition exists in respect to a current passing in a conductor. The two forms of electricity known as "static electricity" and "dynamic" or "voltaic electricity" may differ materially from each other, and what is true of a charged body is not necessarily true of a conductor through which a current is flowing. The distinction between *positive* and *negative* electricity, as being divergent elements, does not appear to affect the status of current electricity in the same degree or sense as characterizes a static charge. It may be stated with much truth that what we do not know about electricity far exceeds our knowledge of the subject.

A CURIOUS CONCEPTION OF ELECTRIC FLOW

One modern view, which has not received any general acceptance, however, is the suggestion that an electric current does not flow through a conductor or over its surface, but passes through the ether or other dielectric surrounding the conductor, the idea being that the so-called wire conductor merely forms a sink where the electrical energy dissipates itself and, in this capacity, acts to direct the current.

Such a theory, however, does not appear to lend itself to the observed and established laws of electricity. Practically, the current capacity of a wire conductor is determined by the heating of the wire, which first shows a dull red glow and, as the strength of the current increases, the wire becomes quite hot, the degree of heat often reaching the melting point of the wire. It is safe to say that these characteristics or effects do not support the idea that the current flows over the surface of the conductor only. ELECTRICAL ENGINEER.

Windber, Penn.

Heat Treatment of Axle Steel

Letter No. 1—In connection with the recent letters relating to different phases of mining equipment, allow me to indorse the statements of P. K. Howard, *Coal Age*, Apr. 13, p. 710, by which he calls attention to the importance of the heat treatment of mine-car and locomotive axles.

As Mr. Howard has said, this is a matter that has not been given much thought by the average mine official, who seldom stops to consider, if he really knows what is the kind of axle steel best fitted for mine-car running gears. As a general rule, this kind of material is bought from a price standpoint. No thought is given to the analysis, tensile strength or hardness of the steel. Also few seem to realize the great advantage of using a heat-treated axle. This latter may cost a few cents

a pound more than the ordinary soft steel, but it will pay for itself many times over in a short time.

By heat-treating an axle of, say 0.40 to 0.50 per cent. carbon content, a tensile strength of about 125,000 lb. per square inch is secured with a hardness of about 40 on the scleroscope scale. The same analysis steel, cold-rolled, gives a tensile strength of about 80,000 lb. per square inch. The advantage in using as hard and as tough a steel as possible is self-evident when the extremely hard usage of mine-car service is considered.

By using heat-treated axles, bent and broken axles may be eliminated. This item itself saves considerable blacksmith and car-labor expense. Then, again, when a heat-treated steel is used it is found that wheel hubs are not enlarged to such an extent as when a soft axle is employed. Also, the axles themselves do not wear down as much as is usually the case.

I know of one large anthracite mining operation that has been using heat-treated steel for axles for the last seven or eight years. When this company was using ordinary soft steel it sold from one to two car loads of scrap axles every year, but since using heat-treated axles it has not scrapped one car load. These axles have also shown a decided saving in shop labor.

Another place where a good grade of steel is necessary is in anti-friction running gear. As mine operators become more and more convinced of the advantages of an efficient anti-friction running gear, they also realize the advantages of using a good grade of axle steel.

Kingston, Penn. E. A PEARSON.

Electric Mine Haulage

Letter No. 1—Having had a number of years' practical experience as a motorman and in the construction of almost every type of locomotive used, and being familiar with the various conditions met in mine haulage, and knowing the kinks it is often necessary to adopt to secure the best results, the discussion, in *Coal Age*, regarding the different types of locomotives in use, has greatly interested me. I agree with Steven D. Otis, who suggests, June 15, p. 1124, that "practical mining men should . . . give their experiences." It is true that the present is no time to hoard up knowledge that will advance the common interests of the coal-mining industry.

Mr. Otis gives a very interesting description, in his letter, of the succession of improvements that followed the displacement of mules by mechanical haulage, in a Pennsylvania mine of which he had charge. In the course of his letter, he brings out some interesting points in regard to the practical operation of storage-battery locomotives on main haulage roads, by the use of roller-bearing instead of plain-bearing cars.

Conditions Determine Type of Locomotive

Experience has long since convinced me that the question of replacing mules with gathering locomotives must be governed largely by conditions underground, and that each installation must be studied separately and decided in accordance with these conditions. The flexibility of the storage-battery locomotive and its adaptation for gathering purposes cannot be denied. However, as stated by "Motorman," in an interesting letter, Apr. 27, p. 800, there are conditions under which better results are obtained by the use of the cable-and-reel type of locomotive.

The recent development of the cable-and-reel locomotive and its combination with the crab type presents many advantages over the original design. Scarcely a year ago I installed several locomotives of this type, which have proved very satisfactory. These locomotives were installed both for gathering purposes and main haulage. The claim of greater capacity, reliability and convenience was what led to the installation.

Crab-and-Reel Replaces Storage-Battery Type

No one will claim that any one type of locomotive is suited to all conditions alike. In one instance that I recall, a large coal-mining company replaced the storage-battery locomotives, which they were using on their gathering hauls, by locomotives of the crab-and-reel type. They had used the battery locomotives for a considerable time but found that better results could be obtained, under the conditions existing in their mines, by employing the cable-and-reel machine. The result proved the wisdom of making the change. I might cite other instances to show that the service conditions of different types of locomotives are being closely studied today and improvements in the structural and electrical details are being constantly made. On this account, the characteristics of the different types of machines are growing in importance each day.

Someone has stated that the storage-battery locomotive is easy to operate. It must be remembered, however, that the operation depends almost wholly on the experience and skill of the motorman. As has been pointed out by the writer who signs himself "Storage Battery," June 1, p. 1028, an unskilled motorman or the use of bad rolling stock will quickly drain the batteries and render this type of locomotive inefficient. The same writer closes his letter with the statement that "the success or failure of any gathering haul depends almost entirely on the condition of the track, the kind of mine cars and locomotives and the knowledge and skill of the motorman."

Successful Storage-Battery Installation

The following citation in my own experience may prove of interest in this connection: Not long ago, I installed, in a large mine, a General Electric storage-battery locomotive of the two-motor, 5-ton type, equipped with 80 Edison storage batteries. The charging equipment consisted of a 10-kw. motor-generator set and switchboard.

Alternating current is supplied, at this mine, from a high-tension system, of 2200 volts, primary, and 220 volts secondary, the latter being used for operating the alternating-current, coal-cutting machines. The motor-generator set was used to convert the 220 volts of alternating current into 250 volts of direct current, which was used for charging the locomotives, this current being regulated by the rheostat on the charging panel to the proper charging voltage. The charging current of this equipment is 60 amp., at 110 volts. The arrangement is such that the battery is automatically cut out when fully charged. In my opinion, where alternating current is available, this equipment is the most nearly ideal system of gathering or main haulage.

The storage-battery locomotive was used on the main haulage road, for hauling the coal to the slope bottom. On July 3, I hauled 413 tons of coal in eight hours with this locomotive, which could have hauled 500 tons of coal, in that time, had the coal been available. During the noon hour, from 12 to 1, the batteries were boosted. In this mine, the grade on the main haulage road is in favor of the loads, but the mine cars are equipped with plain bearings.

T. O. HUGHES,
Windber, Penn. Mining Electrician.

Safety in Shotfiring in Mines

Letter No. 6—It would seem that the subject of securing the greatest safety in the firing of shots in mines has been discussed from almost every angle; and, yet, it appears to me that sufficient emphasis has not been placed on the more general use of permissible explosives.

It is but a few years ago that the matter of testing explosives used in coal mines was taken up by the Federal Government. At a great outlay of labor and expense, the Government has since conducted tests on the different explosives submitted to them by manufacturers as designed for coal-mining use.

Besides making careful tests of these explosives and preparing a list of those powders that passed the test and were therefore considered safe to be used in the mining of coal, the engineers of the Government went further in their investigations of the characteristics of different explosives and the elements involved in the blasting of coal that tended to make the work dangerous. These investigations enabled the engineers to recommend safe practices both in the manufacture and the use of explosives.

BLACK BLASTING POWDER VS. "PERMISSIBLES"

When one considers the universal use of black powder for the blasting of coal in mines and the large number of accidents that have resulted from that cause, the work undertaken by the Government appears almost revolutionary in its character and extent. The movement, however, met with great opposition from large numbers of miners and the adoption of the so-called permissible powders, in many mining districts, has been slow indeed. It required much exploitation to educate the miners to the proper use of this new class of explosives, and to convince them of the greater safety secured by their use.

While the movement has proved successful in the more important coal-mining states and districts, there are still many mines and miners throughout the country that continue to use black powder for the blasting of coal. Recently, a couple of our old miners who had been absent for some time returned and asked for work. They stated that they liked the work and were given good places where they had been. They said their only reason for returning was the fact that the miners in those mines were using black powder. These men had come to know the greater safety of permissible powders and could not be induced to remain where black powder was used in the mine.

The habit of using permissible powders is a good one, and there is no reason why there should any longer be any hesitancy of miners in adopting these powders. It is my opinion that the Government should now take active steps to make their use more general, as it is one of the important features of coal mining, in respect to safety and economy. It is my belief that there is not a seam of coal that cannot be effectively blasted with permissible explosives. I have witnessed the best results obtained where it had been contended that permissibles would prove an absolute failure.

Where permissible powders have been tried, and failed, the result is commonly due to a misuse of the powder, either in the weight of charge employed or in the grade of powder used. The mistake is frequently made, also, of failing to properly tamp the hole. Permissible powders should be thoroughly tamped to the mouth of the hole, and the same care must be exercised in their use as in blasting with black powder. The idea seems to prevail among many miners that, because permissible powders are quicker and stronger than black powder, they do not require the same tamping, but this is a mistake. All holes should be well tamped to secure the best results and insure success.

W. H. NOONE.
Thomas, W. Va.

The Mining Situation

Letter No. 6—I have been greatly interested in the discussion of the present situation in the coal-mining industry, and particularly in the letter of my friend, R. W. Lightburn, *Coal Age*, July 13, p. 78. I do not feel, however, that all the blame should be placed on the miners. Neither are the operators wholly to blame.

A great responsibility rests, at the present time, on the mine foreman, whose duty it is exert himself more than anyone else in the mine to keep things moving. An instance that came under my observation but recently leads me to think that in a number of cases where the mine's output is delayed the blame rests on the foreman in charge.

While there are many good, loyal foremen who are doing all in their power to increase the output of their mines, it must be admitted that there are foremen who are only too willing to lay down on the job. They realize that they cannot be held accountable for the mine not running when they are able to offer the excuse that "only half of my men showed up this morning, and we were forced to shut down." The instance to which I refer as illustrating this disposition on the part of some foremen to neglect their duties is the following:

WHERE THE MINE FOREMAN WAS TO BLAME

A few mornings ago, the miners who worked in one section of the mine where the roof was bad and the roads none too well timbered found, on reaching their places, that a heavy fall of roof had occurred during the night, blocking the road. It was evident that some time would be required to clear up the fall so that coal could be hauled. The miners were on the point of going home, when I and a few others volunteered to have the road cleared in a short time if the diggers would stay and load out their turn, which they agreed to do.

In a short time the track was cleared, but many of the timbers were so badly broken that it was considered dangerous to use the road for hauling, until new timbers could be put in place. Not to throw the mine idle,

however, the driver agreed to take the chance that day and haul the coal, provided the mine foreman would have the place properly timbered the following night. To this the foreman quickly agreed, and the mine ran that day as usual.

But the following morning the road was found to be in the same condition as the day previous, and another small roof fall had occurred. The driver now flatly refused to haul coal another day with the road in that condition. His action forced the men working in that section to go home for the day, with the result that, of the twelve men who went home only three returned the following day. Four of the men did not come to the mine again for four days, and three of them were absent for two days, while two quit the mine altogether. Thus, there being but three men in, the machine crew also quit.

The incident I have related shows gross incapacity on the part of the mine foreman. As a result of his failure to have the necessary work performed the first night, according to his agreement, that section of the mine, in the following two weeks, produced only 200 tons of coal. Ordinarily there would be produced in the same section 125 tons of coal a day, all of the men working there being good miners.

The Result of the Foreman's Failure

As a sequel to this incident, it may be said that the mine foreman embarrassed his own position. He could not discharge the men who stayed out and did not return to the work promptly when the place was made safe. Such action by the foreman would have led to an immediate investigation by the union, and would have resulted in showing that the mine foreman was himself to blame. He was wise enough to know this and so patiently waited for his men to come back to work. In the meantime, however, the output of the mine was greatly reduced.

As has been stated by a writer signing himself "Loyalty," *Coal Age*, July 13, p. 78, the time has come when "slackers should be brought to feel their responsibility in the great cause, by drastic action of the Government." It is just as important to conscript men to produce food and coal as it is to conscript men for the army.

I am myself under the draft law and will probably be in service this month or the month following. The ruling of the Government compels every man to "work or fight." But a man who works but two or three hours in each shift, when he could employ himself full time, is a slacker of the worst sort, and it would seem that these men are being humored, while many brave hearts fighting at the front are suffering from their neglect. To my knowledge, there are ten of these fellows, hereabout, who have never bought a Liberty Bond or a War Savings Stamp. They tell me they cannot afford to do so, although they are drawing from $100 to $125 each pay.

Here, in the summer, we are face to face with a shortage of coal, and what can we expect the coming winter? The situation calls for serious thought, and measures should be taken at once to avoid what is plainly in store for us if the mining of coal continues at the present rate.

I fail to understand the suggestion made by R. W. Lightburn, July 13, p. 79, namely, to work two 6-hour shifts a day. It certainly would not be feasible to work six hours, then rest six hours, work six hours again and rest the remainder of the time in every 24 hours. Perhaps he means to run two separate crews each working 6-hour shifts. Such a plan would present many difficulties, however, and not the least would be to get the men.

My suggestion is to place competent men in charge of each section of the mine who will be responsible for the blasting and loading of the coal in their section. I believe this plan would be feasible.

Cleaton, Ky. Ostel Bullock.

Letter No. 7—The letter of Thomas Hogarth, Coal Age, June 29, p. 1208, draws attention clearly to an important feature in the coal situation. According to the estimates of the Government, there will be a shortage of 55,000,000 tons of coal next winter, which is an appalling proposition. The suggestion Mr. Hogarth makes, regarding the appointment of a Government inspector having authority to check up men who are not regularly on the job, appeals to me as a good one.

A large proportion of the miners working in Colorado are single men; at least that is the case in the district where I am located. It is a fact, also, that the Colorado miner makes as good if not better pay than miners in any other state. These conditions have developed an abnormal tendency in our miners to take vacations. With the increase of pay the shortage of labor here has increased to a startling degree.

It was hoped that the "work-or-fight" order which went into effect recently would prove to be the much needed remedy for holding men in their places. As a matter of fact, however, few cases have come to my knowledge where the idleness of workmen has been investigated. As before, it is the married men who stay on the job, with little loss of time.

The week point in the situation is the fact that when a man wants to lay off for a time, all he has to do is to quit the mine. He knows full well that it will not be difficult for him to get work again at the nearest mine when his money is spent. Thus, an army of competent men whose services are badly needed by the Government are only producing from one-half to two-thirds of the amount they should. The balance of their time is spent in wandering from place to place or is passed in loafing in the saloon.

Questioning Miners Who Quit

For my own satisfaction, I carefully questioned all of the men who left our mine recently. My desire was to ascertain the cause of their leaving. Very few cared to give or could give any satisfactory reason for leaving. Most of them did not try. Some said they "wanted a change," while others "wanted a rest," adding that they "might be back later on."

No doubt Mr. Hogarth's "Government inspector" could easily check up the idleness of men who were not in their places, and this would have a good effect. It would be difficult, however, for such an inspector to ascertain how much time was spent in idleness by men who quit their places in one mine to seek work elsewhere; or to ascertain how long men applying for work had actually been idle.

In order to compete with this feature of the situation some such special means would have to be adopted, as I believe has already been mentioned in the columns of

Coal Age, of giving discharge cards to men leaving a place, and requiring them to show such cards of honorable dismissal when applying for work in another place.

Allow me to draw attention to the fact that the loss in production, due to the idleness of miners, is not the only loss to the mines. There is a very considerable loss in the efficiency of operation when men are constantly coming and going in a mine. Newcomers must become familiar with their places and the conditions surrounding their work before they can show the same efficiency as in the mine they left.

Delay Caused by Breaking In New Men

A new man may be a first-class timberman, but someone must go around with him to show him the places where he is to work, until he knows the roads and can find them himself. A new driver must drive with caution until he has learned his runs. Likewise, an experienced miner must learn the local conditions in a seam before he can load his usual amount of coal each day. A new man going into a strange place must spend a day or more in fixing up his room ready for work. These changes cause much delay and are a positive loss in the production of coal.

All will admit that any law forbidding a man to quit his work when he wishes would be unjust, except as a military measure. The needs of the Government, however, must be the first consideration and the rights of miners to come and go, at this time, may be properly questioned. It may also be a question whether a miner has the right to choose the place where he shall work, as long as this right of choice conflicts with the duty and obligation of the citizen to his country. A soldier has no right of choice in his service but must go where and when he is ordered. If the work of mining coal was subject to the same restrictions during the period of the war, there would not be the loss of efficiency in the mines and the shortage in production that there is at the present time.

M. M. Watson.

Floresta, Colo.

Sealing Off Fire on Intake

Letter No. 8—In the issue of *Coal Age,* June 22, p. 1173, "Ancora" asks for the best method of extinguishing a fire that has gained so much headway on the intake of a pair of entries driven in solid coal that it is thought best to seal off the fire by building air-tight stoppings.

The sketch given in connection with this inquiry does not show whether these are the main headings driven from the shaft or a pair of cross-entries. In the former case, there is little opportunity of preventing the fire from reaching the upcast shaft, or even to give warning to men who may be in danger, since the smoke and gases from the fire are traveling at the rate of 500 ft. per min., that being the velocity of the air current, in this case.

Having warned the men in danger, immediate steps should be taken to short-circuit the air, at a point outby from the fire, by opening a door or tearing down a stopping as near to the fire as possible. This being done and the material being on hand, I would endeavor to erect a temporary brattice, with shiplap or boards, in the return airway, just inby from the crosscut opened.

On entering the return airway it might be necessary to use men equipped with breathing apparatus, in order to avoid their being overcome by the smoke and gases generated by the fire. The temporary stopping should be set far enough back from the opening to permit of the building of a permanent brick or concrete stopping between it and the crosscut. Do not complete the building of the temporary stopping, but leave it open the width of one or two boards from the roof and hang a piece of canvas over this opening.

In the meantime, a similar temporary stopping should be built, at a corresponding point on the intake airway, and carried up to near completion, as before. Now, close the opening in the return stopping with boards, and at once do the same on the intake. The work of building the permanent stoppings should be commenced immediately after closing the two temporary stoppings. This work should be performed as quickly as possible, the two stoppings being carried to the roof and tightly sealed with clay or mortar.

In building the permanent stoppings, it is important to cut into each rib and the roof and floor a sufficient distance to enable the forming of a tight joint. Safety lamps should be used in performing the work, and the thickness should be such as to give the stopping sufficient strength and make it safe. It is customary to build in a pipe in each stopping, at a point near the roof, for the purpose of ascertaining, from time to time, the condition of the air in the space inclosed.

Condition of Air Behind Stoppings

In answer to the second question asked in the inquiry, if we assume that the first stopping was built on the intake, the air behind that stopping would contain much carbon monoxide (CO), owing to the limited supply of air to the fire causing incomplete combustion. Such being the case, it would be a grave question whether it would be possible to build the return stopping.

My experience at a mine fire that occurred at Nokomis, Ill., May 20, 1918, makes me think that the heat of the fire would result in a considerable fall of roof, which would cover the burning coal and timbers. This was particularly troublesome at the Nokomis fire. But it is estimated that a cubic foot of wood (larch) is capable of producing 31.4 lb. of carbon monoxide (CO), which, at ordinary temperature and pressure, would occupy about 420 cu.ft. of space. This suggests what might be the condition in a limited air supply.

On the other hand, in answer to the third question asked, if the return airway is closed first, the gases formed behind the stopping will be mostly carbon dioxide (CO_2); and these gases, being extinctive and rolling back on the fire, would tend to smother it. There would be less chance of ignition and explosion of the gases taking place, and the work of building the stoppings would be safer.

Thomas English,
Springfield, Ill. Supt., Mine-Rescue Station.

Letter No. 9—[This letter, presented by W. H. Detty, Wilburton, Okla., gives the same method of procedure in extinguishing the fire by building stoppings as has already been described by Matthew Stafford, in Letter No. 6 of the last issue of *Coal Age,* page 188, which it will not be necessary to repeat here.—Editor.]

INQUIRIES OF GENERAL INTEREST

Cause of Brittleness in Mine Rails

Kindly permit me to draw attention to a statement made in a letter by "Trackman," July 13, p. 77. In speaking of the brittleness of rails used in electric mine haulage, the writer of the letter says, "The electric return acts upon the rails to make them brittle." I have read elsewhere the same claim that mine rails are made brittle by the action of the electric current, which passes through them on its return.

Permit me to ask if it is not an open question as to whether the electric return has the effect to make rails hard and brittle. I believe that it is the opinion of most all electrical engineers that the electric current has nothing to do with making the rails hard and brittle; but that this is brought about by the constant hammering that the rails receive from the locomotives and mine cars passing over them. Such a reason seems to me far more credible than the one we often hear advanced in regard to the effect of the electric return.

If it is possible to throw any light on this question, that will help to correct wide-spread opinions, it will be greatly appreciated by readers of *Coal Age*. The question appeals to me as a good one for discussion by electricians, who alone are able to give an intelligent opinion. Let us hope for a good discussion.

C. J. CREVELING, Gen. Supt.,
Blackwood, Va. Blackwood Coal & Coke Co.

Through the kindness of Carl Hering, a consulting electrical engineer of Philadelphia, Penn., and a recognized authority on electrical matters, to whom this question was submitted, we are enabled to present the following information regarding the probable cause of brittleness developing in mine rails. Dr. Hering writes as follows:

"Existing knowledge on the possible effect of the electric current to produce brittleness in steel rails is apparently not yet conclusive and definite. There is little doubt in my mind that the factor of degree also enters the problem, that is to say, certain physical actions will have no effect if they fall below a certain limit, while above that limit a decided effect is produced. A familiar illustration of this is the deformation that takes place when a piece of steel is stretched or bent beyond its limit of elasticity, while, on the other hand, the hair-spring of my watch has, for nearly thirty years, been subjected to reverse strains at the rate of five times a second, without the slightest change taking place.

"The claim has not been demonstrated conclusively that an electric current produces brittleness in the conductor. If true, the effect would probably be worse with alternating than with direct current—and would be small with low-current densities.

"The fact is well known, however, that the electric current exercises a crushing effect on a conductor, which effect I described many years ago under the name of the 'pinch effect,' by which name it is now generally known. This force can become very great, but I think it doubtful whether it would ever exceed the elastic limit of steel, except in the case of occasional high-current rushes that might act like a physical blow on the metal, as this force increases with the square of the current flowing in the conductor.

"Besides the pinch effect, I maintain that the electric current produces also a 'stretching effect' in the conductor; while I feel sure this is true, I do not know that my claims in this regard, published some years ago, have been generally accepted. Quantitatively, like the pinch effect, this force increases with the square of the current. But, since magnetization of *steel* produces molecular stresses, it is quite possible that brittleness may arise from this cause in the steel used in mine rails. There is what is known as the 'aging' of steel in transformers, but I am not sure that this includes any pronounced brittleness.

"Regarding the suggestion that the brittleness of rails is caused by the 'pounding of the cars,' allow me to say that the normal action of car wheels is a *rolling* and not a pounding one. The latter takes place only at joints and where dirt accumulates on the rails, or is caused by flat wheels, and is the exception and not the rule. In the passage of cars over the rails, the rails are subjected to an action somewhat similar to that produced when steel is cold-rolled, in a mill. That process, we know, produces hardening and perhaps a degree of brittleness.

"Experience shows that some steels will stand this crushing action by rolling, while others will fail, which shows that the *quality* of the steel in the rails is an important factor. For example, to take an extreme case, we know that a cast-iron rail would go all to pieces if subjected to the rolling action alone. Therefore, as the quality of the steel approaches that of cast iron, the rolling action of the car wheels will no doubt have a greater effect to produce brittleness than in steel of a quality which will stand this treatment.

"I regret not being able to give you a more direct and satisfactory answer To use a mathematician's expression there are many variables involved that affect the results. An approximately direct answer would be about as follows: If the current density in the rails is low, and there are not too many current rushes, the *electrical effect*, is probably *nil*. The *magnetic effect*, with alternating current, might produce brittleness, though this is not certain. The *pounding* of the car wheels on the rails is too local and exceptional to be the cause; but the resulting brittleness observed in the rails arises probably very largely from the rolling action of the car wheels, which, as I have said, resembles the action when steel is cold-rolled in a mill. Lastly, the *quality* of the steel is probably the most important factor in the development of brittleness in rails.

EXAMINATION QUESTIONS

Mine Foremen's Examination Wilkes-Barre, Penn., Apr. 23, 1910

(*Selected Questions*)

Ques.—What can you suggest for the reduction of accidents from falls of top rock, slate and coal, at the working places?

Ans.—To avoid accidents from these causes, the mine foreman and his assistants should visit all working places at frequent intervals, while the men are at work, and observe carefully that the place is well timbered and there is no loose top or coal that may fall. Strict regulations should be made and enforced, compelling every man to inspect his place when going into it in the morning and to set any needed timber before startting to load his coal. Miners must be instructed to set sprags when undercutting the coal. If a foreman or his assistant finds a place unsafe for work, he must withdraw the men until the place is made safe.

Ques.—Name and describe some of the important differences between the Davy, the Clanny and the Wolf safety lamps.

Ans.—In the Davy lamp, commonly used by firebosses when testing for gas, the oil vessel is surmounted by a wire-gauze chimney, which is generally protected by a metal shield on one side of the lamp. There is no glass cylinder surrounding the flame.

In the Clanny lamp, the oil vessel is surmounted by a glass cylinder that surrounds the flame and permits the lamp to give a better light than is possible with the Davy. The glass cylinder is surmounted again by a wire-gauze chimney, which is shorter than that used in the Davy lamp and frequently surrounded by a steel bonnet to protect the flame of the lamp against strong air currents.

The Wolf lamp, in common use as a working lamp, has practically the same form of construction as the Clanny lamp. One particular feature of this lamp is that the metal bonnet surrounding the gauze chimney is corrugated and has a number of tangential openings for the passage of air, which afford good protection against strong air currents. The distinguishing feature of the Wolf lamp is that it is designed to burn a volatile oil, such as naphtha benzine. The oil vessel is of pressed steel and filled with absorbent cotton to reduce the explosiveness of the oil. The lamp is equipped with a self-igniter.

Ques.—What dangers may arise from the improper assembling of a safety lamp?

Ans.—The improper assembling of a safety lamp means that one or more of the parts have been omitted or the several parts have not been accurately fitted to each other. In each case there is opportunity for the burning gas to pass between the imperfectly fitting parts and ignite the gas-charged air surrounding the lamp when the latter is exposed to gas in the mine. In other words, the flame of the lamp is not isolated from the outside atmosphere, and the lamp is no better than an open light.

Ques.—A slope measures 4.6 in. in length, on the mine map; the tidal elevation at the top is +780 ft., and at the bottom +530 ft.; what is the length and grade of the slope?

Ans.—Assuming the map is drawn to a scale of 100 ft. per inch, the horizontal length of this slope is $100 \times 4.6 = 460$ ft. The difference of elevation between the bottom and the top of the slope, or the rise of the incline in 460 ft. of horizontal distance, is $780 - 530 = 250$ ft. The length of the slope is found by extracting the square root of the sum of the squares of the horizontal distance and the vertical rise. Thus

$$\sqrt{460^2 + 250^2} = 523.5 \text{ ft.}$$

The grade of the slope expressed as the vertical rise per horizontal distance is 250 : 460 or 1:1.84. The percentage of grade, or the rise per 100 ft., is $100 \div 1.84 = 54.3$ per cent.

Ques.—What precautions would you suggest to guard the employees in a mine from possible accident due to the use of electricity?

Ans.—All electrical installations should be made by a competent mining and electrical engineer. The power line and trolley, as far as practicable, should be kept off from travelingways. At all points where it is necessary for men and animals to cross the haulage road. or to pass under a power line, the conductor should be protected in a suitable manner to avoid accidental contact. Wherever it is necessary to install live wires on a travelingway, the conductor should be carried on one side of the passage and suitably guarded.

All conductors should be firmly attached to the mine timbers and carefully inspected at regular intervals. Danger signals should be posted at all points where live wires are exposed, and a suitable warning should be posted at the entrance to the mine, cautioning all persons to avoid the danger of contact with live wires in the mine. Where power is used to drive machines at the working face, competent machine runners should be employed who should be instructed to take every precaution against accident to their helpers..

Ques.—Describe the various methods of propping and timbering slopes, gangways and chambers in anthracite mines.

Ans.—Methods of timbering will always depend to a large extent on the nature of the roof, floor and sides of the opening. Under fairly good roof, where the seam has little or no inclination, post timbering is used in chambers and double timbering on the entries. The crossbeams or collars are often hitched into the ribs or supported on short legs toed into the ribs where the coal is hard. Lagging is used over and behind the timbers to give needed support between timber sets where roof and coal are weak. In slopes and in inclined headings and chambers all posts and timber frames are inclined up the pitch a few inches from the normal, depending on the degree of the pitch.

COAL AND COKE NEWS

Harrisburg, Penn.

That the coal miners of the anthracite region are not seeking exemption was demonstrated when the district draft board of Shenandoah attempted to force exemption on a number of mine workers who appeared at the railroad station on July 23 to go to Camp Lee. Two of them knocked down officers who tried to prevent them from boarding the train taking soldiers to camp. Others climbed through car windows, while many left in automobiles for Mahanoy Plane, where they caught the train.

Despite exemption claims filed by the Lehigh Coal and Navigation and other companies in the Schuylkill and Panther Creek valleys, 69 selectives left on July 23, only two less than the full quota. Few of the mine workers will stand for the coal companies' exemption pleas, their claim being that other men can take their places.

At Plymouth, Luzerne County, 21 men on the same date were informed that the coal companies and the Government requested that they be held back as skilled mine employees. The draftees in all these cases had made all preparations to depart and consequently lost a number of days' wages. They have asked that an official slip be issued stating that they came prepared to go to camp, and through no fault of their own were held back by the Government.

The action of draft boards is an aftermath of the meeting held recently at Wilkes-Barre, when Major Conklin, of Provost Marshal Crowder's staff, stated that the boards had authority to place the men in deferred classes on a petition of the coal companies.

Despite the efforts made to keep production rising in the Connellsville regions, the output fell off considerably during the week ended July 20, according to figures made public by the Fuel Administration. Coke production for the week was 347,488 tons, a drop of 808 tons over that of last week's record output, and coal dropped from 168,587 tons last week to 161,140 tons the week just ended.

Car supply for the week was excellent, and idleness on the part of a certain percentage of the men is the only reason that can be assigned for the slump. The Fuel Administration order for a daily check upon the labor slacker is making itself felt, and a noticeable increase is expected in this week's figures.

The scope of the "six-day" order was widened this week when requests were directed by the Fuel Administration to mayors and burgesses of every town in the district asking for coöperation in its enforcement. The authorities are asked either "to run in or run out" any able-bodied men found in their district who have no regular employment.

Although much disappointed with last week's production, Fuel Administration officials take an optimistic viewpoint of the situation and believe that the measures already taken to arraign labor solidly behind the war program will result in appreciable gains in the output within a short time.

Charleston, W. Va.

Production fell off in the Kanawha district during the third week in July, though it was kept above the 200,000-ton mark, the total net tonnage produced being 201,677, as against 205,000 plus for the previous week. Two factors are believed to have contributed to the decrease—loss of power for one day and labor shortage, as mine disability for which lack of power was entirely responsible resulted in the loss of 740 hours—much more than is usually the case. Labor shortage was responsible for 795 hours of lost production. It will also be observed that only 5831 hours were worked, a considerable reduction from the second week in July. It is believed, however, that the total production for July in the Kanawha field will be in excess of that for June.

In the last week there has been a most decided slump in the car supply for the Fairmont field, the number of cars not averaging much over 900 cars a day, which is almost half of the normal requirements. It is said that the slump is approaching an acute stage. It appears that wrecks and derailments, and not the system of distribution, are responsible for conditions in the Fairmont region. Last Tuesday, of 167 mines reporting, 17 were shut down and the number of men idle because of insufficient cars was 1860, resulting in a tonnage loss of 18,345 tons, the cars on hand only amounting to 931, 61 of them being for coke shipments.

That wagon mines, or the so-called "snow-bird mines," are to have recognition was made plain by Dan Howard and other members of the temporary organization committee of five of the Northern West Virginia Coal Operators' Association, who publicly announced that the "snow-birds" were to have proper and fair consideration in the affairs of the new association. The "snow-bird" mine is coming into its own apparently, since it is now recognized that acres of coal which would have otherwise been left untouched have been mined and have helped supply the market. While many of the railroads have put many obstacles in the way of the development of the wagon mines, the Kanawha & Michigan is not one of that class, as it supplies all of its wagon mines with plenty of cars.

Terre Haute, Ind.

Mines in Indiana, for the week ended July 13, hoisted 651,928 tons of coal, according to a statement issued by the Indiana Bituminous Coal Operators' Association. The best previous weeks were in June, when in each of two successive weeks 621,000 tons were mined. Production the week ended July 13 was assisted by the larger number of mines working, the total number being 189. The increase was caused largely by the reopening of several properties on the Southern R. R., which now serves sixteen mines. Car supply was more satisfactory, the total car shortage being only 6.07 per cent. Several of the more important coal roads had a 100 per cent. car supply. The additional tonnage possible with this full car supply was 58,220 tons. The shortage on the Chicago & Eastern Illinois was only 0.96 per cent. and the Chicago, Terre Haute & Southeastern 0.36 per cent. The Pennsylvania had a shortage of 14.45 per cent., the Southern of 20.96, and the Illinois Central of 16.93 per cent. Three large mines at Linton were closed most of the week because the miners refused to work after a train schedule was changed.

PENNSYLVANIA

Anthracite

Hazleton—The Lehigh Valley R.R. has been directed to take the coal of the Coleraine mines to market, this action barring the Philadelphia & Reading R. R. from one of the oldest and richest collieries in the Lehigh field.

Shamokin—The Jones Coal Co., lessees of vast tracts of culm about the Mahanoy Plane, will this week place in operation a model washery and plans to ship from 350 to 600 tons of the smaller sizes of coal to the eastern markets each day. The new operation will be electrically operated.

Sunbury—After a trial which lasted eight weeks, W. C. Moulton, a Scranton coal operator, on July 19 won a verdict against the Philadelphia & Reading Coal and Iron Co. in a suit which involved the ownership of culm banks in Zerbe township, Northumberland County, said to be worth $2,000,000. Moulton alleged he had good title through unseated land-tax sale deeds, while the defendant claimed a clear deed from an original grant to William Penn.

Hazleton—A new ruling on the status of men working about the mines was established on July 22, by the district appeal board of Scranton, in refusing deferred classification to Howard Zullick on industrial grounds. Zullick is employed as a clerk at the Lattimer mines. The appeal board has ruled that clerks and stenographers about the mines are not essential workers and do not come under the recent ruling of the draft officials that mine workers are not to be taken.

The Charles Kehoe & Co. strippings on the Sayre tract of the Lehigh Valley Coal Co., near Mt. Carmel, and the Packer No. 5 operations on Lehigh Valley land at Shenandoah, were sold recently to the Rhoades Construction Co., of Ashland. The purchase covered both equipment and contracts which have many years to run. The Kehoe concern has now disposed of all its holdings outside of the Hazleton basin and will devote its entire attention to the local field.

Pottsville—Philadelphia and New York capitalists are forming a new corporation in this region for the purpose of washing anthracite culm out of the rivers in this vicinity with sluices and flumes, much as is done in gold camps in Alaska. About 100 washeries employing this new method and also the old system of washing culm from dirt banks are to be established, nearly all in this county, with some in Northumberland County. A number of new washeries are to be built along Mahanoy Creek, where there are millions of tons of culm at convenient points.

The greatest war garden in Schuylkill County is being conducted by the Philadelphia & Reading Coal and Iron Co., which has planted a vast tract near the Broad Mountain with corn, wheat, etc. A good crop is in prospect. Many other tracts owned by the company have been leased free of charge to employees. The company is making an effort to have this great mining district show that it not only can furnish this state and many adjacent states with coal, but also supply its own food. A number of years ago the miners of this region raised a considerable portion of their own food products, in gardens adjacent to their homes. An effort is being made to get back to these conditions.

Bituminous

McIntyre—The tipple of the Coal Run Mining Co. for mines Nos. 1 and 3 has been remodeled and enlarged. The railroad company has made additional sidings above the tipple to accommodate increased car facilities.

Somerset—The Orenda Smokeless Coal Co. recently purchased the holdings of the Merchants' Coal Corporation, of Boswell, for $2,000,000. This is the largest deal in this county in some time. All the operations in the Boswell fields are involved.

Uniontown—Four coal miners were killed instantly when they were crushed beneath a fall of slate in the Penn. Coal Co.'s mine at Smithfield on July 19. The dead are George Epley, Arthur Conn, James James and Albert Collins. Officials of the company state that the four men were working together in one section of the mine when the accident occurred. A score of miners worked more than 24 hours before the wreckage was cleared.

West Lebanon—J. C. McGregor, Dr. H. B. Puterbaugh, of Indiana, and Harry E. Clark, of Glen Campbell, have purchased 1200 acres of the Pittsburgh seam of coal between South Bend and Elderton. The consideration was about $40,000. No announcement has been made as to the development of the property.

Washington—Dr. George M. Kelly, of this place, recently sold to the Pittsburgh Coal Co. 92.591 acres in the Pittsburgh or river vein of coal underlying a tract in Canton township for a consideration of $27,777.30, or about $300 an acre. The coal in question fronts on the West Middletown road and adjoins Wolftown, just northwest of Tylerdale.

Indiana—The Manufacturers Coal Co. controlled by an Eastern manufacturing company, is opening new mines on the north side of Yellow Creek, near the present operations of the Meco Coal Co. It is understood that the coal will be used exclusively at the Eastern factories of the company. The mines are located on the Yellow Creek branch of the Pennsylvania Railroad.

Patton—The tipple of the Pennsylvania No. 39 colliery of the Pennsylvania Coal and Coke Corporation, near here, was de-

stroyed by fire last week. Incendiarism is given as the cause, and the company has offered a large reward for the arrest of the persons setting the building on fire. A temporary tipple has been erected and will serve the operation until a large structure can be built.

Berlin—John and Robert Groff have leased 20 acres of the J. O. Stoner 6-ft. vein of coal. They have begun two openings and are into the coal. The coal is under the field north of Stoner's grove, and the drift mouths are a few rods from the end of the railroad track above the Baltimore & Ohio R. R. station. For the present the mines will be operated as wagon loaders, but arrangements may be made later to install a tipple.

Uniontown—C. G. Rockwell, an attorney, of Chicago, this week exercised options taken upon 5000 acres of "back" coal in Whitely and Franklin townships, Greene County, with the initial payment in the $2,000,000 deal to the trustees in bankruptcy of Josiah V. Thompson, former coal baron and banker, now the principal figure in what has been termed the largest bankruptcy case in history. The identity of the purchasers has not been disclosed, but it is likely that the information will be revealed with the proceedings before Referee in Bankruptcy J. G. Carroll. The purchase price in this, the second largest deal in the liquidation of Mr. Thompson's tangled affairs, averages $350 per acre.

WEST VIRGINIA

Page—With a large force of men at work on the completion of a side track from the VirginianRy., the Beaver Fork Coal Co. expects to be able to begin the shipment of coal in the near future.

Princewick—With machinery already on the ground ready to be set up, a conveyor and picking tables will form a part of the new equipment of the Princewick Coal Co. at this place, added in order to secure cleaner coal.

Charleston—Another mine is being opened by the Mead-Pocahontas Coal Co. and the company hopes to begin mining and shipping coal in about 60 days. The general manager of this company is J. C. Sullivan, of Tralee.

Logan—A conveyor system is soon to be installed by the Fire Creek Smokeless Coal Co. at Lego, in Raleigh County, enabling the company to clean its coal with facility. The company also expects to let the contract soon for the construction of a number of houses for miners

Fairmont—Jamison mine No. 7, where a terrible explosion occurred in 1916, has been the scene of activity the major part of the time since the accident. J. M. Wolfe, superintendent for the West Virginia interests of that company, announces that the work of recovery will be completed by Sept. 1.

Worthington—The Worthington Coal Co. has closed down its mine on account of the car supply. But one car was received during the week ended July 13, and it was impossible to hold the miners. Perry D. Burton was the manager, and his employees were taken to another mine operated by him near Monongah.

Welch—Operations on a large scale will be undertaken by the Middle West Coal Co., which has been organized with a capital of $200,000, the seat of operations to be in McDowell County. Those chiefly interested in the organization of the company are Eugene H. Popinsky, Simon Solin, Harry Kline, Nathan Goodman and Harry Bank, all but Bank, who lives at Kimball, being at Welch.

OHIO

Aetnaville—The Koehnline coal mine here has resumed operation after an idleness of more than a year while undergoing extensive repairs. The mine is said to be in the best possible condition, and it is expected to increase the output.

Martins Ferry—The Y. & O. Coal Co. has completed arrangements for opening up a tract of between 10,000 and 15,000 acres of coal land near Connersville, a few miles north of here. The Y. & O. company has extensive holdings in Belmont County, with several mines already in operation.

INDIANA

Brazil—Chicago & Eastern Illinois R. R. officials have denied cars and switching privileges to the W. C. Nash coal mine, near Clay City, on the ground that the operation was not producing enough coal. Mr. Nash is arranging to open a new mine on the Charles Cooprider farm, near Clay City, in a short time.

Terre Haute—Edward Stewart, of Terre Haute, Ind., president of the United Mine Workers' District No. 11, has announced that he has decided not to accept the appointment as state mine inspector, which position was recently offered him by the Indiana Industrial Board. He said that he thought he could do more good in the present national situation by keeping his present place. District No. 11 includes the greater part of Indiana.

Linton—About 675 miners, who have been out on a strike for seven days because of a change in the schedule of a miners' train leaving Linton daily, have returned to work after the Indianapolis and Vincennes Railroad Co. had restored the former schedule. The miners struck because they claimed that the change put an extra hour on them daily in going to and from the mines. Most of the miners worked for the Vandalia Coal Company.

ILLINOIS

Peoria—The failure of the Consumers Coal Co., of this city, to execute a contract given it by the City of Peoria has caused the Council to issue instructions to the city clerk advertising for new bids.

Mt. Vernon—As a result of a strike of employees of the Wabash, Chester & Western R. R., which operates between Mt. Vernon and Chester, four coal mines served by it have been temporarily forced to suspend operations.

Panama—It is said that William McDonald, recording secretary of the Panama coal miners' union, is missing after a warrant had been issued charging him with forgery. It is charged that McDonald, while acting as recording secretary, forged the name of Peter Smith, the treasurer and the president of the local, to orders which he cashed, and thereby secured possession of about $1100 from the funds raised by the miners of Panama to be given to the Red Cross and other war relief work. Officers have been looking for him since about the Fourth of July. Auditors have been placed at work on his books.

McLeansboro—The drillers at Dale, Ill., have reached a depth of over 500 ft., and the prospects are good for a rich vein of coal. If coal of sufficient quality is found, a shaft will be sunk and a mine will be placed in operation just as soon as material and machinery can be installed.

Decatur—No coal has been shipped out of Macon County, but there is strong local demand for the output of the mines. On a recent day 35 teams were noted waiting at the mines. The mines are now running from three to six weeks behind in their orders, all of the coal being used in Decatur and vicinity.

Pana—The Penwell Coal Co. hoisted for the year ended June 30, 1918, a total of 315,870 tons of coal. The car supply for this mine was good, and but little time was lost by the miners. The Pana Coal Co., operating two mines in the same general field, hoisted 352,900 tons of coal, although the hoisting at the North mine was not begun until Jan. 15, 1918. There has been a good demand for coal from both the Penwell mine and the Pana mines.

Carlinville—The Standard Oil Co. has begun sinking the shaft for its No. 3 mine here. The company first purchased the Carlinville mine, which it named No. 1, and then opened No. 2. No. 3 will be completed as soon as possible. A fourth mine, not as large as the others, is also to be opened in October. In Mine No. 2 quantities of quicksand have been encountered which have hindered operation. It is feared that work in this mine will have to be stopped for a time unless a way is quickly found to control the quicksand. A power house costing more than $1,000,000 is under construction at Mine No. 3, which will furnish electricity to all the company's mines.

Harrisburg—The Saline County Coal Co.'s No. 2 mine, known as the "Steel Tipple" mine, has recently been awarded a large flag in honor of the fact that every employee at that shaft is the owner of a Third Liberty Loan bond. R. O. Burke, chairman of Saline War Savings Stamp Committee, made one of the addresses at the raising of the flag and told the miners that if they would make a 100 per cent. record in the purchase of War Savings Stamps that he would personally guarantee them a flag in commemoration of that feat also. The men are making an active canvass of the mine and selling stamps to every employee. In fact, that district known as West Ledford, in which this mine is located, has already sold about $8000 worth of stamps and hopes to make it $10,000. The quota is $9750.

OKLAHOMA

Howe—After being idle for more than 15 years, the 100-oven coke plant built here in 1899 and 1900 by the old Mexican Gulf Coal and Transportation Co. has resumed operations. The property was bought last December by the Howe-McCurtain Coke Co., operators of the coke plant at McCurtain, Okla. Included in the deal was 4000 acres of coal lands. The new operators propose to enlarge the plant as soon as possible and to materially increase its present daily capacity of 125 tons.

TEXAS

Dallas—Headquarters of the Standard Petroleum and Coal Co. has been moved from Mount Pleasant, Texas, to Dallas, and established at 1209 Great Southern Building. B. W. Williams, president of the company, will move to Dallas and take charge of the office. The company owns extensive coal and oil lands in Titus and other east Texas counties, and is preparing to operate on a large scale.

WASHINGTON

Chehalis—The Superior Coal Co. has closed a contract for supplying 200 tons of coal a day to interests in Portland. It has doubled its working force and is laying plans for new development work at once.

Centralia—A fire which broke out in one of the crosscuts of the Mendota Coal and Coke Co. mine has temporarily closed it down.

Foreign News

Victoria, B. C.—In a memorandum issued on July 17 by Charles W. Peterson, deputy fuel controller for Canada, it is announced that Winnipeg is to have 65 per cent. of its normal supply of anthracite coal next winter, while the remainder of the Province of Manitoba other than the City of Winnipeg, and that portion of the Province of Saskatchewan east of approximately the 104th meridian, is to have 50 per cent. of last year's consumption. To the cities of Moose Jaw, Regina and Saskatoon 50 per cent. of last year's consumption is allotted.

Vancouver, B. C.—Shipments of coal from its new coal mines at Cassidy Landing to the bunkers of the Canadian Collieries at Ladysmith have been started by the Granby Mining, Smelting and Power Co., and will continue for the present at the rate of 100 tons a day. This will be increased as the operations at the mine permit. The coal will be stored at the bunkers until the by-products plant at Anyox is ready to receive it, which will be several months, in all probability. Meanwhile work on the company's own bunkers will proceed. Reports from Anyox indicate that work is being rushed on the byproducts plant, the coke ovens now being in course of construction. With its own coal mine and coke plant the company will be assured that it will have available sufficient coke for the smelter and will not suffer from shortage as was the case last year when labor troubles in the Crows Nest district interfered with the output of coal, causing a corresponding depletion of the coke supply at the smelter at Grand Forks.

Personals

H. J. Kennard has resigned as superintendent of the mines of the Coal Run Mining Co. at Kent, Penn.

H. B. Stamper has resigned as superintendent of the Jacksonville Nos. 1 and 2 mines of the Jefferson and Clearfield Coal and Iron Co., at McIntyre, Penn.

Matthew Lewis, formerly of Holsopple, Penn., has taken charge of the United Smokeless Coal Co.'s operations at Humbert, Somerset County, Pennsylvania.

Thomas Hogarth, formerly superintendent of Coal Run Nos. 4 and 5 mines, has been promoted to superintendent of all the mines of the Coal Run Mining Co. Nos. 1 to 7, at Kent, Penn.

A. M. Ogle, of the Fuel Administration, has been spending a couple of weeks in the field. During his absence, C. G. Hall, the district representative for Indiana, has been handling Mr. Ogle's work in Washington.

Spencer Ewing, formerly fuel administrator of McLean County, Illinois, has recently been appointed Director of State Requirements of the State Administration of Illinois. The Bloomington Coal Dealers' Association passed resolutions commending the faithful and impartial services of Mr. Ewing while fuel administrator of McLean County.

A. Yule of the Pioneer Coal and Coke Co. of St. Louis, Mo., is now an assistant to A. W. Calloway in the distribution of smithing coal. He is the first St. Louis coal man to be taken to Washington in connection with the Fuel Administration.

Obituary

John L. Schmidgall, age 47 years, for many years a prominent operator in the Murphysboro (Ill.) field, died in a St. Louis hospital on July 21 after a long illness. He was a graduate of Washington University at St. Louis and for several years was a civil engineer. Later he took charge of his father's extensive affairs, including the Schmidgall mine. The deceased was a member of the State Mining Board some few years ago and was mayor of Murphysboro for the years 1909 and 1910. Besides a widow, he leaves three sons.

Industrial News

Sullivan, W. Va.—The Sullivan Coal and Coke Co. is planning to increase its output from 500,000 to 1,000,000 tons per annum. The plant will be enlarged.

Hazleton, Penn.—The Lehigh Coal and Navigation Co. is planning to enlarge its works for the manufacture of coal briquettes, to provide for increased output.

Hazleton, Penn.—The Lehigh Valley Railroad Co. will increase the capacity of its mixer plant to provide for the blending of small anthracite coal with bituminous for locomotive service.

Stearns, Ky.—The Kentucky & Tennessee R. R. Co., of Stearns, operating in a rich timber and coal belt, where a number of big mines are operating, has increased its capital stock from $25,000 to $625,000.

Houston, Tex.—J. B. Adone, of 436 Westmoreland Boulevard, is planning the development of extensive lignite properties and would like to get in touch with producers of all kinds of mining machinery and equipment.

Jersey City, N. J.—The Central Railroad of New Jersey has awarded a contract to the General Contracting and Engineering Co., 29 Broadway, New York, for the construction of new reinforced-concrete coal pockets at its local terminal.

Oakdale, Ohio—Emmet Riley has leased a tract of 160 acres from the Buckeye Coal & Ry. Co., located on the Zanesville & Western railroad near Glouster. Plans have been made to drive an entry and open a mine to produce about 300 tons daily.

Gooding, Ida.—The Oregon Short Line has been authorized by the Federal Director of Railroads to construct a 12-mile spur track to the Teton coal fields, which are to be fully developed by the Teton Coal Mining Co., of Coeur D'Alene, of which R. C. Talbot is manager.

Greendale, W. Va.—A deal has been closed whereby the Greendale Mining Co., has sold its operating mine at Greendale to the Dollar Coal Co., of Cincinnati, which will make improvements and extensions and operate it in the future. The present capacity is about 300 tons daily.

Sassafras, Ky.—The Montgomery Creek Coal Co., recently incorporated with a capital of $100,000, has perfected its organization and is said to be planning for the early development of about 1000 acres of coal properties in this district held under lease. J. W. Reedy, of Lothair, is president.

Seattle—The Seattle School Board is considering an offer of the Pacific Coast Coal Co. to install coal burners in the schools here for burning powdered coal for heating purposes. All schools which were until the first of the year equipped to burn oil have been changed to coal burners.

Newark, N. J.—Until 1.30 p.m., Aug. 7, the Board of Freeholders will receive bids for the construction of reinforced-concrete coal pockets, including the installation of coal conveying machinery and equipment, at the Essex County Hospital, Overbrook. Runyan & Cary, 845 Broad Street, consulting engineers.

Louisa, Ky.—It is reported that the Louisa, Fort Gay & Torchlight Coal & Development Co., capital $1,000,000, organized by C. E. Stafford president, and others, plans the development of coal lands, the operating of ten collieries, construction of ten miles of railroad, and also the building of a central power plant on Lick Creek.

Charleston, W. Va.—Tracts of coal lands in Clay and Nicholas Counties will be developed by the Gauley Coal Co., which has been chartered with a capital stock of $100,000. Those principally interested in this company are Mat Levy, M. E. Moore, Louis Levenson, Elmer G. Biddison, Lemual A. Maxman and Louis Levy, all of Charleston.

Mortonville, Ohio—The Buckeye Coal & Ry. Co. has leased to William M. McCracken of Lancaster, O., a tract of 160 acres of No. 7 coal near Mortonville, which he will open by driving an entry. Electrical power will be secured from the Mortonville power plant of the Buckeye company. It is planned to equip a mine to produce 350 tons daily.

Charleston, W. Va.—The Marmet-Oliver Coal Co. will operate mines in Kanawha County, and with that end in view has secured a charter under which a capital stock of $50,000 is authorized. Those principally interested in the new company are Edwin Marmet, Thomas Oliver, V. L. Black, John Wehrle and S. P. Richmond, all of Charleston.

Piedmont, W. Va.—Holdings of the Fredlock Coal Co., of Piedmont, in Preston County, will be developed by that company, which has been chartered with a capital stock of $10,000, the incorporators being Frederick W. Fredlock, Jessie R. Fredlock, Robert McV. Drane, of Piedmont, Louis Adams and C. C. Culbertson, of Westernport, Md.

Charleston, W. Va.—Coal in the No. 2 gas seam on Campbell's Creek, in Kanawha County, will be mined by the Dana Coal Co., which has been organized and chartered by H. A. Jepson, of the American Rolling Mill Co., Marting, W. Va., with an authorized capital stock of $100,000. Offices will be maintained in the Union Building, Charleston.

Charleston, W. Va.—An acreage of coal in Elk District, Kanawha County, will be developed by the Liberty Coal Mining Co., recently incorporated with a capital of $10,000, the incorporators being B. M. Smith, J. A. Thomas, J. V. Sullivan, W. E. Whiteman and C. A. Wood. It is stated by one of the incorporators that work will be begun in about two weeks.

Oakland, Md.—The Freeport Coal Mining Co., a corporation engaged in mining near Corinth, W. Va., will increase its capital stock from $25,000 to $100,000, and has let the contract for extensive improvements and construction work on its property. The sole owners are Messrs. Campbell and Hoffa, of Piedmont; F. A. Thayer and Herman Creutzburg, of Oakland; and George Warnick, of Bloomington.

Clarksburg, W. Va.—Another mining operation in Harrison County will be established by the Diamond Fuel Co., this company owning a tract of coal in Simpson District. With a view to producing coal on a large scale, the company has been chartered with a $50,000 authorized capital stock, the incorporators being Paul E. Reutter, Wayne B. Hornor, Chas. B. Johnson and Carl Hornor.

Uniontown, Penn.—An order has been issued in United States District Court directing the immediate sale of 3000 shares of the Liberty Coal Co. and 7000 shares of the Wetzel Coal and Coke Co., both West Virginia corporations, to liquidate J. V. Thompson's indebtedness to the First National Bank. The indebtedness approximates $800,000, while the two blocks of stock have a reputed value of $1,700,000.

Decatur, Ill.—It is estimated that Decatur industries will store this summer at least 100,000 tons of coal. The largest consumer is the Wabash Railway Co., which is placing between 30,000 and 35,000 tons of coal in storage for next winter. The Decatur Railway and Light Co. will store 5000 tons of coal, and there are a score more of industries which will lay in from 500 to 15,000 tons each.

Sebree, Ky.—N. O. Tyler and J. M. Anderson, of Birmingham, Ala., representing the New Sebree Mining Co., recently incorporated with a capital of $100,000 with headquarters at Hopkinsville, were recently in Sebree looking over the old Sebree coal mine, of the Sebree Mining Co., which has been purchased. It was stated that improvements would be made at once, and the mine would be shipping coal again before cold weather.

Springfield, Ill.—State Fuel Administrator Williams of Illinois has announced that the allotment of anthracite to Illinois shall be divided on an equal percentage basis among the thirteen northeastern counties of the state — Stephenson, Winnebago, Boone, McHenry, Lake, Ogle, De Kalb, Kane, DuPage, Lee, Kenall, Will and Cook. The distribution will be on the basis of about 80 per cent. of the consumption in 1916 and 1917.

Hazard, Ky.—Coal operators of Perry County feel that they did good work when during the fiscal year ending June 30, 1918 they showed 1,618,353 tons of coal mined as compared with 998,000 tons during the preceding year. This is a healthy increase, but the operators claim they will surpass it this season if the labor supply holds up anywhere near requirements. A number of good mines, well equipped, are operating in the section, and these operations are keeping up with modern methods.

Alton, Ill.—Utilization of the Alton river terminal for the landing of coal on barges is contemplated in the plans of M. V. Sanders, Federal Inland Waterways Manager, who has charge of the establishment of barge service on the river. The terminal, which was equipped with hoisting apparatus, will enable the loading of great quantities of coal direct from cars to barges to be transported up and down the Mississippi. A. W. Mackey, of St. Louis, Sanders' assistant, will inspect and determine to what extent it can be used.

Charleston—D. H. Morton and associates of Burnwell, Raleigh County, have organized the American Eagle Colliery Co., and plan to expend $300,000 in the construction of a plant in Raleigh County, the mine to be a drift mine. It is estimated that the capacity of the new plant will be 300,000 tons a year. Work on the new plant will start shortly it is said. The Colliery company has been incorporated with a capital of $600,000, the incorporators being G. S. Couch, V. L. Black, L. G. Summerfield, Angus W. McDonald and S. L. Boriarsky, of Charleston. The superintendent of the new plant is to be Holmes Morton, who is located at Burnwell.

Indianapolis, Ind.—It is probable that fourth vein coal, the best grade of coal taken from Indiana mines, will be taken from the market, except for certain industrial plants engaged in work essential to the prosecution of the war and which can use no other grade of coal. A prediction to this effect was made by R. L. Flood, of the Quartermaster's Department of the United States Army, who was assigned to Indiana to supervise the establishment of preference lists for industrial plants engaged in war work and to work in coöperation with the state fuel administrator. Fourth vein coal is scarce, and this has caused the Federal Fuel Administration to desire to husband it closely.

Chicago, Ill.—The Chicago & Alton R. R., which is handling an immense amount of coal into Chicago for both city consumption and for delivery northward, has lodged a protest with the Cook County fuel administrator saying that receivers of carlots of coal have failed to unload consignments promptly. The Alton officials are keeping a sharp lookout for receivers who fail to unload their coal as soon as they should, and a systematic check will be kept on the failure of these men to send cars back. The Alton has received five new locomotives from the Baldwin locomotive works, and with the new engines assigned it by the Government will be able to move a vast tonnage of coal as well as of other commodities.

Columbus, Ohio—The State Public Utilities Commission has secured from the Supreme Court a writ of mandamus to compel the Morgan Run Coal Co., operating a three-mile railroad in Coshocton County, to furnish service to other coal mines on the line than that owned by the company. The proceedings resulted from complaints by other operators with mines on the road that service was refused them by the Morgan Run Coal Co., the latter defending on the ground that it was not a common carrier. The Commission, after a hearing, held that the road was a common and not a private carrier, and ordered the company to furnish car and transportation service to other mines on the line, but the company refused.

Fort Wayne, Ind.—Coal dealers of this city, when asked by their county fuel administrator to lay in large supplies of coal, appealed to their local banks for credit with which to purchase the coal. The banks asked for a statement of how much money was due the coal companies from delinquent customers. A list was prepared, taken from the books of the dealers, and it was found that there were 4000 consumers in Fort Wayne who owed the dealers $140,000. The fuel administrator says that he will permit no dealer selling to any delinquent customer of any other dealer, and that all those in arrears will be denied coal. The delinquents who pay their old bills can secure coal from any dealer. The administrator is preparing to store 25,000 tons of coal for emergency purposes next winter.

MARKET DEPARTMENT

Weekly Review

Market Generally Optimistic—Production Heavy But Not At Record—Stocks Accumulating in Certain Instances—Lake Movement Heavy

THE week's coal production while not establishing any new records has been heavy, closely approximating the best week the country ever experienced. Car supply has also been good, in some few cases equaling or even exceeding requirements. The accumulation of stocks is gradual and most pronounced in the case of the domestic and small industrial consumer. Railroad stocks are increasing with slowness as are also those of big industrial consumers.

The householders on the other hand are accumulating their winter's supplies and it is probable that by cold weather there will be but few that ordered their coal last spring that will not have a supply sufficient to carry well into the winter.

Recent fear of congestion at various points, particularly in New England, has arisen more from a shortage of labor wherewith to unload cars than from lack of motive power. A greater variety of cars than formerly are also being employed in the coal trade and the use of other than dump bottom cars is occasioning considerable inconvenience. No one thinks of entering complaint, however, as all dealers and consumers are glad to get the coal irrespective of the car it is shipped in.

The Lake trade is heavy and it is probable that there will be no greater shortage in the Northwest during the coming winter than there was during the past.

In the Middle West some coal has been sold at less than the Government price. This is perhaps significant of the position that coal occupies in the market. Since the Government prices went into effect it has been seldom indeed that coal has been sold in the open market for less than the Government figures.

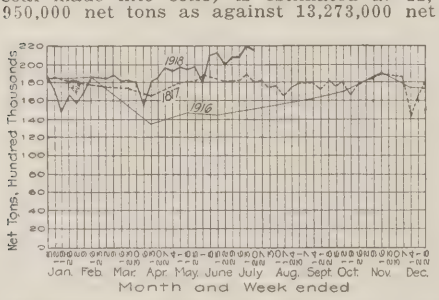
The car supply, taking the country as a whole, appears to be somewhat better than in some past weeks. In some localities in the East the car supply has been fully equal to the demand, while in Illinois some mines have only been able to work about three days per week. Much complaint is heard concerning this car distribution.

Because of railroad and navy demands for gas coal some illuminating gas companies are experiencing difficulty in securing supplies. Coal has been shipped all the way from western West Virginia to New England for this purpose. It is believed, however, that any great quantity of this coal will not be shipped such a distance for this purpose.

The demand for coal is everywhere brisk with supply just about equaling the demand. Production is heavy, car supply in general fair and individuals and small industrial consumers are beginning to get small stocks ahead.

COAL PRODUCTION

Production of bituminous coal during the week of July 20, while not equivalent to the record week of July 13, was higher than any previous week. The output during the week ended July 20 (including lignite and coal made into coke) is estimated at 12,950,000 net tons as against 13,273,000 net



tons during the week preceding, or a decrease of 2.4 per cent. and as against 11,230,000 during the corresponding week of 1917, or an increase of 15.3 per cent. The average production per working day during the week of July 20 is estimated at 2,159,000 net tons as against 2,212,000 net tons during the week previous and 1,872,000 net tons during the week of July 20, 1917.

Shipments during the week of July 20 decreased slightly from all districts with exception of Iowa, Texas and the Southwest States, the increase in this district amounting to 1.2 per cent. over the week of July 13. Carriers' reports show that shipments from Central Pennsylvania decreased 2.4 per cent., from Ohio 1.5 per cent., from Southwest Virginia 5.6 per cent. and from Illinois, Indiana and Western Kentucky 2.3 per cent.

CARLOADS OF COAL ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended: June 29	July 6	July 13	July 20
Bituminous shipments, 123 roads.	219,625	180,090	235,291*	229,545†
Anthracite shipments, 9 roads...	41,641	31,493	42,419*	40,664†

* Revised from last report. † Subject to revision.

Anthracite shipments during the week ended July 20, declined 1755 carloads or 4.2 per cent. compared with the week preceding, the total movements amounting to 40,664 carloads.

Beehive Coke—The production of beehive coke in the United States during the week ended July 20 is estimated at 668,188 net tons as against 680,285 net tons during the week preceding, or a decrease of 1.8 per cent. The average production per working day during the week of the 20th is estimated at 111,000 net tons as compared with 113,000 net tons during the week preceding.

Byproduct Coke—Working conditions in the byproduct coke industry improved considerably during the week ended July 20. The plants of the country produced 517,671 net tons of coke and were operated at 91.2 per cent. of their present capacity as against 89.8 per cent. during the week of July 13. Repairs to plants during the week caused losses attributed thereto to decrease from 5.4 per cent. to 4.8 per cent. and other causes which entailed a loss of 1.9 per cent. of present capacity during the week of July 13 decreased to 1.1 per cent.

BUSINESS OPINIONS

Bradstreet's—The line of cleavage between war industries and what are termed non-essentials is more marked, the first named becoming more active, while the latter, feeling increased difficulty in getting adequate supplies of materials, labor and coal, faces a serious situation. The week has seen further large drafts made upon man power for the military service, a marked shifting of existing forces, and increased participation of women in industry being foreshadowed. Further heavy orders for and enlargements of munition plants, increased speed in steel production and in shipbuilding, and heavily augmented outputs of clothing and other supplies for the rapidly growing armies, are other features of the week.

American Wool and Cotton Reporter—The wool situation has settled down to a point where manufacturers can be relatively certain as to what their supply of raw material will be. It is quite likely to be the supply of raw material which they have on hand, plus whatever amount of substitutes their ability will permit them to handle. It is felt that as long as the price of wool is regulated, manufacturers will be safe; but should any condition develop whereby the costs of raw material advance, the manufacturers would be placed in a difficult position. In cotton goods it will require strict regulation, much more strict than has been noted up to the present, if a regular price scheme is to be established and if that stability which is so desirable is to be imparted to the market.

The Iron Age—In its third warning to consumers of steel within three months the War Industries Board puts the needs of the second half of the year for war and essential industries at 20,000,000 tons of finished steel products, or 3,500,000 tons more than the expected output. A sharp challenge of the 20,000,000-ton estimate came from automobile interests, accompanied by a call for a definite assurance as to steel supply, even on a reduced scale. No assurance has been given, nor can it be given, the most certain thing in the prospect being that the use of steel for war purposes will increase, while production is less likely to increase.

Marshall Field & Co.—Current wholesale distribution of dry goods is in excess of the large shipments of the corresponding week in 1917. Road sales are larger than those for the same period a year ago. Customers have been in to market in greater numbers. Collections are very satisfactory.

The Dry Goods Economist—Interest in textiles during the week has been devoted chiefly to the price-fixing of cottons, accomplished and prospective, the possibility of getting additional supplies of wool, and measures which will have to be adopted if it becomes necessary to depend entirely on existing stocks of dress goods and of other woolen fabrics for the trade's needs during the coming fall and winter. Emphasis was given to discussions of the cotton and woolen goods situation by the announcement of Secretary of War Baker as to the need for an army of 5,000,000 men before the end of this year. Secretary Baker supplemented this assertion with the statement that at least 2,000,000 men must be in Europe before Dec. 31.

Atlantic Seaboard

BOSTON

Receipts of bituminous now in good volume. Reserve stocks creeping up, especially with smaller users. Railroads accumulate stocks slowly, but are far behind last year's reserve. All-rail shipments continue to show steady increase, although figures are about the same as for March and April. No sign yet of car congestion on New England roads. Number of gas plants where usual source of supply is Pittsburgh or Connellsville, find no provision made in fuel "budget." Hampton Roads situation better, but detention is certain if fuel authorities sag off from recent orders turning coal to Tidewater. Anthracite receipts are fair all-rail but still slow by water. Agitation over municipal buying.

Bituminous—Ample car-supply, record production, and perceptible increases in stocks on hand have all had their favorable effect on New England buyers. Distinctly there is a much better feeling in the trade over the status of bituminous than was the case a month ago. It has even had its effect upon the purchase of anthracite screenings. There is simply a less anxious disposition among buyers who for nearly two years now have been under constant strain to get coal forward. This is probably as near as we shall come to what in normal years would be midsummer dullness.

Larger stocks are especially noted among the smaller steam-users. The shortage of labor everywhere is a factor and distributors are careful about sending cars in large number to certain plants because of the delays that usually follow. The large consumers are not well stocked in proportion. In fact, some of the largest utilities have been unable thus far to accumulate coal in sufficient volume to give them even a safe margin of supply. The corps of scouts organized by the New England Wholesale Coal Association is doing effective work. There is a natural tendency of consumers to exaggerate the tonnage used and for that reason the use of experienced coal men in policing distribution is of special value.

Effective July 22 all wagon-loaded coal in box cars in the central Pennsylvania districts was taken over by the Fuel Administration, the coal to be sent to the scales for disposition by the district representative. It is assumed that this will mean a considerably increased movement to this territory. Wagon coal forwarded on direct requisition through the Fuel Administration is to be invoiced to Mr. Storrow when tagged for New England points. New England consumers are ready to take whatever tonnage can come forward in box cars and the effort is made to spread them over a wide area in order to prevent detention at destination.

As yet there are no indications of congestion at any of the New England gateways The roads at this end are handling promptly all the coal traffic turned over to them and so long as general freight remains at its present level at least 200 cars more per day could be taken care of. A week ago there was some anxiety lest the New Haven R. R. show signs of extra detention at certain stations but it was recognized that these local situations were due to scarcity of help rather than to lack of motive power. The worry therefore was over possible delay in returning empties and a temporary car shortage that might follow. Part of the car accumulation was due to wholesale diversions of coal originally marked for South Amboy and since this was done in blocks of 400 to 500 cars there were bound to be humps here and there.

Notwithstanding all the representations that have been made to Washington over the heavy tonnage of railroad fuel being drawn from gas coal districts, particularly from grades low in ash and sulphur, railroad contracts are receiving 90 @ 100 per cent. performance, while illuminating gas requirements in New England are in arrears on shipments. It has been pointed out repeatedly that the use of high grade gas coal in locomotives is wasteful and that the railroads might as well begin now to use medium grades on fast trains.

The outlook for illuminating plants gets complicated when usual sources of supply are absolutely shut off and the gas plants are obliged to look for consideration at the hands of new shippers in districts that are already overburdened with other requisitions. For the moment an increased tonnage of Kanawha splint and other West Virginia high volatiles is being received via Hampton Roads, but it is hard to see how an adequate tonnage can be relied upon. Lately there has even been a tendency to arrange for gas coal in the Kentucky districts, sample shipments having been forwarded by rail, but doubtless there will be a regulation to prevent cars being used for so long a haul.

The volume of coal eastbound to Hampton Roads continues large and despatch at the piers has correspondingly improved. At this writing there are only about 30 bottoms waiting where a fortnight ago there were 70, and daily dumpings are being held at the 60,000 ton mark. Coastwise steamers have suffered some detention but the demurrage paid was not so serious as feared, two days at 25c. per ton having been the average for both loading and discharging. Renewal of U-boat activities off the coast has again caused slower movement. One of the results is a general order through the Emergency Fleet Corporation to camouflage steamers in the coal trade. The number of ships in repair yards is away above normal, although at this juncture with the number of new vessels entering the service a little extra time spent on camouflage will not be any great handicap.

Anthracite—For 25 days in July the daily receipts of domestic sizes at the five gateways averaged 644 cars. The daily average for steam sizes was 180 cars or 23 per cent. of the total anthracite. The latter is smaller in percentage than heretofore but this is due to increased movement of domestic sizes. While these figures indicate fair shipments all-rail, the mark is considerably below what was reached in June. August will therefore have to show a material increase if New England is to receive its full quota. Water shipments are still seriously affected by the lack of towing power and the cautious operations of what barges and tugs remain in service. Receipts from New York ports are also affected by the disinclination of Long Island Sound barge owners to send their craft this side of the Cape because of the delay in moving bottoms from the canal to Boston points.

The desire of Boston municipal authorities to take over the retail distribution of anthracite has had a prominent place in the newspapers the past week. Mostly this publicity disclosed a lack of information on what seems to be a peculiarly difficult business to understand. The mere advance of 25 per cent. in railroad tolls effective Jun. 25 seems to have meant nothing at all to the city fathers and they showed great surprise and even resentment over an advance in retail prices to cover the extra cost.

NEW YORK

Anthracite moving easier but supplies are lacking. New state fuel administrator pleases the trade. Dumpings at the local tidewater piers fall off. Anthracite committee discontinues shipments to various communities. Bituminous conditions improve. Car supply better and railroads move coal rapidly. Change made in bunker pools. Labor shows dissatisfaction.

Anthracite—There has been a noticeable change in the situation. Coal is moving easier, but there is no more surplus on hand owing to the continued heavy demand.

The trade here feels easier now that the office of state fuel administrator has been filled by the appointment of D. W. Cooke, who has been identified with the Erie R. R. as vice president in charge of traffic, and who is thoroughly acquainted with the coal industry. It is expected that Mr. Cooke will see to it that New York will receive its just quota of fuel and that its receipt will soon wipe out the feeling that New York will face a famine next winter. Mr. Cooke promptly entered into the solving of the problems before him and has already had conferences with some of the county administrators of the state. Following Mr. Cooke's appointment there was a strong rumor that C. E. Robertson, who was deputy administrator under Albert H. Wiggin, and since the latter's resignation acted as state administrator, had sent his resignation to Dr. Garfield. When it was announced that it was the intention of the Washington authorities to name two administrators for New York State it was stated that Mr. Robertson was slated to look after New York City and Long Island, which was to comprise one district. Mr. Robertson was not in favor of dividing the state, and the division has not been made.

Although production reports indicate that the mines are operating at capacity with existing labor conditions, the local situation is described as being as bad as at any time. Domestic coals are not to be had in greater quantities than have existed for some time and this includes pea and buckwheat No. 1. Consumers in some instances are using rice in place of buckwheat and some have resorted to burning barley in place of the larger of the steam sizes.

In view of the optimistic reports from the mining regions as to production, the trade here is inquiring as to the destination of the shipments. No gain is reported in receipts here and the dumpings at the local tidewater docks for the week ended July 26 show a falling off of 321 cars, as compared with the week previous, when 7375 cars were discharged. For the week ended July 26 7054 cars were dumped. If reports are authentic this market is to be accorded increased shipments beginning early in August.

There is plenty of barley to be had and most dealers say they have more of this size on hand than they have had in many months. Many of them are looking for bituminous so that they can dispose of both coals together.

Conditions in the mining fields are unchanged. Labor continues to leave the mines for other industries where higher wages prevail, but the authorities have taken steps to prevent this and to put mine workers in deferred classes. In this way it is hoped to keep production up to the top notch. The mine workers are watching with interest the efforts of their leaders to reopen the wage agreement and appear to be confident that they will receive increased wages. They are being urged by their leaders to do everything possible to keep up a record production, meetings being held in the three districts for that purpose.

The anthracite committee of the fuel administration has issued orders discontinuing shipments of domestic coals, including pea, into 51 communities in Vermont and to 89 counties in Illinois. The committee also placed an embargo on all shipments of pea and larger to all points in Ohio south of the main line of the Erie R. R. running across the state from Orange to Wren.

Current quotations, per gross tons, f.o.b., tidewater, at the lower ports, are as follows:

	Circular	Individual		Circular	Individua
Broken	$6.75	$7.50	Pea	$5.20	$5.95
Egg	6.35	7.10	Buck	5.10	5.90
Stove	6.60	7.35	Rice	4.65	5.10
Chestnut	6.70	7.45	Barley	4.15	4.30
			Boiler	4.60	

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates. Prices for buckwheat, rice, barley and boiler are not fixed by the Government.

Bituminous—With conditions indicating a slight improvement there is a feeling that with the mines keeping up to their production of the past two weeks the expected shortage of bituminous next winter might be averted. The heavy demands do not, however, permit of much storing in this vicinity. Reports from other near-by sections indicate that manufacturers are more fortunate and that some of them have good sized storage piles.

Further changes have been announced by the Tidewater Coal Exchange in the composition of the pools containing coals suitable for bunkering of transatlantic steamers. All coals consigned to Pool No. 9, when intended for use in bunkers, are to be sent to Pool No. 71, a new pool, and the coals formerly consigned to Pool No. 10 that have been allowed to be used for bunkering for transatlantic steamers are to be sent to Pool No. 72, also a new pool. All other coals sent to Pool No. 9 are to be used for commercial purposes. No coals are to be mixed, that is, coals sent to Pools Nos. 71 and 72 cannot be loaded into the same cargo. Under the new orders coals consigned to Pools Nos. 1, 71 and 72 can be used for transatlantic bunkers, while those sent to Pools Nos. 1, 4, 10, 71 and 72 are permissible for coastwise bunkers.

It is expected that these changes in bunkering coals will increase the quantity of commercial coals in this market. Consumers are said to be willing to pay the additional cost allowed producers of bunker coals if they could obtain some of them for commercial purposes, so urgent is the demand for fuel.

There is a better feeling among operators as to the outlook. Car supply on the Pennsylvania and New York Central is said to be all that can be expected at this time, but labor is dissatisfied. The railroads are doing much better in the movement of coal. Shipments from central Pennsylvania to New Jersey points are coming through in four days, whereas the average at the corresponding time last year was from 3 to 5 days longer.

The demand for railroad fuel has increased rapidly and some of the roads that heretofore have used anthracite on their passenger locomotives are now using a

mixture of bituminous and anthracite steam sizes.

The public has been warned that violators of the new "lightless" night rules will be prosecuted.

There was a falling off in dumpings at the local tidewater docks for the seven days July 20 to 26, inclusive, 6922 cars having been dumped, as against 7130 the previous week.

Current quotations, based on Government prices at the mines, net ton, f.o.b. tidewater, at the lower ports, are as follows:

	Mine Gross	F. o. b. N. Y. Gross
Central Pennsylvania:		
Mine-run, prepared or slack	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of-mine	3.08	5.23
Prepared	3.36	5.51
Slack	2.80	4.95

Quotations at the upper ports are 5 c. higher.

PHILADELPHIA

Anthracite demand continues despite hot weather. Slight improvement in receipts. Dealers doubtful as to future; authorities optimistic. Miners' unrest affects trade. State tax refund. Additional carrying charge. Little canal tonnage now expected. Exports supervised. Lightless nights in effect. Bituminous continues in good volume. Car supply in excess of needs at times. Government ownership doubted.

Anthracite—Despite a week of intensely hot weather there was no diminution in the demand of the public for coal. As many people feel summer is slipping away without coal in their cellars their anxiety increases. Of course the most of these are people who never heretofore ordered their coal in the summer, but now that they have been induced to do so they fear if the coal is not delivered before Sept. 1 they are liable to suffer accordingly. As to receipts there is just the barest possibility that on the average shipments have been slightly better than the previous week, but even at that not up to the quota for the city.

It is generally known among the dealers that there is a slight decrease in production of domestic sizes at the mines from week to week as compared with last year and they are probably more pessimistic than the consumers. However, we feel that the fuel authorities have begun to give this fact the fullest recognition now, as the instructions to cut off shipments to certain states contiguous to soft coal mines increase.

The unrest among the miners is being felt among the interests here, from producer to consumer. The operators here seem more anxious to increase production than anything else and now have a plan whereby the patriotism of the men can be further stirred to increased activity in coal production. The plan is to engage soldiers who have served in foreign armies, such as Poles, Slavs and Italians to go into the region and urge upon the men the importance of their staying in the mines and producing coal and that by so doing they will be doing a work equal to the soldier in the field. This plan has gained much impetus since the men are refusing exemption by the draft boards and getting into the war by enlisting.

To the surprise of every one in the trade one of the large companies has sent notices to its customers asking them to make up bills for tax collected under the last state tax law, which was declared invalid by the courts over a year ago. The dealers all along have known that they were entitled to this tax, but had come to the conclusion that the companies were too busy to work up the refund under present conditions. Since the lead has been taken it is quite likely now that all the other companies will follow.

Due to the many complaints entered by dealers because of the low charge allowed for carrying coal into cellars when it cannot be chuted in, the administration has granted an increase of 25c. to 40c. a ton. This is hardly satisfactory, however, and a number of dealers are reported as refusing to take orders where there is an extra carry. Some of the dealers had adopted the practice of dumping the coal on the sidewalk, but the fuel authorities refused to place their official sanction on this. Some consumers are making arrangements to do their own carrying. The fuel authorities have also had complaints from citizens who claim that dealers will not take their orders at all, claiming they have already more orders than they can take care of.

With the summer almost half gone it is seen that little coal will reach the city via canals, although great promises had been held out earlier in the summer. The matter has not been abandoned by any means, for dredging of the Schuylkill canal continues and it is expected that some shipments will be made via that route. The Lehigh canal is in operation, but whereas 40 crews were operating last year, only 26 are working this summer and no shipments are made south of Bristol, Penn. Dealers here with water yards are being supplied via barges from Port Richmond piers.

The lightless night order has gone into effect without friction, although in some sections a few violations were discovered, probably due to a misunderstanding of the edict. It is believed that a considerable saving of coal will be effected by this curtailment of four nights of the week beginning with Monday.

The steam trade continues as active as in midwinter. No coal of any size, except culm, is offered, and this is so well taken by outside markets that little effort is being made to seek local business. It is also understood that shipments of this coal have recommenced to the states which had been cut off by the order prohibiting shipments of any kind of anthracite. The authorities were shown that shipments of culm to these states could not affect the general situation and thus authorized the resumption of culm sales.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.25	Buckwheat	$3.40	$4.45
Egg	4.50	5.85	Rice	2.90	3.80
Stove	4.75	6.10	Boiler	2.70	3.70
Nut	4.85	6.20	Barley	2.40	3.30
Pea	3.45	4.70	Culm	1.25	2.15

Bituminous—Good shipments of bituminous continue to arrive and it is the feeling that this condition will prevail right along now, at least until winter. The matter of car supply seems to have been solved and it is not uncommon these days for many mines to receive more cars than can be loaded. This is explained by the fact that when calls for cars are placed by mines they ask for the full rating of their plants, but there is no way of telling how many men will turn out on the succeeding day. This is a condition that is becoming general in the bituminous region and led to a report being issued from Washington stating that the mines as a whole have recently received more cars than they can use. The cars could be used if the men were available to produce the coal.

Quite a little trouble has been occasioned for the bituminous distribution committee by the shutting off of anthracite to 31 counties in the state. Retail dealers in those counties are calling upon this committee to procure them a source of supply of bituminous coal to take the place of the former anthracite. Before directing shipments it is necessary for the committee to have some assurance as to the credit standing of the applicants, many of whom only need a few cars of coal, and it is taking considerable time and effort to effect this.

Little credence is given locally to the intimation in some quarters that the Government is liable to assume control of the mines this winter if there should be a failure to produce sufficient coal to meet the needs of the country. As a matter of fact it is hard to be seen how the Government could have a closer control on the business than it has now.

BALTIMORE

This section hard hit by plan to send all available fuel to more distant points. Small reserves being rapidly exhausted. Hard coal, after brief spurt, continues record much behind expected schedule of receipts here.

Bituminous—Under the general Government plan of sending all coal possible to the Northwest and to New England in this mid-summer period, the Baltimore fuel district is hard hit. A. W. Calloway, Federal fuel director, who was in this city during the week, explained that it had been decided to cut to a minimum the deliveries in territories contiguous to mining sections in order that distant consuming territories, where sufficient fuel is absolutely necessary for war industries, be supplied before any chance of wintry weather cutoff comes. This would seem to mean that consumers here of soft coal may have to scrape along from hand to mouth until near Thanksgiving and rely throughout the winter upon heavier deliveries to keep them going at a time when deliveries farther north would be difficult if not impossible. The office of Maryland Fuel Administrator Meyer was the scene of much urging for fuel the past week, and this condition continues, despite the fact that many consumers have not awakened to the tightness of the situation. It is only those who have been caught without coal by the cutting off or curtailment of their direct deliveries, or those who are now forced to use part of reserve supplies at a time when they are usually stocking up, who make up the group of more urgent claimants.

Anthracite—Hard coal men here report another slump in receipts after a brief spurt in the first ten-day period of July. The general condition is shown by the fact that the total receipts for June fell not only behind the 10 per cent. increase in allotment set for Maryland, but behind the receipts for June of 1917. Last month the total received was 58,777 tons, against 64,751 tons in June, 1917. In addition war industries here used probably 4500 tons more this June of hard coal than in June of last year. On July 1 the total reserve of hard coal in Baltimore, as reported by dealers, was 23,000 tons; and the same dealers reported 264,000 tons of orders undelivered on their books, with prospects of a total of 300,000 tons undelivered before Aug. 1. At the rate of present receipts it would take until the end of January to deliver the coal already ordered. Each new draft is leaving the retail dealers with less working force, and even if the coal should come in heavily in September and October the majority of hard-coal men here fail to figure out how they can deliver it.

Lake Markets

PITTSBURGH

Heavy Lake shipments. Production substantially at record rate. Much coal by river and truck.

At latest reports Lake shipments from the Pittsburgh district were running at the rate of 1,400,000 tons for the month, but the month as a whole is expected to make a better showing than this. The original quota for the month was 1,300,000 tons, but on account of the extra demands upon West Virginia and Kentucky from the navy the Pittsburgh district has been required to exceed its quota as much as possible.

Production of coal in the district is substantially at record rate. Car supplies are not equal to requirements, but are more satisfactory than at any time recently. Labor performance has improved somewhat and the efforts of the various Governmental agencies are being continued to produce as nearly 100 per cent. efficiency as possible.

Nearby consumers of coal are receiving substantially as much fuel as required for current operations. No rail coal is being stocked, as the local distributor's orders are emphatic on that point. River coal shipments are heavy and a considerable proportion of this coal is being stocked, by the limited number of consumers who can take river delivery. A project has just been broached to lengthen the locks on the Monongahela river, as with the increasing traffic there is hardly enough capacity, while time is lost breaking tows. A great deal of coal continues to be trucked to manufacturing plants. Buyers of such fuel are making the best of a bad bargain, as the cost of the coal is materially increased.

The market remains quotable at the set limits: Slack, $2.10; mine run, $2.35; screened, $2.60 per net ton at mine, Pittsburgh district, brokers being allowed to charge customers up to 15c. commission in addition.

BUFFALO

Large demand for anthracite. Better shipments by lake. Bituminous moving slowly. Jobbers not hopeful, but will keep up business as best they can.

Bituminous—The trade does not change much. A ray of hope is found in the official report of record production, but a jobber who claims to be posted says that it cannot last. He also takes the pessimistic side of the case by predicting a political outcome of the public control of the trade. This section has about forgotten politics in such matters. It is well to look on the other side of business these days. As a rule this is done. If a jobber can get no coal he watches his chance and tries again. Many reports of the alleged actions of the Government with regard to the jobber are going about, but they almost always turn out to be conjectures.

Bituminous prices are as follows to this market: Thin-vein Allegheny Valley, all sizes, $4.65; Pittsburgh lump, $4.45; Pittsburgh mine-run and slack, $4.20; cannel, $6.20; smithing, $5.85, all per net ton, f.o.b. Buffalo, with jobber's profit added.

Anthracite—The situation is hard to define, for while the supply is next to noth-

ing, the demand is heavy and insistent. Retailers send their wagons to the trestles on days when coal is to be had, but often not more than half the long line gets any coal. Then the customer blames the dealers because the orders are not filled. At the same time the cellars must contain more coal than in any summer during previous years. The county fuel administrator has asked for 900,000 tons of anthracite, but so far is only promised a minimum that shall run above 700,000 tons, which is only a little more than has been distributed in former winters.

The fuel administrator on July 24 fixed the city prices of coal at the curb at $9.30 for grate, $8.95 for egg, $9.20 for stove, $9.25 for chestnut, $7.80 for pea and $7.75 for buckwheat. This is $1.85 per ton more than the wholesale price. Retailers in ordinary times always contended that they ought to get a margin of $1.50, but competition often cut it down to 85 cents.

Lake shipments of anthracite are increasing again, being for the week 114,700 net tons, of which 53,500 tons cleared for Duluth and Superior, 30,200 tons for Chicago, 14,900 tons for Milwaukee, 7500 tons for Waukegan, 7000 tons for Fort William, 1000 tons for Depere and 600 tons for Mackinaw.

CLEVELAND

Local bituminous coal requirements have been made subsidiary to the pressing demand for supplies for the Northwest. Industrial stocking of bituminous has been ended until after Oct. 1. Industrial concerns well stocked are to be denied further shipments and will be compelled to dig into their stockpiles.

Bituminous—Above all developments in both the local bituminous and the Lake trade are the general orders of the United States Fuel Administration giving the right-of-way to shipments for the Northwest. It is hoped that Lake shipments may be brought up to schedule by Oct. 1, and consequently, every ton of coal possible must be rushed up the Lakes. Industrial plants that have from four to six months' supply on hand must not expect further supplies at present. Industrial stocking will be cut to a minimum.

Bituminous coal has proved more and more difficult for retail dealers in Cleveland and northern Ohio to obtain the past few days, and most dealers are considerably behind on orders. It is stated that less than one-fourth of the domestic requirements for bituminous for this winter have been satisfied to date. Car supply in the southern Ohio fields continues 100 per cent. or close to that figure. The labor situation has not improved, but the inauguration of the new Federal plan for recruiting labor Aug. 1 will help some, operators believe.

Anthracite—Virtually no anthracite is reported entering the Cleveland and northern Ohio market, but dealers are expecting further supplies for domestic consumers before cold weather sets in.

Lake Trade—Bituminous for the Northwest in the early part of the week was coming forward at the rate of 1,000,000 tons a week, but shipments in the latter part of the week have brought the estimate to a lower level. Revised figures for the week ending July 20 now place the shipments to the Northwest at 913,672 tons. First figures for the week ended July 27 place shipments at 978,800 tons. As has been the case all season, capacity is far in excess of cargoes.

DETROIT

Improvement in supply of domestic coal fails to develop. Household distribution is delayed. Lake shipments show gain.

Bituminous—For the present interest of local jobbers and retail dealers is held by the small volume of coal available for domestic use that is being received in Detroit. While the bituminous shipments arriving are lighter than in previous years, the supply of steam coal seems to be sufficient to meet present needs of the consumers, though not much opportunity is given for adding to reserves.

As regards consumers of domestic coal, the situation is less satisfactory. The stock coming in is largely mine run and not adapted for use in the ordinary household heating plant, while there is a marked scarcity of domestic lump and sizes favored by domestic users. This condition is made more vexatious by the fact that under regulations of the state fuel administrator a largely increased use of bituminous coal is made necessary as a substitute for anthracite, coke and smokeless coal.

Anthracite—Incoming shipments of anthracite are small, some days amounting to fewer than 30 cars and seldom exceeding 40 cars. The dilatory method of supplying the needs of Detroit consumers while shipments of large volume are being sent elsewhere is preventing distribution among consumers at a time when it should be well under way. The Detroit Board of Commerce has decided to intervene in the interest of residents of Detroit and Michigan.

Headed by President J. J. Crowley, a committee of 15 prominent Detroiters left Sunday to appeal to the Federal Fuel Administrator to expedite movement of coal into Detroit and to urge also that the state's allotment of 1,201,000 tons of anthracite be increased to an amount more nearly commensurate with requirements and to a degree that in part at least will offset the loss of some 600,000 tons of coke and smokeless coal diverted from Detroit for war purposes.

Lake Trade—Coal has been moving rather freely to lake loading docks during the week and it is estimated by shippers that nearly 1,000,000 tons of cargo coal were loaded last week. Vessel supply offered for loading exceeds the available cargoes and a heavier movement will be necessary to meet the schedule of shipments for the month.

COLUMBUS, OHIO

A steadier car supply is helping production in all Ohio fields. Strong demand for all sizes is still reported from every quarter. The Lake trade is especially active.

Production figures continue to rise in all mining districts because of a better car supply and steadier employment. There is still a labor shortage but that is to be expected under the circumstances. On the whole the market is in good shape as the demand for all grades and sizes remains strong. Prospects indicate a continuation of the strong demand for domestic, steam and Lake tonnage.

The Lake business is being rushed as fast as possible as producers and shippers wish to forestall a possible priority order later in the season. The vessel movement is active, although some boats are still going to the head of the Lakes light, because of lack of coal tonnage at the Lower Lake ports. The ore trade is rushing and the Federal authorities are making every effort to get the ore to the manufacturing sections. The shortage at the head of the Lakes is still a matter of deep concern as it is feared that the Lake trade can not be pushed much stronger than at present.

CINCINNATI

Improved car supply and beginning of river shipments have helped receipts. Volume of movement is satisfactory and demand heavy.

The receipt in Cincinnati of a large shipment of river coal which was sent down by an artificial wave, added materially to the total volume of fuel available. The first of a series of such shipments, this transportation medium will undoubtedly be an important factor during the remainder of the summer. Better car conditions at many mines were also reported last week, enabling operators to forward more coal. The movement through this gateway for the Lake ports and other Northern destinations was correspondingly heavier. Local receipts are satisfactory, although the wants of dealers and consumers in this immediate section have to give way, to a large extent, to the requirements of those more distant from the mines, in accordance with the policy of the Government in the distribution of fuel. The demand for storage continues to be heavy and insistent, especially from domestic consumers, who in many cases are worried over their winter's coal supply. The trade is confident that the needs of the public, both for industrial and domestic purposes, will be met next winter more thoroughly and generally than last winter, both on account of improved production and distribution and on account of the fact that everybody has been educated to the necessity of taking coal when it is available, thus freeing the distributing machinery for essential work later on.

LOUISVILLE, KY.

Demand continues strong for all grades of coal, with slack in somewhat lighter call due to the placing of nut and slack on the same relative basis.

Coal production in the western Kentucky field has suffered during the past two or three weeks due to heavy draft calls on colored laborers. In eastern Kentucky white labor is used principally, and the recent calls haven't affected such labor so greatly.

At the present time the mines are getting a good supply of cars, and a good movement of coal and coke is being noted considering the short supplies of labor obtainable.

In a retail way the situation shows little change. The local dealers are far behind on orders, and coal is scarce, with few yards with any supply on hand, and being forced to make deliveries directly from cars as rapidly as the coal can be secured. Orders now on hand will keep the trade busy for more than two weeks. About the only coal to be had at this time is western Kentucky and a little Hazard coal, eastern Kentucky grades being practically unobtainable.

BIRMINGHAM

Production showing a slow but steady gain. Market conditions good as regards demand, inquiries being strong for domestic, while steam appears to be a little easier than last week. Car shortage reported in a few instances, but so far this has not crippled production.

A general improvement is noted in the output of coal in the Alabama field during the past week or so and the production is expected to show a steady gain from now on. The slackers are receiving requests from the Fuel Administration to work full time, and the forces at the mines are being increased by the addition of men from other less essential industries.

Local conditions as regards the demand and supply show little or no change over last week, reports from some distribution sources indicating a slightly easier steam market, though inquiries are still strong and much in excess of the supply.

Domestic trade, both wholesale and retail, is active, and there is a pressing demand on the mines for every ton that can be produced. Everybody appears to be anxious to lay in coal at once, hence such abnormal immediate requirements cannot be met. Coal is being stored at a satisfactory rate, though retailers are not receiving the desired tonnage to meet orders in hand.

Slight interruptions to operations have been experienced by mines on the Southern and Frisco recently by the lack of equipment for loading. However, there has been no serious delay on this account so far and the loss in production has been immaterial.

Coke

CONNELLSVILLE

Market offerings negligible despite increased production. Still more byproduct coke.

While the production of Connellsville coke has been increasing slightly of late there is still little offered in the open market, except of foundry grade. Furnacemen think it can hardly be long until there are relatively free offerings in the market, and if such a condition obtains there is a possibility of prices being affected, for there is admittedly quite a handsome profit in coke making at the Government prices, much more than there is in the production of coal. It is well recognized in the trade, from all past experiences, that when there is a slight shortage of coke it is extremely easy to sell while when it is a bit plentiful it is difficult to sell.

While the production of Connellsville coke has increased but slightly of late, the mere fact that any increase at all has occurred is quite encouraging, considering that in the past two months the 180 new byproduct ovens of the American Steel & Wire Co., at Cleveland, have been put in operation, and 128 ovens of the Carnegie plant at Clairton. The Connellsville region has to ship correspondingly more coal and for it to maintain and even increase its coke output is doing well. Another case of more byproduct coke is the 60-oven addition to the Bethlehem Steel Co.'s 120 ovens at Steelton, put in operation July 9, increasing the output at Steelton by fully 20,000 tons a month. The next byproduct plant will be the National Tube Co.'s 208 ovens at Lorain, some of the ovens now being in process of drying out, and full output from the plant is expected by September.

The market remains quotable at the set limits for furnace and foundry coke, $6 and $7 respectively, per net ton at ovens. Limits on other descriptions are: Crushed, over 3-in., $7.30; crushed, under 3-in., $5; breeze, $3.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended July 20 at 351,650 tons, a decrease of 1720 tons.

Buffalo—The demand is heavy, both for commercial sizes and domestic small stuff. The furnaces obtain supplies from the producers with difficulty, but manage to keep running. Consumers of breeze and gas

coke get a small amount. The Fuel Administration allows $4.54 for breeze at the place of production, but some shippers still sell it at the old price of $2.45 at the ovens. The receipts of iron ore by Lake keep up well, the amount for the week being 322,232 gross tons.

Middle Western

GENERAL REVIEW

Rumor that jobber's 15c. margin is to be abolished, and another to effect that Government is to take over several Middle West mines.

The most noticeable feature of the coal market for the past week was a large number of rumors, all of which, for the present at least, are without official confirmation or sanction. The most important of these rumors is to the effect that the United States Fuel Administration is contemplating a ruling which will abolish the 15c. per ton margin charged by a jobber for his purchasing agents' commission. If this rumor becomes a rule, it will mean that if the jobber is to continue in business it will be necessary for him to purchase his coal from the operator on a basis of at least 15c. per ton under the current Government price. As the average operator today can sell his entire output without the slightest bit of trouble, the outlook for the jobber is pretty black. We understand that there is enough foundation to this rumor to have caused a committee from the National Coal Jobbers' Association to hurry to Washington to take the matter up with the proper parties.

Another rumor which has gained considerable credence is that the Government will shortly take over a number of the larger coal-producing properties in this territory. It appears that some of the operators are not taking the care they should of the orders given them by the various Fuel Administration representatives, and for this reason, to enforce a compliance of its orders, the Fuel Administration is planning to step in, which will result in Government supervision and control of the mines in question. It is said that the problem will be handled in a manner similar to the Federal management of the railroads.

The last and least important of these current rumors is that there will be modification in Zone C which will bar shipments of Illinois coal from moving to certain districts of Iowa, which at the present time are in the Illinois zone.

CHICAGO

Market has eased up. Labor situation at mines much improved. High grade domestic coals firm. Steam trade stocking up. Some coals selling below Government price.

There has been a decided easing up of the market during the past few days. This is all the more remarkable in view of the fact that the Government about a week ago placed orders aggregating between two hundred thousand and three hundred thousand tons to be used at the various Government training camps, munitions factories, etc., throughout the Middle West. The only explanation for the present easing up of the market in the face of this large order is that the mines had an unusually good production week. The labor situation was perhaps a little better, as men are moving to the mines, anticipating the "Work or Fight" order, and the car supply all over the territory was extremely good.

High-grade domestic coals are of course firm, but this position has been weakened some by unusually large receipts of Lake coal. The steam trade is purchasing coal freely and stocking up what coal they do not use for their current needs, as a sort of insurance pile for the winter months. All the better grade coals from most of the producing districts are selling on a basis of Government price current at time of shipment, but there are some coals that are selling considerably below the price set by the Government.

Quotations in the Chicago market are as follows, per net ton, f.o.b. cars at mines:

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La-Salle, Bureau and Will.
Steam lump	$2.55@2.70	$2.55@2.70	$2.95@3.10	$2.55@2.70	$2.55@2.70	$3.25@3.40
Domestic lump	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Egg or furnace	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Small egg or nut	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Stove	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Chestnut	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Pea	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Washed egg	2.75@2.90	.....	.....	2.75@2.90	2.75@2.90	3.45@3.60
Washed stove	2.75@2.90	.....	.....	2.75@2.90	2.75@2.90	3.45@3.60
Washed nut	2.75@2.90	.....	.....	2.75@2.90	2.75@2.90	3.45@3.60
Mine-run	2.35@2.50	2.35@2.50	2.75@2.90	2.35@2.50	2.35@2.50	3.00@3.15
Screenings	2.05@2.20	2.05@2.20	2.35@2.50	2.05@2.20	2.05@2.20	2.75@2.90
Washed slack	2.05@2.20	2.05@2.20	.....	2.05@2.20	2.05@2.20	2.75@2.90

MILWAUKEE

Increasing receipts of anthracite by Lake. Small dealers embarrassed by short allotment. No schedule of prices fixed. Conservation notes.

Anthracite has been coming in freely of late. Since last week's report five cargoes, aggregating 34,300 tons, have been put upon the docks. This makes a total of 209,891 tons of anthracite since the opening of navigation. The dock companies are not giving retailers a sufficient supply, however, and many small dealers are unable to supply their customers promptly. Some refuse to book any more orders until this situation changes. If present conditions should continue for any length of time, the smaller or "desk-room" middlemen are bound to be eliminated.

Stocks of bituminous coal were increased to the extent of 92,239 tons by cargo arrivals during the week, making the total since the opening of navigation 1,200,746 tons.

The anthracite schedule has not been announced as yet, and all coal deliveries made thus far remain unbilled. The state fuel administrator and fuel board continue to wrestle with the problem of fixing the margin of profit to dealers. The former maximum of $2.25 per ton has been pronounced too high.

The breweries of the city have been notified that they can use hydro-electric power in excess of the amount of coal they are permitted to consume. This rule does not apply to wood, however, even if such fuel is available without railway transportation. Illinois screenings are also forbidden in excess of the 50 per cent. fuel allotment.

A saving of 20 per cent. in the amount of fuel used by industries in Wisconsin is the purpose of Charles A. Cahill, state administrative engineer. The Milwaukee Street Railway Co. promises a saving of 10,000 tons of coal annually if it is allowed to inaugurate a skip-stop system. The matter is under consideration by the city authorities.

Two lightless nights per week are now the order in Milwaukee—Mondays and Tuesdays.

Fire is consuming 300 tons of bituminous coal in the bunkers of the lighting and heating plant of the University of Wisconsin at Madison. The bunkers are so situated that poisonous gases defeat every attempt to attack the burning mass.

The Dane County, Wis., fuel administrator has cut deliveries of coal in Madison from two-thirds to one-half, where the total amount exceeds six tons.

ST. LOUIS

The market shows a tendency to stiffen on Standard grades. The demand, however, is quiet both locally and in the country, and steam has been slow in moving. Car supply extremely poor and the distribution poorly managed. Transportation shows improvement. Large tonnage to move to Michigan.

The local situation has toned up somewhat in the past week principally because the tonnage is not available. In addition to the car shortage there is something radically wrong with the method of distribution. Some mines work every day and others only two or three days a week, taking the men away from some good operations to work at others that are supplied with the cars. Inquiries as to how this occurs bring no results and several operators are threatening to take the case to Washington and show up the inability to follow or the utter disregard for car distribution rules.

Screenings, which have been heavy, are picking up in a way on account of the coming shortage.

During the past week it has been agreed between the fuel administrator for Missouri, Wallace Crossley, and F. C. Honald, district representative of Chicago, who is in charge of the distribution of Illinois coal, that all the surplus in the Standard field on the lines of the Wabash, B. & O., Vandalia, L. & N. and Southern can move to Michigan, as prescribed by Mr. Honald, for a period of 60 days. This is going to bring about a tightening up of the local market and also convince local buyers that conditions are somewhat acute in other places if not at home.

The domestic call for Standard coal is not as good as might be expected. The labor problem is still a serious one in this field, but this is principally at mines where the car distribution has not been evenly pro-rated.

In the Mt. Olive field normal conditions continue to exist, with a car supply that is fairly good, a labor problem that is not bad, and a tonnage produced about equal to the demand.

The railroads still continue to take coal in large quantities from the Carterville field where there is a scarcity of cars and where transportation is not as good as in the other regions.

The labor problem in this field is about stationary, inasmuch as the draft will not affect Illinois for the month of July, but with the coming of August there is a likelihood of several thousand miners being taken in the new draft.

Conditions in the Duquoin field are somewhat similar to those in the Carterville district, with the railroads still getting a good tonnage and the car supply being short.

There are no eastern coals of any kind coming in. A little Arkansas moved in the past week with an advance of $1.50 a ton tacked on it, in accordance with the recent agreement of the miners and fuel administration officials in Arkansas.

The demand is good locally for all kinds of high grade coal, and the local condition in so far as storage coal is concerned for domestic purposes is very satisfactory to the fuel administration.

The prevailing market is as follows, per net ton f.o.b. mines:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.55@2.70	$2.55@2.70	$2.40@2.70
3x6-in. egg	2.55@2.70	2.55@2.70	2.35@2.55
2x3-in. nut	2.55@2.70	2.55@2.70	2.35@2.55
No. 2 nut	2.55@2.70	2.55@2.70	.....
No. 3 nut	2.55@2.70	2.55@2.70	.....
No. 4 nut	2.55@2.70	2.55@2.70	.....
No. 5 nut	2.05@2.20	2.05@2.20	.....
2-in. scrgs	2.05@2.20	2.05@2.20	1.25@1.50
3-in. lump	.....	.....	2.25@2.40
2-in. lump	.....	.....	2.25@2.40
Steam egg	.....	.....	2.25@2.40
Mine run	2.35@2.50	2.35@2.50	1.85@2.00
Washed:			
No. 1	2.75@2.90	2.75@2.90	.....
No. 2	2.75@2.90	2.75@2.90	.....
No. 3	2.55@2.75	2.55@2.75	.....
No. 4	2.55@2.75	2.55@2.75	.....
No. 5	2.05@2.20	2.05@2.20	.....

Williamson and Franklin County rate is $1.10; Duquoin field, $1; Standard and Mt. Olive fields, 95c.

SEATTLE

Car supply now adequate, but labor shortage holds up production. Domestic consumers lag in placing orders for fuel and last winter's experiences likely to be repeated.

The car supply in the state, while not wholly satisfactory, is said by the operators to be nearly equal to demands, and coal is getting away from the mines as fast as it is being produced. The shortage of labor, however, is now quite a problem. Labor officials estimate that the western Washington mines alone are short about 400 men at the present time, with no indication that this want can be supplied. Coal operators throughout the state report that they are operating to capacity and yet are unable to meet the demand. This is not coming from the domestic or householder consumer, but from industrial plants and railroads. The householder is not heeding the many warnings to purchase coal early, with the result that last winter's experiences are likely to be repeated this year. Owing to the impairment of the hoisting equipment of the Wellington Coal Co. bunkers, Nanoose Wellington coal shipped from British Columbia to this city will have to be delivered to bunkers in West Seattle; and to cover the additional expense the Fuel Administrator has permitted a raise in price of 20c. per ton. As the Canadian Fuel Administration has allowed a raise in the price of coal at the mines of the Wellington Coal Co., the United States Coal Administration has also permitted a raise in the retail price here of 65c. per ton on lump and 25c. on nut and pea of the Wellington variety. In coal circles this action is believed to foreshadow an increase in other Canadian coals on the local markets.

CURRENT PRICES—MATERIALS & SUPPLIES

IRON AND STEEL

STEEL SHEET PILING—The following price is base per 100 lb. f.o.b. Pittsburgh, with a comparison of a month and a year ago:

Current	One Month Ago	One Year Ago
$4–5	$4–5	$3.60

PIG IRON—Below are the present quotations, with a comparison of a month and a year ago:

	Current	One Month Ago	One Year Ago
CINCINNATI			
No. 2 Southern foundry	$36.90	$36.90	$49.90
No. 2 Northern foundry	.....	36.26	56.20
NEW YORK †			
No. 2 X Northern foundry	34.40	34.40	54.25
No. 2 plain Northern foundry	33.90	33.90	53.75
No. 2 Southern foundry	40.70	39.00	52.75
BIRMINGHAM			
No. 2 Southern foundry	33.00	33.00	47.00
CHICAGO			
No. 2 Northern foundry	33.00	33.00	55.00
No. 2 Southern foundry	38.00	38.00	.....
PITTSBURGH			
Bessemer iron *	36.60	36.60	55.95
Basic iron *	32.00	32.00	53.00

* These prices include the freight charge from the valley to the Pittsburgh district. † Delivered Tidewater, New York.

STRUCTURAL MATERIAL—The following are the base prices, f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

	Mill, Pittsburgh	—New York— Current	One Year Ago	St. Louis	Chicago
Beams, 3 to 15 in.	$3.00	$4.245	$5.25	$4.27	$4.27
Channels, 3 to 15 in.	3.00	4.245	5.25	4.27	4.27
Angles, 3 to 6 in., ¼ in. thick	3.00	4.245	5.25	4.27	4.27
Tees, 3 in. and larger	3.05	4.245	5.30	4.27	4.27
Plates	3.225	4.745	9.00	4.52	4.52

BAR IRON—Prices in cents per pound at cities named are as follows:

Pittsburgh	St. Louis	Denver	Birmingham
3.50	4.24	4.60	4.50

NAILS—Prices per keg from warehouse in cities named:

	Mill Pittsburgh	St. Louis	Denver	Chicago	Birmingham	San Francisco	Dallas
Wire	$3.50	$4.50	$5.05	$4.32	$4.75	$5.95	$4.75
Cut	4.00	5.50	.....	4.47	....	6.40	.....

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh	Cincinnati	Chicago	St. Louis	San Francisco	Birmingham	Denver
Standard railroad spikes ⅝-in. and larger	$3.90	$6.00	$4.50	$5.30	$6.70	$6.00	$5.00
Track bolts	4.90	8.90	5.50	Prem.	8.00	8.00	6.00
Standard section angle bars	3.25	....	4.45	Prem.	5.15	....	4.30

COLD DRAWN STEEL SHAFTING—From warehouse to consumers requiring fair-sized lots, the following discounts hold:

Cincinnati	Cleveland	Chicago	St. Louis	Denver	Birmingham
17½%	List	+10%	+15%	+40%	+30%

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill Pittsburgh	Cincinnati	Chicago	St. Louis	Denver	Birmingham
Straight	$5.75	$7.00	$6.50	$6.25	$8.00	$7.50
Assorted	5.50	7.00	6.50–7.00	6.40	8.25	7.75

Cincinnati—Horseshoe nails sell for $4.50 to $5 per 25-lb. box

CAST-IRON PIPE—The following are prices per net ton for carload lots:

	—New York— Current	1-Month Ago	One Year Ago	Chicago	St. Louis	San Francisco
4 in.	$64.35	$64.35	$68.50	$64.80	$63.00	$80.50
6 in. and over	61.35	61.35	65.50	61.80	60.00	77.50

Gas pipe and 16-ft. lengths are $1 per ton extra.

STEEL RAILS—The following quotations are per ton f.o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

	—Pittsburgh— Current	One Year Ago	—Chicago— Current	One Year Ago
Standard Bessemer rails	$57.00	$38.00	$67.00	$38.00
Standard openhearth rails	55.00	40.00	65.00	40.00
Light rails, 8 to 10 lb.	*3.135 (100 lb.)	80.00	*3.135 (100 lb.)	68.00
Light rails, 12 to 14 lb.	*3.09 (100 lb.)	82.00	*3.09 (100 lb.)	67.00
Light rails, 25 to 45 lb.	*3.00 (100 lb.)	75.00	*3.00 (100 lb.)	65.00

* Government price per 100 lb.

OLD MATERIAL—The prices following are per gross ton paid to dealers and producers in New York. In Chicago and St. Louis the quotations are per net ton and cover delivery at the buyer's works, including freight transfer charges:

	New York	Chicago	St. Louis
No. 1 railroad wrought	$30.80	$30.00	$34.00
Stove plate	22.50	23.50	19.00
No. 1 machinery cast	34.00	28.00	21.50–22
Machine shop turnings	15.30	16.00	19.00
Cast borings	15.30	16.75	18.50
Railroad malleable cast	30.30	30.00	25.50–26

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Cincinnati	Birmingham	St. Louis	Denver
$0.12	$0.16½	$0.18	$0.19	$0.17½

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis	Birmingham
Solid	15c.	14c.	15c.
Hollow	24c.	25c.	....

PIPE—The following discounts are for carload lots f.o.b. Pittsburgh; basing card of Nov. 6, 1917, for steel pipe and for iron pipe:

BUTT WELD

Steel Inches	Black	Galvanized	Iron Inches	Black	Galvanized
⅛, ¼ and ⅜	44%	17%	¾ to 1½	33%	17%
½	48%	33½%			
¾ to 3	51%	37½%			

LAP WELD

2	44%	31½%	2	26%	12%
2½ to 6	47%	34½%	2½ to 4	28%	15%
			4½ to 6	28%	15%

BUTT WELD. EXTRA STRONG PLAIN ENDS

⅛, ¼ and ⅜	40%	22½%	¾ to 1½	33%	18%
½	45%	36½%			
¾ to 1½	49%	36½%			

LAP WELD. EXTRA STRONG PLAIN ENDS

2	42%	30½%	2	27%	14%
2½ to 4	45%	33½%	2½ to 4	29%	17%
4½ to 6	44%	32½%	4½ to 6	28%	16%

From warehouses at the places named the following discounts hold for steel pipe:

	—Black— New York	Chicago	St. Louis
⅜ to 3 in. butt welded	33%	39%	37%
3½ to 6 in. lap welded	15%	43%	33%
	—Galvanized— New York	Chicago	St. Louis
¾ to 3 in. butt welded	16%	28%	22%
3½ to 6 in. butt welded	+3	25%	19%

Malleable fittings. Class B and C, from New York stock sell at list price Cast iron, standard sizes, 5%.

SHOP SUPPLIES

NUTS—From warehouse at the places named, on fair sized orders, the following amount is deducted from list:

	—New York— Current	One Year Ago	—Cleveland— Current	One Year Ago	—Chicago— Current	One Year Ago
Hot pressed square	$2.50*	List	$1.40	$1.65	$1.05	$3.00
Hot pressed hexagon	2.50*	List	1.20	1.50	.85	3.00
Cold punched square	2.50*	List	.75	1.40	1.00	1.60
Cold punched hexagon	2.50*	List	.75	1.40	1.00	2.00

* List plus.

Semi-finished nuts sell at the following discounts from list price:

	Current	One Year Ago
New York	40%	50%
Chicago	50%	50%
Cleveland	60%	50%

MACHINE BOLTS—Warehouse discounts in the following cities:

	New York	Cleveland	Chicago
⅜ by 4 in. and smaller	30%	46%	37%
Larger and longer up to 1 in. by 30 in.	15%	40%	25—5%

WASHERS—From warehouses at the places named the following amount is deducted from list price:

For wrought-iron washers:

New York..... $2.50 Cleveland..... $3.00 Chicago..... $2.50

For cast-iron washers the base price per 100 lb. is as follows:

New York..... $5.00 Cleveland..... $4.00 Chicago..... $3.50

RIVETS—The following quotations are allowed for fair-sized orders from warehouse:

	New York	Cleveland	Chicago
Steel ⅞ and smaller	30%	45—5%	45%*
Tinned	30%	45—5%	45%*

Button heads, ¾, 7/8, 1 in. diameter by 2 in. to 5 in. sell as follows per 100 lb.:

New York..$5.65 Cleveland...$5.15 Chicago....$5.67 Pittsburgh...$4.65

Coneheads, same sizes:

New York..$5.75 Cleveland...$5.25 Chicago....$5.77 Pittsburgh..$4.75

MISCELLANEOUS

GREASES—Prices are as follows in the following cities in cents per pound for barrel lots:

	Cincinnati	St. Louis	Birmingham	Denver
Cup	7	13.0	8½	12½
Fiber or sponge	8	13.0	8½	20
Transmission	7	13.0	9	20
Axle	4½	4.1	3¾	5¼
Gear	4½	7.0	8	9
Car journal	22 (gal.)	4.3	5½	8½

BABBITT METAL—Warehouse prices in cents per pound:

	New York		Cleveland		Chicago	
	Current	One Year Ago	Current	One Year Ago	Current	One Year Ago
Best grade	125.00	70.00	108.00	70.00	100.00	70.00
Commercial	70.00	40.00	23.00	24.50	24.00	25.00

HOSE—Following are prices of various classes of hose:

Fire

	50-Ft. Lengths
Underwriters' 2½-in	75c. per ft.
Common, 2½-in	40%

Air

	First Grade	Second Grade	Third Grade
¾-in. per ft	$0.55	$0.30	$0.25

Steam—Discounts from list

First grade....30% Second grade....30–5% Third grade....40–10%

LEATHER BELTING—Present discounts from list in cities named:

	Medium Grade	Heavy Grade
St. Louis	40+5%	35%
Denver	40%	30%
Birmingham	35%	35%
Chicago	45%	40%
Cincinnati	40—10%	40%

RAWHIDE LACING—40—5% off list.

PACKING—Prices per pound:

Rubber and duck for low-pressure steam	$0.99
Asbestos for high-pressure steam	1.76
Duck and rubber for piston packing	1.10
Flax, regular	.99
Flax, waterproofed	1.21
Compressed asbestos sheet	1.10
Wire insertion asbestos sheet	1.30
Rubber sheet	.66
Rubber sheet, wire insertion	.99
Rubber sheet, duck insertion	.55
Rubber sheet, cloth insertion	.25
Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes	1.21
Asbestos wick, ½- and 1-lb. balls	.75

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York and St. Louis
Galvanized iron rigging	+20%
Galvanized cast steel rigging	List
Bright plain rigging	30%
Bright cast steel	17½%
Bright iron and iron tiller	5%

MANILA ROPE—For rope smaller than ⅝-in. the price is ½ to 2c. extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: ⅝-in., 8 ft.; ¾-in., 6; ⅞-in., 4½; 1 in., 3½; 1⅛-in., 2 ft. 10 in.; 1¼-in., 2 ft. 4 in. Following is price per pound for ⅝-in. and larger, in 1200-ft. coils:

Boston	$0.34	Birmingham	$0.38
New York	.36	Denver	.35½
Cincinnati	.33½	Kansas City	.34
Chicago	.34	Seattle	.34
St. Paul	.34	St. Louis	.34
San Francisco	.32	Los Angeles	.35

PIPE AND BOILER COVERING—Below are discounts and part of standard lists:

PIPE COVERING

Pipe Size	Standard List Per Lin. Ft.
1-in.	$0.27
2-in.	.36
6-in.	.80
4-in.	.60
3-in.	.45
8-in.	1.10
10-in.	1.30

BLOCKS AND SHEETS

Thickness	Price per Sq.Ft.
½-in.	$0.27
1 -in.	.30
1½-in.	.45
2 -in.	.60
2½-in.	.75
3 -in.	.90
3½-in.	1.05

85% magnesia high pressure—List

For low-pressure heating and return lines—4-ply 58% off; 3-ply 60% off; 2-ply 62% off

LINSEED OIL—These prices are per gallon:

	New York		Cleveland		Chicago	
	Current	One Year Ago	Current	One Year Ago	Current	One Year Ago
Raw in barrel	$1.86	$1.16	$2.00	$1.20	$1.97	$1.21
5-gal. cans	1.96	1.26	2.15	1.35	2.17	1.36

* Nominal.

WHITE AND RED LEAD in 500-lb. lots sell as follows in cents per pound:

	Red				White	
	Current		1 Year Ago		Current	1 Year Ago
	Dry	In Oil	Dry	In Oil	Dry and In Oil	Dry and In Oil
100-lb. keg	14.00	14.50	13.25	13.50	14.00	13.00
25 and 50-lb. kegs	14.25	14.75	13.50	13.75	14.25	13.25
12½-lb. keg	14.50	15.00	13.75	14.00	14.50	13.50
5-lb. cans	.....	.....	15.25	15.50	16.00	15.50
1-lb. cans	.....	.....	.....	.....	17.00	.....

COMMON BRICK—The prices per 1000 in cargo or carload lots are as follows:

Cincinnati	$13–16.75	Birmingham	$13.75
St. Louis	12.00	Denver	8.50

WIRING SUPPLIES—New York prices for tape and solder are as follows:

Friction tape, ½ lb. rolls	38c. per lb.
Rubber tape, ½-lb. rolls	45c. per lb.
Wire solder, 50-lb. pools	46c. per lb.
Soldering paste, 2-oz. cans	$1.20 per doz.

PREPARED ROOFING—Standard grade rubbered surface, complete with nails and cement, costs per square as follows in New York, St. Louis, Chicago and San Francisco.

	1-Ply		2-Ply		3-Ply	
	C.l.	L. C.l.	C.l.	L.C.l.	C.l.	L.Cl.
No. 1 grade	$1.30	$1.55	$1.60	$1.75	$1.90	$2.05
No. 2 grade	1.15	1.30	1.45	1.60	1.75	1.90

Asbestos asphalt saturated felt (14 lb. per square) costs $5.35 per 100 lb.

Slate-surfaced roofing (red and green) in rolls of 108 sq.ft. costs $1.95 per roll in carload lots and $2.20 for smaller quantities.

Shingles, red and green slate finish cost $5.25 per square in carloads, $5.50 in smaller quantities, in Philadelphia.

ROOFING MATERIALS—Prices per ton f.o.b. New York or Chicago:

	Carload Lots	Less than Carload Lots
Tarfelt (14 lb. per square of 100 sq. ft.)	64	65
Tar pitch (in 400-lb. bbl.)	21	22
Asphalt pitch (in barre's)	37	42
Asphalt felt	72.50	77.50

HOLLOW TILE—The price per 1000 in carload lots f.o.b. mine is as follows:

	4 x 12 x 12	8 x 12 x 12
St. Louis	$74.00	$138.00
Chicago	79.00	137.00
Denver, per ton	None	None
Kansas City	75.00	140.00
St. Paul	56.00	110.00
Boston	80.00	150.00
Birmingham	72.00	135.00
Cincinnati	72.75	136.10
Pittsburgh	86.50	147.10

LUMBER—Price of yellow pine per M in carload lots:

	1-in. Rough 10 In. x 16 Ft.	2-In. T. and G. 10 In. x 16 Ft.	8 x 8 In. x 20 Ft.
St. Louis	.....	$40.00	$40.00
Birmingham	$33.00	33.00	28 50
Denver	40.00	42.00	42 50
Cincinnati	45.00	44.00	39 00

STEEL SHEETS—The following are the prices in cents per pound from jobbers' warehouse at the cities named:

	Pittsburgh, Mill, in Carloads	New York Current	New York One Month Ago	New York One Year Ago	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago
*No. 28 black	5.00	6.495	6.445	10.00	6.42	9.50	6.52	9.50
*No. 26 black	4.90	6.395	6.345	9.90	6.32	9.40	6.42	9.40
*Nos. 22 and 24 black	4.85	6.345	6.295	9.85	6.27	9.35	6.37	9.35
Nos. 18 and 20 black	4.80	6.295	6.245	9.80	6.22	9.30	6.32	9.30
No. 16 blue annealed	4.45	5.695	5.645	9.70	5.62	9.70	5.72	9.70
No. 14 blue annealed	4.35	5.595	5.545	9.60	5.52	9.60	5.62	9.60
No. 10 blue annealed	4.25	5.495	5.445	9.50	5.42	9.50	5.52	9.50
*No. 28 galvanized	6.25	7.745	7.695	13.00	7.67	11.00	7.77	11.00
*No. 26 galvanized	5.95	7.445	7.395	12.70	7.37	10.70	7.32	10.70
No. 24 galvanized	5.80	7.295	7.245	12.55	7.22	10.55	7.47	10.55

* For painted corrugated sheets add 30c. per 100 lb. for 25 to 28 gage; 25c. for 19 to 24 gages; for galvanized corrugated sheets add 5c., all gages

COPPER WIRE—Prices per 1000 ft. for rubber-covered wire in following cities:

	Denver			St. Louis			Birmingham		
No.	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex
14	$15.00	$20.00	$35.00	$12.00	$16.00	$33.00	$13.00	$17.40	$36.80
10	25.65	28.90	57.45	27.20	31.00	63.00	21.40	24.40	42.75
8	36.45	40.25	80.30	38.00	42.00	78.00	42.35	44.35	.....
6	57.40	61.70	.....	.....	65.00	130.00	64.60	74.00	.....
4	83.40	88.70	.....	.....	93.00	.....	101.75	106.05	.....
2	126.60	132.80	.....	.....	140.00	.....	151.50	.....	.....
1	164.15	172.40	.....	.....	182.00	.....	201.00	.....	.....
0	206.80	206.80	.....	.....	242.00	.....	276.00	.....	.....
00	278.80	278.80	.....	.....	290.00	.....	317.00	.....	.....
000	341.65	341.65	.....	.....	360.00	.....	417.00	.....	.....
0000	417.05	417.05	.....	.....	435.00	.....	516.00	.....	.....

EXPLOSIVES—Price per pound of dynamite in small lots and price per 25-lb. keg for black powder:

	Low Freezing 20%	Gelatin 40%	Gelatin 60%	Gelatin 80%	Black Powder
New York	.....	$0.27½	$0.34½	.....	$2.40
Boston	$0.24¼	.27¼	.34¾	$0.41¾	2.40
Cincinnati	.18¼	.22¼	.27¾	....	2.25
Kansas City	.20	.26½	.33¼	.43¼	2.45
Seattle	.17½	.29½	.31¾	.41¾	.....
Chicago	.18¾	.22¼	.33	.43	2.35
St. Paul	.19	.23	.28	.43¼	2.75
St. Louis	.19	.26¼	.33¼	.43¼	2.35
Denver	.18	.25½	.32½	.42¼	2.45
Dallas	.23	.30¼	.37¼	.47¼	.....
Los Angeles	.22	.28	.36	.....	.....
San Francisco	.17¼*	.23½*	.30½*	.40½*	.....

* Carload lots.

FREIGHT RATES—On finished steel products in the Pittsburgh district including plates, structural shapes, merchant steel, bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished), chains, etc., the following freight rates per 100 lb. are effective:

Boston	$0.27	New Orleans	$0.385
Buffalo	.17	New York	.245
Chicago	.27	Philadelphia	.23
Cincinnati	.23	St. Louis	.34
Cleveland	.17	St. Paul	.495
Denver	.99	Pacific Coast (all rail)	1.25
Kansas City	.59		

Note—Add 3% transportation tax.

COAL AGE

Volume 14 New York, August 8, 1918 Number 6

A Single Purpose

By Floyd W. Parsons

THERE is no place on the earth today for a nation made up of nerveless, undecided people. A German Kaiser proposes to be master of the Universe. He exalts himself as superior clay. He justifies the subjugation of weaker nations. He glorifies brutality, prays to a substitute God and makes a religion of war.

This Prince of Death gazes without compassion on a world he has drenched with the blood of countless fathers and sons. He has brought about more misery than was caused by all the tyrants of history combined. Millions of women pray to Heaven for relief from their sufferings, and ask that retribution be sent upon the Teuton beasts who masquerade in the forms of men.

The German people have listened for generations to vicious teachings which are now firmly embedded in their natures. They believe that a policy of sentiment is folly; that enthusiasm for humanity is idiocy; that might is the supreme right, and that a nation has the right to do what it has the power to do; that the present conflict must leave nothing for the vanquished but their eyes to weep with; that war is the most august and sacred of human activities, and that peace is but a means to new wars.

So long as the Hun believes in the virtue of such barbarous doctrines there can be no peace. How can any Christian nation hope to live in a world where a king and his people make slaves of their victims while alive and grind their bones into fertilizer to enrich the soil when dead. How can we expect to live happily on earth with men who say—"Kultur must build its cathedrals upon hills of corpses, seas of tears and the death rattle of the conquered. The lives of human beings are to be conserved only if it makes for the State's advancement."

OVER in France the very flower of American manhood is now shedding its blood. Many of our splendid sons already sleep in graves hastily dug in alien soil. Other Americans are fighting as men never fought before and youngsters with Hun bullets in their bodies try to slip away from the dressing stations and again join their comrades battling fiercely at the front.

While this is going on "over there" what are we doing here at home? Are we working every day, all day? Is every mining official on the job early and at his desk late? Does every miner at the working face say to himself with every four shovels of coal he loads into his car—"There's another 3-inch shell for the Hun"?

Over in Mercer County, Pennsylvania, 150 mine workers who had retired on account of old age went back to work again to help satisfy the urgent need for coal. They knew that every 8000-ton cargo ship that slid down the ways at a shipyard had used up 16,000 tons of coal in its construction. They had learned that every 42 cm. shell our boys fire at the Teutons meant a consumption of 900 pounds of coal, and they have donned their old mine clothes and gone into the fight as nobly as any youth who goes "over the top." What an example for those of us who are yet in our prime!

We are no longer only preparing for war, we are in it and there is no way out except the straight road to the finish. American miners can do more to stop the arrogant Hun than any other class of men on earth. No miner today is a patriot and deserves the friendship of honest, earnest Americans who slacks for a single hour when there are cars to load with coal.

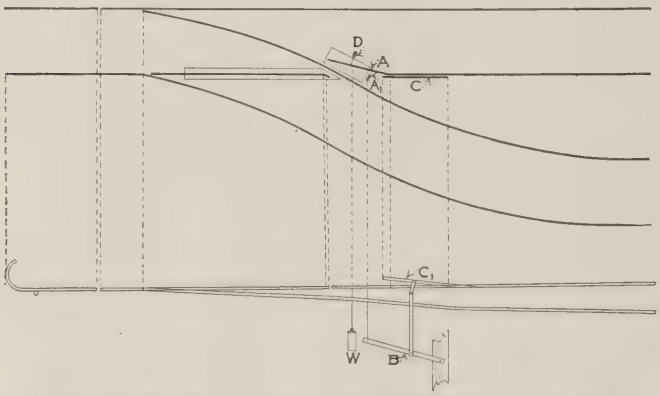
We must win with our Allies now or fight alone later.

IDEAS AND SUGGESTIONS

Automatic Tipple Switch

BY T. F. PRICE
San Antonio, Texas

The accompanying illustration shows a handy arrangement that I designed and installed in the Hale No. 1 mine of the Madeira-Hill Coal Co. at Phillipsburg, Penn. The device was found to be quite efficient and cut down



PLAN AND ELEVATION OF AUTOMATIC SWITCH

the operating expense, since it did away with the services of two men in operating the tipple.

No dimensions are shown on the drawing, as these will vary with the diameter of the car wheel used and the arrangement of the tipple. When a device of this kind, however, is built for wheels 18 in. in diameter, it will successfully handle cars with 14-in. wheels if the other portions of the dump and kickback will also accommodate wheels of this size.

Referring to the illustration, the latch *A* normally stands open, being held in this position by the weight *W*. This latch is operated (closed) by the car pressing down the lever *C*, which depresses the arm *B* and actuates the latch through the medium of the cable A_1. The loaded car is now free to pass over the latch to the dump or kickback. After the passage of the car the latch is again opened by the weight *W*. This permits the free return of the car.

Chasing the Elusive "Bugs" Out of the Commutator

BY FRANK HUSKINSON
Lafayette, Colo.

In the rewinding or repairing of any direct-current type of armature, one of the most important details to attend to before putting any of the leads into the commutator is to test for and remove all short-circuits between the adjacent commutator bars. These are familiarly called "bugs," and in this respect they are rightly named. There has been many a time that the "electrician" was on the verge of "bugs" while chasing these elusive bugs out of the commutator.

An armature will come into the shop for repairs, and probably the top leads will be removed from the commutator and also a few of the bottom leads. Repairs are made and the commutator is given a test for "bugs," with the result that several are found that can not be located on the surface. It is thus necessary to remove the front ring, and sometimes the entire commutator will have to be removed from the armature shaft and taken apart just to clear up a few partially shorted bars or bugs.

Now it is some job to remove a commutator from the armature shaft, take it apart and rebuild it again, all on account of a few bugs. A short-circuit of this kind is as a rule caused by the current leaking across the mica and carbonizing it to a certain degree. If this condition is not removed and the armature is put in service with a partial short or bug between the commutator bars, it results in the burning out of the coils connected to those particular bars. In some cases the resistance is so high at the point of short-circuit that the coil will withstand the effects of the bug for an indefinite period of time. Nevertheless the trouble is always there and is manifested by the short-circuited bars heating. The final results are the burning out of the coil or coils. Or again, it results in the mica rings carbonizing to such an extent that the current eats a path to the iron core, thereby causing a ground that puts the armature out of commission. It is therefore highly important that a commutator be given a thorough test and all "bugs" removed from it.

In my experiences with this class of trouble I have found several effective ways of removing a bug, or partial short-circuit, from between two commutator bars. In making tests I always use one or more lamps in series with my test terminals when the test terminals are placed on adjacent bars. If there is no bug there will be no light; on the other hand, if the bars are shorted the lamp will light up. The nature of the bug can generally be judged by the brightness and wavering of the light. If the trouble is on the visible parts of the commutator it is an easy matter to clear it. If it is in an inaccessible place, such as on the bottom part of the mica and bars, it can sometimes be located by watching the mica closely, as the arc caused by the current jumping across this insulation can be seen through the mica.

To remove such a bug without taking the commutator apart I have had considerable success by taking a small drill and drilling into the mica ring and mica bar at the intersection of the bottom of the bars and the mica rings. After drilling under the bar and mica I take a fine needle hook and proceed to scrape the bottom of the mica bar. The result is that this will as a rule remove the bug. In other words, I drill in to the spot where the mica is carbonized either in the mica bar or the mica ring, and then I scrape the carbonized matter clear of the commutator bars. After testing and finding the

bars clear I fill up the cavity caused by drilling and scraping with a good commutator cement and the repair is complete.

Another effective method that I have employed at times when the drilling failed or it was impossible to use the drill, was to take a piece of flat steel the same width and breadth as the mica between the commutator bars, place this upon the mica bar and tap it with a hammer until t[illegible] is driven down slightly below the level of the other bars. At times it is necessary to slightly loosen the front rings of the commutator to enable the mica bar to drive down a trifle. As a rule, however, this is not necessary, as the mica will drive down without the tightening rings being loosened.

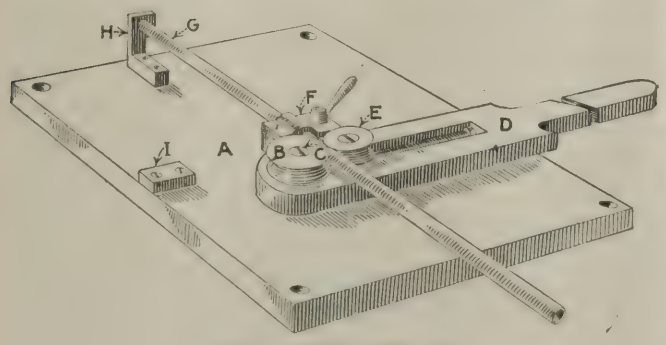
I have often secured satisfactory results from this method. Generally, in driving the mica bar down a trifle it pushes the carbonized part clear of the copper bars. The space resulting from driving the mica down can then be filled up with commutator cement.

I have found that with the two methods described and a little perseverance, I am able to remove a large percentage of the bugs from the commutators without removing them from the armature and without taking them apart. I will admit that the methods used are not always crowned with complete success, but on an average I can state that they are successful nine times out of ten. They are therefore worth a trial any time.

Device for Bending Small Pipe

A device that has been used with success for the bending of pipe and boiler tubes, and that may have other useful applications, is shown in the accompanying sketch, described in the *American Machinist* by Stephen Jaross.

The iron base *A* carries a pilot roller *B* of a diameter of the required bend, reduced, however, to provide for the inevitable spring-back when pressure is removed. The pin *C*, which acts as a pivot for *B*, is also the fulcrum for the lever *D*, which carries at *E* a roller similar to *B*. The roller *E* is adjustable toward and from *C* to permit of the use of rollers *B* of varying size. At *F* is a clamp for the tube *G*, and at *H* a stop for the end of the tube. At *I* is an adjustable stop, which must be placed at such a point as will assure that the right angle of bend



SMALL PIPE BENDER

will be provided after the work springs back on the stress being removed. If a circle of a different diameter is desired, the roller *B* must be changed accordingly.

The grooves in the rulers *B* and *E* should be turned about 0.01 in. deeper than the radius of the exterior of the pipe. As the wall of the pipe is only $\frac{1}{16}$ in. thick or thereabout, it is necessary to reinforce it against collapse. This is done by filling it with fine, dry sand held in place by tight plugs at the pipe ends. The part to be bent is heated. The sand not only helps to keep the pipe in shape, but it aids in retaining the heat, so that the bend can often be made in one operation.

Some Random Notes on Electrical Trouble

By Jack L. Ball
Amsterdam, Ohio.

A ventilating fan was driven by a 10-hp., 250-volt, direct-current motor. When the mine load on the generator was heavy, the motor would slow down; in other words, the speed was governed by the load on the generator. The theory was advanced that the motor was too small for the work intended. A test was made, and it was found that it required just $4\frac{1}{2}$ hp. to drive the fan at its normal speed.

The greenhorn (?) would give no reason why, but when he substituted copper fuse wires of the proper size in place of the lead fuses that had been used, the trouble was cured.

A great deal of trouble was experienced with the brushes of a direct-current generator. Although they were well fitted to the commutator, they would burn and break around the edges. Upon examining these brushes, it was found that the mine electrician in fitting them was not removing the copper sheathing. This is an important point to watch, for this reason: Copper has a much lower resistance than carbon, and when the brush is worn sufficiently so that the copper comes in contact with the commutator surface, the current will localize at this point and will not be evenly distributed throughout the brush. This causes a burning and chipping away at the edges. The remedy is to strip back enough of the sheathing and see that at all times it does not touch the commutator.

Upon starting a 150-kw., direct-current generator one morning, it refused to generate. Someone had gotten the idea that before putting on new brushes it was necessary to boil them in machine oil in order to soften them. After the brushes and commutator were carefully cleaned with gasoline, the trouble was not repeated. In this case, when the commutator was warm the brushes had contact; but as soon as the machine cooled off a film of oil froze around the commutator, keeping the brushes from making actual contact.

Oil should never be used on brushes or commutator unless trouble is invited. If the brushes being used are too hard for the machine, get a softer brush. A safe guide is to write to the makers of the machine, stating what difficulties are being experienced. They will gladly make helpful suggestions.

A 250- to 275-volt generator was brought up to speed, and the voltmeter registered 300—its extreme range. It was found that about half of the resistance of the shunt field rheostat was burned out, and as it was but a few minutes until starting time, something had to be done quickly. An extra resistance column of a mine locomotive was connected in series with the rheostat, it being necessary to cut out about half of the resistance of the column to give the proper range. The column is still in use after several months' service.

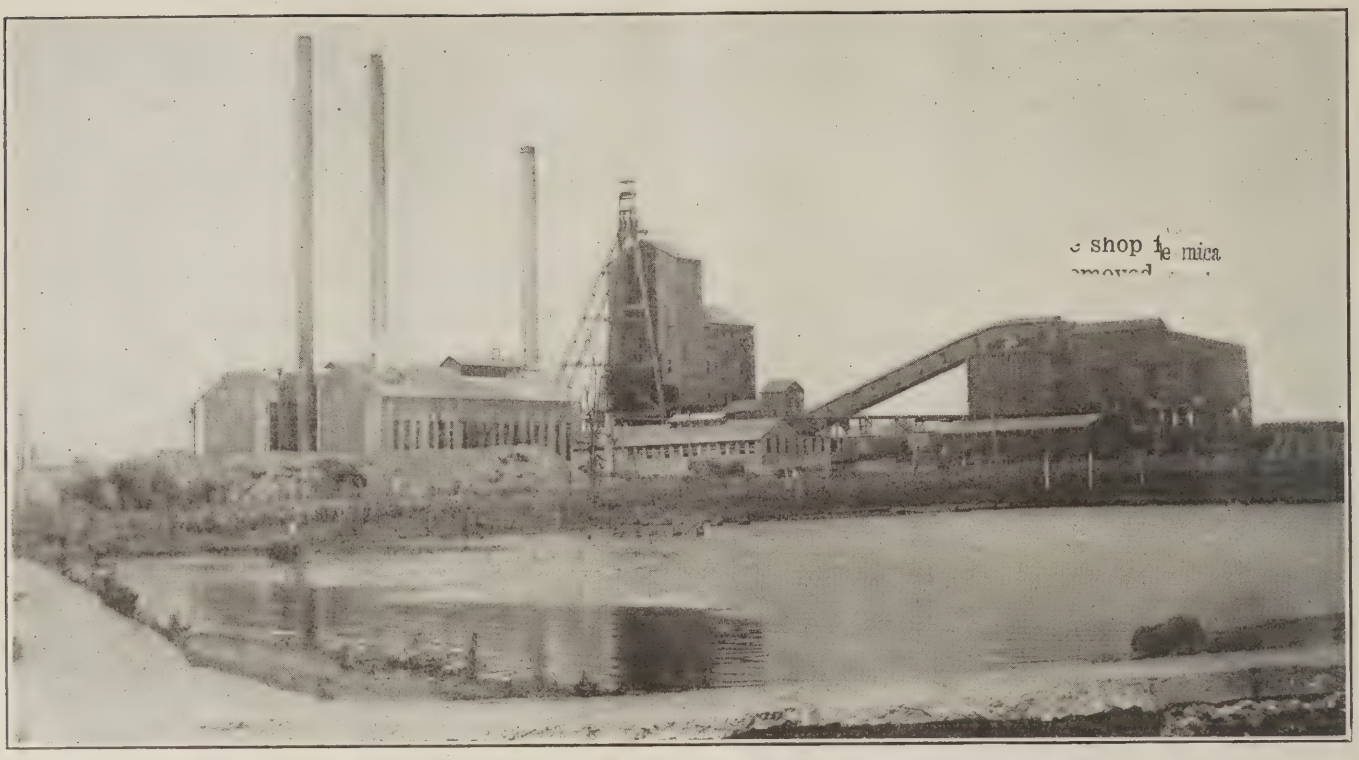


FIG. 1. GENERAL VIEW OF ZEIGLER MINE OF BELL & ZOLLER MINING CO.

New Plant of Pioneer Operation in Franklin County, Illinois

By GEORGE W. HARRIS
Editorial Staff "Coal Age"

PROBABLY few (if any) coal mines in the United States in the last quarter of a century have been more prominently advertised than the old Zeigler mine of the former Zeigler Coal Co. The real development of the Illinois Franklin County field dates from the time Joseph Leiter prospected and took over approximately 8000 acres of coal land upon which he located the town of Zeigler and developed the mines of the Zeigler Coal Co., now being operated by Bell & Zoller Mining Co., of Chicago, Ill. The subsequent history of this noted plant is too well known to require comment beyond reference to the stormy days when the mine was having such serious labor difficulties.

Coal history in Franklin County dates back about a third of a century, when a prospect hole was drilled for the purpose of finding coal in the vicinity of Benton, the county seat of Franklin County. It is stated that after drilling to a depth of 584 ft. the promoters of the enterprise became discouraged and stopped the drill. At the time prospecting operations were stopped the drill was within about 50 ft. of the No. 6 seam, and the failure to continue drilling probably greatly delayed development in southern Illinois.

A number of years afterward the late W. P. Halliday, of Cairo, Ill., prospected extensively in Franklin County, putting down drill holes and covering this territory systematically. Parallel rows of holes one mile apart each way thoroughly investigated conditions, but unfortunately the results of this investigation were not disclosed. After Mr. Halliday's death it was announced that his policy was eventually to take over a large area of the Franklin County coal which he had prospected and found of such high quality. The next prospecting, and the first one by which the general public was made aware of the rich seam of coal underlying this county, was made by some citizens of West Frankfort in 1896.

It is always interesting to note the successive steps in the development of such a famous field as the Franklin County coal region. In this development the Zeigler mine has always taken a prominent part. Probably the latest investigation of a practice which bids fair to assume importance in big production is along the lines of rotary dumps and skip hoisting. The Bell & Zoller Mining Co. has such equipment for large tonnage (Fig. 1) which has been modified as certain features of the original installation proved unacceptable to its requirements. In this connection the old bottom-dump mine cars have been replaced by solid-end cars; the rotary underground dump and skip have been retained, have been operating for a year and a half, and are a success. In the bottom dump car (Fig. 2) the dog would work loose while trips were en route to the shaft bottom, and the car would empty along the entry. This old car bottom included two doors, each 2 x 3 ft. in dimension, and there was a cross-bar in the center of the bottom. As the trip moved continuously over the dump the bottom was easily knocked open—that part was all right. But sometimes there was difficulty from large lumps of coal lodging in the bottom, and these had to be broken up or barred loose. This special Zeigler

installation and the whole matter of rotary dumps and skip hoisting has been fully covered by a most interesting article entitled "Hoisting Coal in Skips," by John A. Garcia, which appeared in the June 22, 1918, issue of *Coal Age*.

Comments on the practice of the Bell & Zoller Co. at its No. 1 mine are especially interesting when taken in connection with the new plant this company is developing two miles southwest of this operation. The Zeigler mine is close to the top of the leading producers of Franklin County. There are 21 mines in this county, which produced 11,317,657 tons of coal for the year ended June 30, 1917, out of a state tonnage of 77,412,-054 for the same period. At this time the Zeigler mine produced 1,065,359 tons of coal.

Substantial progress has been made at the No. 2 mine of Bell & Zoller. The main and air shafts are well down to coal, and a permanent steel headframe is in place at the latter shaft, together with a Litchfield hoisting engine which is being used to sink the shaft; also some of the permanent buildings about the plant have been constructed. Before the shafts were started diamond drill holes were put down to coal at the site of each shaft. This plan might seem to be an unnecessary precaution in the Franklin County field to some, but instances are on record in other coal fields where this policy would have saved a large amount of money, considerable time, and permitted a much better layout of plant. In one special case in mind, a number of drill holes were put down systematically covering a large tract of coal. The engineers advised the management to locate shafts, tipple and other surface plant on the strength of general information as to depth and condition of the seam to be worked. But no hole had been drilled at the proposed shaft location. It took an expensive main hoist shaft, considerable rock tunnel and valuable time to prove a serious disturbance to the coal at this point. Meanwhile a steel tipple and other modern buildings were practically completed on a layout fitting in with this hoist shaft and could not well be changed to suit other and better development. The shafts at this new No. 2 mine will not have steel buntons, as the management considers the injury done to such construction by falling coal to be a serious objection to the use of steel for that purpose. Wood buntons will be used here and made fireproof with concrete, strengthened and secured to the wood by metal lath and staples. The air shaft will have three compartments; an airway, stairway and a compartment for a cage hoist. The main hoist shaft will have two compartments. The cover over the No. 6 seam at these shafts is about 317 ft., or 100 ft. less than at the hoist shaft at No. 1 mine at Zeigler.



FIG. 3. STORAGE PLANT AT ZEIGLER MINE



FIG. 2. OLD BOTTOM DUMP MINE CAR AT FACE OF ROOM

The new mine will be laid out on the four-entry system, and the main entries will be north, south, east and west to fit the boundaries. The panel system is used in the old mine and a modified panel will be adopted for No. 2.

The middle entry pillar of the four entries will be left solid; there will be no breakthroughs, and the pillar will only be broken where entries cross it. This plan makes it much easier and safer to block off one side of the mine from the other. Also each panel is to have no connection with any other panel, but is to be

a proposition by itself. The new mine is to have a capacity of 5000 tons in eight hours, or about the same as mine No. 1. The mine car will hold 5¼ tons; the Zeigler car is a 4¼-ton car, and that would have been considered a novelty a few years ago. But in the Franklin County big-seam mines, where tonnage is sought and headroom is available, one way to achieve this end is to send trips of big units to the shaft bottom. Also, when coal is hoisted, quantity cargoes count; in fact big cars and double-deck cages or skips are practically essential when a mine aspires to large production.

At the new place a self-dumping cage of the Olsen type, manufactured by the Eagle Iron Works, of Des



FIG. 4. DRILLING A HOLE AT ZEIGLER MINE

Moines, Iowa, will be used. The Olsen cage is popular in Illinois, and it is significant that it is used at two other plants which are close to the top, not only on record daily production (5508 and 5502 tons in eight hours respectively) but also on yearly tonnage—substantially over a million tons a year, according to the last Illinois coal report. In connection with a change in policy from skip hoisting at mine No. 1 to self-dumping cage at the new operation, Robert Zoller, the general manager of the company, stated that breakage of coal in the use of the skip was not the reason for giving up that method of hoisting—that the breakage was not a serious matter. A self-dumping cage was preferred, as it gave a better opportunity to dock cars for dirt. When one car was dumped into a weigh hopper it was an individual lot of coal; if it was dirty, the man who loaded it was docked. When cars are dumped into a bin, or even when two cars are dumped into a skip direct, then individuality is lost. There is no opportunity in skip hoisting to send a condemned car of coal to the outside, shovel it out on the ground and show the loader the exact state of affairs.

In commenting on opportunity to dock dirty coal in skip hoisting, John A. Garcia, of Allen & Garcia, engineers, Chicago, Ill., states that ideal docking schemes are offered in skip hoisting—that there are two good chances with the skip to one with the cage to detect impurities in coal. First, Mr. Garcia states, cars may be tested at unexpected times so that the men may never know when a test will be made; or secondly, one car of coal at a time can be placed in the skip when the cleanness of the coal is questioned. Then the skip can be dumped at the top and the coal spread out on a wide feeder, where there is a better chance for inspection than in the case of the cage and weigh hopper. This can be done 20 times during the day, and the time consumed will be negligible—there is a world of leeway to do this in a day's run. A further comment was made that in a mine of 5000-tons capacity it would be a physical impossibility to comply with the miner's contract. That the only way in a big-tonnage mine is to watch a car as it dumps, pick off all impurities possible and then go and see the man who loaded the car and discipline him. The writer would suggest that with any system of docking, a foreman could readily go through the working places and notice where rooms or entries failed to have such impurities in the gob. If seam impurities are not in the gob, it would be well to examine cars from such places, for the chances are that the impurities are being sent out with the coal. Rotary dumps and skip hoisting are attracting considerable attention, are being installed in some of the big new plants not only in Illinois but in other sections as well, and the progress of this combination will be watched with considerable interest.

The No. 2 mine will be electrically equipped throughout. At the old mine 26 motors are in use of some of the leading makes—Jeffrey, Westinghouse, Goodman and General Electric; cable and reel gathering locomotives are used here. One lonely mule is kept to haul powder. Each panel includes 28 rooms; units of 14 rooms were decided upon to fit in with machine mining employed at No. 1 mine, 14 loaders being apportioned to each machine. Goodman mining machines are used at this plant, made by the Goodman Manufacturing Co., of Chicago, Ill. Pick men are placed in sections where there is a shale top and long rooms are to be worked.

In Fig. 4 is shown a man drilling a hole for a shot at the face of a room. The mining coal drill used here is the Hardsocg made by the Hardsocg Manufacturing Co., Ottumwa, Iowa. The height of the coal is well brought out and emphasized by the fact of his standing on a bench to reach the drill. If the man standing in the corner of the room is 5⅔ ft. high, the height of the coal might easily be 10 ft. Where electrical apparatus is used in the new plant, it is easily possible that those types which have given satisfaction in the older operation will be favorably considered for the new mine. The management contemplates having

every convenience for facilitating operations. An inspection was made of other plants, and good ideas which have worked out satisfactorily for others will be utilized when they will be an improvement over old methods.

A rescreening plant will be installed at No. 2 which will be a little larger than the one at No. 1. Ordinary Illinois coal preparation will be adopted, and any coal washing will be done by the gravity process—either by the Luhrig or Stewart jigs. Plans for the plant were made by the Link Belt Co., which will put in necessary coal and ash conveyors. Among other mechanical devices for simplifying operations will be stokers for firing boilers. Draft for the boilers will be furnished by a 240-ft. brick stack. All men and material will be handled through the air shaft.

A large amount of grading for the No. 2 mine yard has been done by a Marion dragline steam shovel (Marion Steam Shovel Co., Marion, Ohio) borrowing on both sides of the track to form the fill. An additional machine has just been placed on this job—a Bucyrus dragline machine—made by the Bucyrus Co., of South Milwaukee, Wis. It is the intention to avoid disturbance to the handling of cars by placing the car sidings above the high-water line wherever possible. The ground at the tipple will be filled up to the high-water line. From the tipple the empty tracks will be graded so that cars will run to the tipple by gravity; this will mean a maximum fill of 31 ft. on the siding and 14 ft. at the tipple. This arrangement will leave the lower end of the loaded yard at the high-water line. The tipple foundations will be secured by starting the footings below the fill and concreting through it to a point above the ultimate surface.

The Leiter interests own the coal and most of the surface at the Zeigler plants, and Bell & Zoller operate under lease. The lessor is building a town between mines No. 1 and No. 2 for the accommodation of the employees who will work at the new mine. A feature of some of the big plants in the Franklin field is provision to stock coal at times of insufficient transportation.

There will be no new storage plant at No. 2 mine, as there is an 80,000- to 90,000-ton plant for this purpose at No. 1 mine which will be convenient for use by mine No. 2. Fig. 3 shows a locomotive crane loading coal from this stock pile into the railroad cars at mine No. 1; the top of the tipple can be seen in the background. Bell & Zoller hope to get the new plant in shape by early next winter, but feel doubtful about being able to do so; labor is scarce and it is hard to obtain electrical machinery and supplies.

The officials of this company are: H. E. Bell, president; Robert H. Zoller, general manager. At the mine Joseph Yerley is superintendent; G. C. Breckenridge, mining engineer; Andrew Leslie, top foreman, and Edward Prudent, mine manager.

Coal Age Index

The indexes to *Coal Age* are furnished free to all who ask for them. The index for the first half of 1918 is now ready for distribution, and a copy can be had by addressing a post card to the Subscription Department of *Coal Age*.

Storing Small Coal

By M. Meredith
Liverpool England

The market for small coal in Great Britain being insufficient to absorb the present supply, which is unusually plentiful on account of the necessity for maintaining the output of large coal for national requirements, collieries in Northumberland, South Wales and other mining centers are having to stock the surplus. Trouble having been experienced with spontaneous heating and firing of the small coal thus stored, a meeting of the North of England Institute of Mining and Mechanical Engineers was held a short time ago to discuss the matter.

John Morrison, who opened the meeting with a paper on the subject, recommended, in the light of his own experience the following preventive measures: (1) Do not make a spread heap more than 12 ft. deep nor a conical heap more than 15 ft. high at the center of the cone. (2) Keep iron temperature rods in the heap at intervals of about 8 yd. and draw them out and through the hand daily to detect heating. (3) Whenever heating is noticed, trench the top of the heap by irregular trenches to a depth of 4 or more ft., for it is usual to find that heating commences at a depth of about 5 ft., and if left alone will spread downward until the coal fires. (4) In addition to trenching, work a long tiff bar or poker into the heap so as to form funnel-shaped orifices at intervals. (5) Rake the whole surface of the heap periodically in order to break up the surface exposed to the weather. (6) Tread the heaps as little as possible. (7) Do not form coal heaps on marshy ground.

In the subsequent discussion several speakers advocated pipes down which a thermometer could be lowered, as preferable to rods, on the ground that the pipes give more certain measurements, and at the same time allow of the escape of heat.

Various additional suggestions were put forward. Professor Knox, of the South Wales School of Mines, recommended that wherever possible the coal should be sized before stocking and that each size should be put in a separate heap; that where it is necessary (on account of lack of space) to store "through" coal or mixed smalls to a greater height than 13 ft., the material should be laid down in succeeding layers of not more than 3 to 4 ft. each; that perforated ventilation pipes 3 to 4 in. in diameter should be inserted, one pipe to every 300 sq.ft. of surface, the lower ends of the pipes being at different heights from the ground throughout the stacks; and that coal should never be stacked behind wooden structures, or on ground covered by coarse vegetation like bracken, and that wet small coal should not be mixed with the dry coal, but dumped around the edges of the stack, where the air could get to it freely.

The treatment recommended by Professor Knox for heaps which have begun to smoke is to sink a series of small "shafts" about 10 ft. deep on the top of the heap, and allow a plentiful supply of water to pass into these and find its way through the heated zone. The shafts should be kept flooded with water until the height of the heap can be reduced to such an extent as to render further heating improbable.

An Innovation in the Coke Industry

By JOHN L. GANS
Connellsville, Penn.

THE entrance of the W. J. Rainey interests into the realm of byproduct-coke manufacture, through becoming joint owner with the Alan Wood Iron and Steel Co. in the construction and operation of a 330-oven plant of the Koppers type at Swedeland, Penn., marks a distinct departure for the beehive-coke producers of the Connellsville region. By the same token it bears record of the fact that the owners of Connellsville coking coal have recognized an opportunity and, after long and mature deliberation, have decided to take advantage of it. No less significant is it as a new trend in the expanding development of the byproduct-coking industry.

With the exception of a few merchant byproduct installations more or less distant from the Connellsville region, the construction and operation of ovens of this type has been limited to iron and steel manufacturing interests which are normally their own consumers. Connellsville operators have been without interest in these enterprises other than as producers of coal which they sold in its raw state in lieu of beehive coke which they formerly sold, and oftentimes to the same customer, as a manufactured product. The joint undertaking, in which the largest independent manufacturer of beehive coke and owner of Connellsville coking coal becomes the partner of a steel manufacturer in the production of byproduct coke, both for the use of the latter and for sale to other merchant furnaces in the Schuylkill and Lehigh valleys, is therefore the first step in a more intimate union of interests between the Connellsville region and the byproduct industry.

Connellsville Produced Byproduct Coal

Ever since the byproduct oven has attained importance as a factor in the manufacture of metallurgical fuel, the Connellsville region has supplied a constantly increasing quantity of raw coal for conversion into coke by the retort process. Until the organization of the Rainey-Wood Coke Co. the relation existing between the operators of the Connellsville region and the operators of byproduct ovens was merely that of seller and buyer. The latter needed a commodity the former was able to produce, but not always in the quantity desired. In the new enterprise the relation has been broadened to include, on behalf of the erstwhile seller of Connellsville coal, the interest of part ownership in the business of making that coal into byproduct coke, thereby constituting an innovation in the industry.

Some years ago, and not many at that, a suggestion that a Connellsville operator enter the byproduct-coking field would have been adjudged as little short of disloyalty by many members of the beehive craft. The reasons therefor were the decidedly unsatisfactory showing made by the pioneer byproduct plants and the generally unfavorable impression made by the results of their operation upon both the makers and users of coke in the United States. The original plants labored under all the difficulties and handicaps incident to the formative stages of all new industrial processes. The quality of their product, which has always been compared with Connellsville beehive coke as the standard, was inferior in size, color, cell structure, burden-bearing and other qualities by which discriminating consumers appraise the value of a coke.

After a thorough investigation into the operation of the early byproduct plants and the existing state of the art, the Connellsville operators became convinced that they had little to fear from competition in the markets hitherto exclusively supplied by them. At the same time they were not able to wholly dispossess themselves of the feeling that the newcomer was an unbidden guest at the metallurgical-fuel banquet table, and might develop a very vigorous appetite. Likewise did they agree that no advantage, and certainly no profit, would arise from the construction of byproduct plants in the Connellsville region, and the abandonment of the beehive oven, even though the latter would soon become antiquated and always had been inefficient and wasteful. They realized that without a consumer of oven gas immediately at hand, which the Connellsville region did not have, byproduct ovens built at the mines would in reality be even more wasteful than beehive ovens, and infinitely more expensive to build. Hence they saw, in the early stages of the byproduct oven's development, little more than a means of augmenting, with a low-grade coke, the fuel supply of a furnace here and there, little dreaming of the possibilities of the newborn industry when stimulated to expansion by a world war.

The Chief Byproduct Was Gas

In the period of its infancy, through which the byproduct oven passed rather slowly, comparatively little effort was made to utilize the byproducts other than gas. In fact, the market for byproducts had not been created. As American engineering genius and skill later brought the byproduct and recovery processes to perfection, and the market for byproducts became wider and more diversified, the beehive operators did not fail to note that the industry began to assume proportions and to take on new phases. When, in 1915 and later, the number of byproduct ovens began to increase so rapidly, and the Connellsville region was brought face to face with the fact that beehive coke was being replaced in many quarters and in large quantities, no little concern began to be manifested as to the ultimate effect upon the manufacture of beehive coke, particularly in the Connellsville region.

Meantime it had been observed, however, that coincident with the increase in the number of byproduct ovens there had been an increased demand for Connellsville coal as the raw material for making byproduct coke. But in that situation, which was beginning to be recognized as presaging a change in the character of the Connellsville region from a producer of coke to a producer of coal, the operators were confronted with freight differentials which placed them at a decided disadvantage with immediately adjacent and competitive coal-producing districts. These differentials were an

inheritance from the fathers of the Connellsville region's principal industry. In their day and generation Connellsville coal was esteemed altogether too valuable to be applied to any other use than the manufacture of beehive coke, and they had persuaded the railroads to penalize the shipment of coal outside the region. Joining for defense in a common cause the independent producers early in 1916 formed the Connellsville Coal Tariff Association, with the removal of the rate discriminations as its immediate purpose and object. After the presentation of what is conceded to be one of the best prepared and most skilfully conducted cases before the rate-regulatory bodies, practically every contention of the association was supported and the whole region was placed upon an equal footing with its neighbors in the matter of freight rates on coal to the byproduct-coke manufacturing centers.

Operators Do Not Oppose Byproduct Coking

Their position being thus strengthened, the Connellsville operators were able to view with more equanimity than before the actual and prospective inroads into their coke trade by their passive and sometimes active byproducts competitors; more so because of the dependence of the latter upon the Connellsville region for a large part of their raw material. While the progress of the war has demanded an output of beehive coke to the limit of the Connellsville region's capacity to produce, as well also of the byproduct plants, the interests of the former have been centering their energies upon the things of the present, but not without some thought and probably some speculation as to the things of the future. The desirability of making an alliance with steel-producing interests in the manufacture of byproduct coke at the point of consumption, to which coal would be shipped from the Connellsville region has, no doubt, been given more or less consideration in the councils of the larger merchant operating companies. Whether or no this has happened, it has been reserved to the W. J. Rainey interests to take the initial step in that direction.

Considered from an economic viewpoint this step is merely an adaptation to the conditions which are developing in consequence of the expansion and growth of the byproduct industry and the transformation that is gradually taking place in the Connellsville region. While there is certain to long remain a demand for beehive coke, and the Connellsville region will retain its preëminence as the producer of it, the region will continue from year to year to undergo a change from a coke-manufacturing to a coal-producing center. The transition will be easily accomplished, the process involving little more than suspending the operation of the beehive ovens and centering plant activities on the mining and shipping of coal to the byproduct plants. This evolution, or revolution as some may term it, has been in progress for some time and cannot be said to have detracted from the importance of the Connellsville region as a fuel-producing center. In fact, without the extensive mine development of the Connellsville region the rapid growth in the byproduct industry would not have been possible, such development having provided an immediately available source and ample supply of coal for the new byproduct plants as they were made ready for operation.

The pig-iron and steel producers who have also become byproduct-coke producers early realized that Connellsville coal sustains the same important relation to the manufacture of a high-grade byproduct coke, rich in byproducts, that it does to the manufacture of a high-grade beehive coke. Through becoming a producer of byproduct coal the region has only changed in character, not in importance, in its relation to the iron and steel industry. This fact insures the continued activity of the Connellsville region as a fuel-producing center and provides opportunity for the beehive-coke producers and owners of coking coal to become interested, as the Rainey estate has done, in the enlarging activities of byproduct-coke production.

Automatic Caging Saves Labor

By W. A. Brown
Bowerston, Ohio

There never was a time in the history of the country when it was so necessary to conserve labor as now. Not only is this necessary at this time, but it will doubtless remain so for many years after the war is over. Our own people have been taken away from our industries, and the source of supply upon which we have always relied—immigration—has been cut short. After the war is over the foreigner, upon whom we have heretofore depended, will doubtless find work in the reconstruction of his own country, while many of our boys who in the natural course of events would enter the industries will never return.

This condition of labor shortage has been anticipated by the producers of the country, who are putting forth every effort to bring about a maximum production with a minimum amount of labor. Every sort of labor-saving device is sought after and brought into use.

In no field are these labor-saving devices more imperative than in mining. Only a few years ago—well within the memory of middle-aged men—undercutting machines were practically unheard of. Today most of the bituminous coal mined is cut by machinery. Mechanical devices are employed in every step in the handling of coal. Today coal is gathered from the rooms and hauled by motive power to the tipple or shaft bottom, as the case may be, where it is caged or fed automatically onto the dump or cage.

The automatic feeding of cars onto a cage or dump is being done with so much promptness, simplicity and with such a saving of labor that one who sees it for the first time is astonished, comparing it, as he must, with the old method where two men, or as was sometimes the case as many as could get around a car, pushed it onto the cage. These men who pushed the cars onto the cage or dump are released for other work where automatic cagers are employed. The transfer of these men is not the only gain, as the cars are fed with a promptness and rapidity not possible with hand feeding.

Knowing that success must follow specialization, the Mining Safety Device Co. centered its efforts for eight years on the automatic handling of cars at the shaft bottom and on tipples. This singleness of purpose has made possible the general satisfaction that its machines are giving.



COAL SHOT DOWN READY TO BE LOADED OUT

Coal, Explosives, War—III

By H. J. BROUGHTON
Wilmington, Del.

SYNOPSIS—*In shooting coal it is important to have as many free faces as possible; consequently, undercutting or side shearing not only aids the explosive but relieves the roof. Shooting from the solid requires more explosive per ton of coal dislodged than does shooting after undercutting, and also shatters the coal more. It is liable to weaken the roof and render it dangerous. The method of priming a charge has much to do with both its safety and effectiveness.*

BLASTING powder is the most economical and satisfactory explosive for most coal blasting unless mine gas or coal dust is present in dangerous quantities. It is strong enough to blast even the hardest coal from "the solid," provided the boreholes are given the correct location, direction and charge; and its velocity of explosion is so comparatively slow that it does not crumble or shatter the coal. To reduce shattering and increase the quantity blasted per pound of powder, soft coal should be undercut. Where this is not practicable, side cutting or "shearing" may be done before the "breaking-in" shot is made.

When shooting from the solid there is only one free side, and as the blasting powder must break the coal on all other sides a larger and therefore more expensive charge is required for the amount of coal blasted. Furthermore, the coal is shattered more than if it had another open face from undercutting. In "slab shooting," and all other shots after the breaking-in shot, the undercut gives three free faces and accordingly reduces shattering and increases the quantity of coal blasted per pound of powder.

Shattering can also be reduced by using course-grain blasting powder, as the large granulations explode more slowly than the small ones. Shattering may also be reduced by means of "air shots." These not only reduce the shattering effect on the coal, but often cause the force of the explosion to spread farther laterally and bring down a larger quantity of coal.

To blast coal successfully and economically the charge must be located in just the proper place, and must consist of exactly the right quantity and granulation of blasting powder. These are governed entirely by the conditions of coal to be blasted by the shot—the number, size and position of bands of slate, "bone," sulphur or clay, the quality and condition of top and bottom, the presence and position of clips and seams, whether the coal is solid, undercut or sheared, whether the work is on the faces or on the butts, whether the coal is hard, medium or soft, the height and width of the face to be shot, etc.

The borehole must be so placed and pointed that it will be no easier for the charge of explosives to break to one free face than to another. This does not necessarily mean that the charge should be the same distance from each free face, because coal may break much more easily in one direction than in another.

When better work will be done by putting the charge all in the back of the hole, drills or augers of large diameter should be used. Under other conditions it is preferable to have the charge spread along more of the boreholes. In such a case a hole of small diameter is necessary, but never so small that the charge comes too close to the mouth of the hole to be properly tamped.

The amount of the charge should be just great enough to crack and break to a maximum distance laterally,

and to each free face simultaneously. When the charge is so located that less force is necessary to break to the mouth of the borehole than to any other free face, the result is a "blow-out" shot. If it is in such a position that there is much less resistance to the undercut or some other free face, the result may be a "windy" shot. Holes are generally from 1 to 2 in. in diameter, and from 3 to 6 ft. deep.

In anthracite mines the hole for the cut or breaking-in shot may be drilled in any part of the breast face. This makes a second free face, and all subsequent shots should leave an irregular breast face, so that each shot may have the benefit of two free faces. In the gangways the depth, position and direction of the boreholes are governed by the quality of the coal and the thickness and pitch of the bed.

When blasting in bituminous mines, and in rooms that are undercut, the hole for the breaking-in shot is generally started a few feet to the right or left of the vertical center, and pointed upward and toward the far side, so that the point of the hole will be about halfway between the two sides or ribs and 2 ft. below the top or some heavy band of slate or sulphur. The holes for the following shots are located so that the points will be somewhat higher than the point of the breaking-in hole, and as far away from it laterally as the force of the powder will carry. Sometimes a hole on each side, fired simultaneously by electricity, will give best results. In many bituminous coal mines two or three shots will bring down the entire chamber face.

Entry blasting in bituminous coal mines must be adapted to the coal conditions, whether the entry is on the face or on the butts. The charge of blasting powder required in coal may fill from 1 to 3 ft. of the borehole.

Blasting powder is the principal explosive used for blasting where the rock and earth covering of coal is being removed. In some places, where solid earth with large boulders has to be removed, blasting is done in small horizontal tunnels, known as "gopher holes," driven into the bottom of the face for 20 or 30 ft. These holes are sometimes made 2 ft. in diameter, so that the man digging them can drag himself to the rear and dig a small crosscut for the blasting powder. Others are dug with long-handle shovels and bars, and are but 8 or 10 in. in diameter. Tamping is tightly packed from the charge to the mouth. Charges are exploded electrically with a 40 per cent. dynamite primer.

Ever since blasting powder first came into use, the advantage of igniting the charge in the center has been evident to all, particularly when this charge is distributed for a foot or more along a borehole of comparatively small diameter.

When a charge of blasting powder in a borehole is ignited at one end, it is always possible for some of the coal to fall before the entire charge is exploded, and thus cut off for an instant the remainder of the charge. This is most likely to happen when large charges are ignited at the end nearest the mouth of the borehole. In such a case more or less of the powder at the back of the hole, where the burden is usually the heaviest, does little execution, and a large flame and a great volume of smoke are projected into the working place.

Attempts to ignite the charge at the center are sometimes made by extending the fuse to that point; but this is seldom successful, owing to the fact that most fuses will spit fire from the sides and ignite the charge where the fuse enters it. Even the very best triple tape and gutta-percha fuse will do this occasionally. The expense attached to the use of the highest quality of fuse has caused this method of igniting charges of blasting powder in boreholes to be practically abandoned.

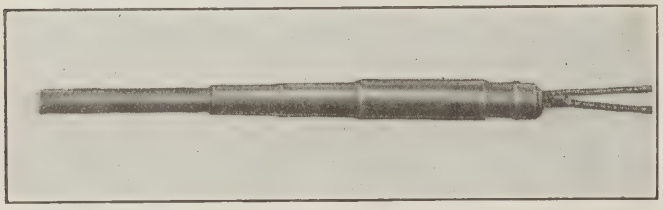
"Miner's squibs," often used for igniting blasting-powder charges in boreholes, are sometimes uncertain in their rate of burning, and may give but little time for the blaster to reach a place of safety after lighting them. This makes it necessary, when a number of shots are ready to be fired, for the blaster to return to



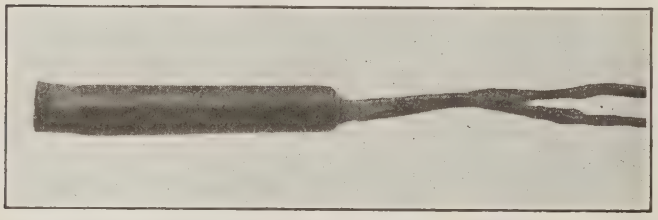
LIGHTING THE FUSE FOR A SHOT IN A FACE THAT HAS HAS BEEN UNDERCUT BY MACHINE

the face several times, causing the loss of valuable time. All of these disadvantages are overcome by the use of the electric squib. These squibs are similar in general appearance to electric blasting caps, but have a heavy paper cap instead of a copper one. The charge in this cap does not detonate like that in electric blasting caps, but merely shoots out a small flame. When electric squibs are used, the charge of blasting powder can be ignited in the center, giving a little quicker and stronger action, and insuring the explosion of the entire charge before any of the surrounding material can fall and cut off a portion of it. The borehole, too, can be tamped solid, leaving no vent for a partial loss of the strength of the powder. When the entire charge is exploded at once, less smoke is given off by the explosive. This, with the elimination of smoke from burning safety fuse, results in purer air, making it possible for both miners and draft animals to do more work.

Other advantages in the use of electric squibs are that when more than one shot is to be fired all the boreholes can be connected in series and fired at the same instant, resulting in a considerable saving in both



DELAY ELECTRIC IGNITER



ELECTRIC SQUIB

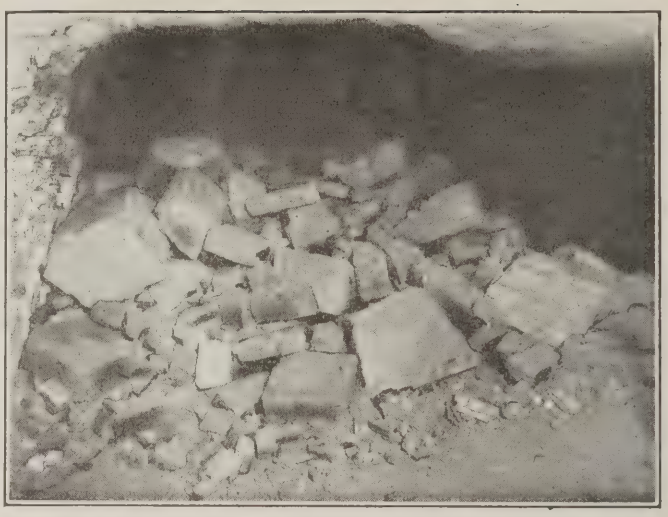
powder and time. Shotfirers can thus cover a great deal more ground than when using fuse or miner's squibs.

It is much safer to blast with electric squibs than with fuse or miner's squibs, because shots are not fired until every one, including the blaster, is a safe distance away, and because danger of hangfires is entirely obviated.

In short, the advantages gained by the use of electric squibs may be summed up as follows: More work from a given amount of blasting powder; everybody out of danger before the shots are fired; no waiting—the firing is instantaneous; any number of shots can be fired simultaneously; no fumes from burning safety fuse; a minimum amount of smoke from the blasting powder.

In connecting up electric squibs for firing, the wires, where joined, should be clean and bright. Connections should be made in series in the same manner as those of electric blasting caps.

Electric squibs require the same storage conditions as electric blasting caps, and although they cannot be exploded by shock or concussion like electric blasting caps, they must be handled just as carefully, for their



RESULT OF SHOT IN WEST VIRGINIA COAL

construction is necessarily delicate, and they can be easily broken by rough handling.

Delay electric igniters consist of a copper tube about 3 in. long, into one end of which is inserted and fastened the igniting material, bridge wire and the two wires connected to the bridge wire. Into the other end is crimped a piece of fuse that may vary in length from 2 to 12 in. When it is desired to have a period of delay between the firing of different charges of explosives, this can be accomplished by using an igniter of the shortest length fuse in the charge desired to fire first, the next length fuse in the next hole and so on.

The fuse in the igniters is ignited from the material surrounding the bridge wire, the delay period being brought about from the different lengths of fuse. These igniters can all be connected in the same series and fired by means of one application of the electric current.

When used with blasting powder, it will be necessary to have only the end of the fuse in the charge; for if the entire length of fuse is placed in the blasting powder the latter is apt to be ignited from the side spit of the fuse, and consequently the purpose for which the igniters were used will be defeated.

Delay electric igniters are made with copper wires of any length, but when iron wires are used they are only made either 4 or 8 ft. long. They are dipped all



RESULT OF SHOT IN ALABAMA COAL

over in a waterproof paint. This covers the ends of the fuse as well as the rest of the igniter, and prevents the powder in the fuse from absorbing moisture from the air. The fuse is made ½ in. longer than necessary, so that ½ in. of the end must be cut off before inserting into the blasting cap or the charge of blasting powder.

The importance of using reliable blasting supplies cannot be overestimated. The failure of explosives to perform their functions most effectively is, in many cases, due to defective or weak detonating agencies. In the selection of blasting supplies for firing the explosives, the greatest care should be exercised. The lives of employees should not be imperiled nor property endangered by attempting to fire charges with weak, improperly made detonating apparatus. To be sure of results, reliable blasting supplies should be employed.

Every explosion prevented in a mine through the paying of more attention to technique of operations in blasting probably saves the services of a certain number of men, who instead of being laid up in hospitals, can be more profitably employing their time in trying to improve their methods.

For this work of shotfiring at the mines there must be employed men who have enough patriotism to use every ounce of available energy to produce a maximum



A RIB SHOT

of coal with the least expenditure of time, labor and material. Operators must be made to realize that unpatriotic foreigners will not meet this requirement. Efficiency and competency are the qualities that must be possessed by the worker who is to be counted on to improve the technique of his blasting operations.

With the constant improvement that is going on in the manufacture of explosives there is being brought to the attention of investigators, employed by the manufacturers, easier, simpler and more efficient ways of using explosives in the mining of coal. They make exhaustive tests of the manner of priming, tamping and loading. All this knowledge is compiled in concise form and published by the different manufacturers, who at all times are willing to supply the operators and miners with booklets setting forth the facts.

There are no methods employed by the mine worker which cannot be improved upon if study is given to the subject. The various booklets referred to above contain the meat of the subject with which they deal, so that unnecessary time does not have to be spent in searching through lengthy volumes to gain this knowledge.

Mine operators should see that booklets containing all available information on up-to-date methods of blasting coal are placed in the hands of every man handling explosives. A little thought and study of methods, together with their proper application, will do much to aid in the increased production of the coal so necessary to keep the wheels of industry moving, the homes of our nation warm, as well as to supply almost every needed article for the successful prosecution of the great world war.

Waterproof Plunger Grease

By L. W. Brooks
Jersey City, N. J.

Coal mining, like other industries, is seriously hampered by inability to obtain enough men to get out the great amount of tonnage now in demand. This difficulty will increase with the still larger need for coal next winter. It is a serious problem, and it will not be solved unless drastic action is taken by the authorities.

In times like these every man and every piece of machinery must operate at highest efficiency, and there must be no breakdowns. Machinery is doing its part, but can continue to do so only by careful handling and constant attention. Shutdowns cannot be tolerated.

In the old days machinery did not always receive as good attention as common sense would dictate, especially in such matters as lubrication. Poor lubrication was responsible for most of the repairs and faulty operation. By this is not meant that cheap lubricants were used, but the opinion is held that the proper care was not used in selecting suitable lubricants for each class of service. Cheap oil or grease may be deemed satisfactory in some cases, such as for the machinery in the breakers, but the power house, hoists, cables, mine pumps, etc., require lubricants selected with special reference to the service. Even high-priced lubricants may be a failure if they are not designed to meet the conditions under which they are used.

To illustrate this point, consider reciprocating mine pumps handling dirty water. Grit works into the packings and acts as an abrasive on the plungers, scoring them badly. It also cuts out the packings, so that they are an endless source of trouble. Packings cost money, and it takes time to replace them. Neither common black oil nor high-grade cylinder oil will stop the excessive wear, because neither has the necessary characteristics. The problem is not solved merely by buying more expensive lubricant.

The first consideration, therefore, is the fitness of the lubricant for the purpose; the price is secondary. Study each machine separately. In the case of mine-pump plungers the lubricant should be waterproofed so it will not wash off. It must be adhesive so the packing will not wipe it off and a man be kept busy applying it. Such a necessity wastes grease and time too. It must be of heavy body in order to maintain a film that protects the plunger from the cutting action of grit. It should contain flake graphite to counteract the effect of grit and add weeks to the life of the packing. Such a lubricant is cheap at any price.

In a similar way the kind of lubricant most suitable for wire cables, for car wheels, for haulage locomotives, for pneumatic tools, etc., may be determined.

Mine Accidents

By F. G. JARRETT
Anchorage, Alaska

SYNOPSIS—*Much has been done to increase the safety of mining on paper, but possibly decidedly less underground. This is believed to be due to the faulty, or at least in some respects objectionable, manner in which the tenure of office of mine inspector is determined. Is there not a better method of selecting and retaining mine inspectors than by election?*

THE readers of *Coal Age* and mining men in general have for many years discussed and written articles pertaining to firebosses, safety and mining inspections. Some of these articles have been along intelligent lines, opening a vital subject, which I am sorry to say was closed before being properly cleansed, as it were, leaving us in practically the same position as heretofore.

In addition to all our well-directed efforts, we are being deluged with "safety-first" signs, which are plastered in and around the mines in every conspicuous place. We point with pride to the wonderful strides made with the first-aid and mine-rescue teams, to the advancement made through education, together with dozens of new laws and inventions. But, can we point with pride to the death and accident statistics?

Men are still being killed and maimed, by falls of rock or coal, due, in many instances, to negligence on the part of the miner, to unsystematic timbering, or to the inspection department. With all our knowledge of mine gases, and our boasts of mine ventilation, blue-scarred faces, shrivelled ears and hands are still in evidence. Explosions still claim their toll.

We are confronted with that pertinent question, What's the matter? Are we in a rut? In other words, does all our mining experience, which has been indeed dearly acquired, stand for naught?

Present System Has Many Shortcomings

The old adage of prevention versus cure is surely applicable here. Owing to the fact that the fireboss, foreman and inspectors are always involved in accident cases, the logical solution to my mind hinges on and around the inspection end of the business. But can we justly blame anyone? The fireboss has to be a jack-of-all-trades. If a success, he is called a "hustler." The foreman gets and holds his job through his practical knowledge of mining and his ability to "make good" at getting the coal out. In large mines it is impossible for him to visit each working place every day. The inspector comes about once each month. He has to be firm and fearless and pray hard every election.

The question arises, Is this system conducive to mine safety? Should an inspector, after many years of practical experience, if he be a capable and fearless man, be ousted with a change in politics? Why not hold strict competitive examinations, pick out the best men, grading them down to the fireboss, and allow them to fill these positions as long as they do their duty?

The fireboss, being essentially a mine inspector, should be classed as such, coming strictly under the jurisdiction of the state mine inspector. He should deal strictly with mine safety, be in a position to enforce the laws in his mine or section of the mine, leaving questions of output to the foreman and his assistants. The fireboss, or rather we will call him a "safety inspector," should be placed under the supervision of the state inspector, to whom he should report and be responsible. With these safety inspectors recognized as a unit of the inspector of mines department, they should be able to show a decrease in the accident rate, at the same time preparing themselves for higher positions. When an opening occurred these safety inspectors should, if qualified, step up and keep going to the top, irrespective of politics and favoritism, which have been pernicious in the past in our inspection departments.

Progress Means the Saving of Life

Progress along these lines should bring its reward by saving lives. It should be a help rather than an impediment to the management, by helping to take a load of worry off the foreman's shoulders.

Due to the large territory assigned to the different state mine inspectors, they are unable to play a very important part in the detail work of mine safety. This, in addition to the fact that the fireboss is often otherwise engaged, places the workmen in the position of being at liberty to exercise their own ideas. We have thousands of miners in our midst who cannot read a safety sign, or a word of English, and consequently know absolutely nothing about gases, safety signs, or why a safety lamp is safe. Miners become so accustomed to danger that unnecessary risks are taken daily for the sake of a few cents or a few minutes. I have taken them myself and have seen hundreds of others do the same. Every miner can cite cases of leaving his timbering until the last moment, or of taking other chances just as foolish.

Higher wages attract unskilled men, who are, on account of shortage of trained miners, often put to work in mines, taking a chance on their own lives as well as becoming a constant menace to every other man in that mine.

I will cite one case, which I handled personally, and although many years have passed the incident is still fresh in my memory. Upon going my rounds in one of the most dusty and gaseous mines in this, or any other country, I entered the last room on a split, which was being worked by two foreigners. My senses warned me as soon as I stepped through the door in the crosscut and into their room that something was wrong. Glancing toward the face a distance of 40 to 50 ft. I could see the shapes of these two miners in the dust working like frenzied fiends, shoveling coal into a car. But what made my heart stop, or rather jump into my mouth, was their safety lamps. In addition to their lamps being on the floor, instead of hanging to a post, the flames of both lamps were nearly to the top.

As will be evident, those lamps were nearly red hot, and little time elapsed before I had them out into the fresh air, leaving these would-be suicides, or rather murderers, to grope their way out in the dark. Sitting down on the side I suddenly felt tired, and years older. Presently the miners came along jabbering apologies. This nearly made me see red, but keeping a strangle hold on my nerves I asked them—Why, etc.? They answered, We load 'ums' car, Mr. Boss, and then 'loka' see."

This, and other cases which have come under my observation, such as firing shots in bodies of gas, shooting on the solid, working in gas until rendered unconscious, smoking in gaseous mines, mining (undercutting) without sprags, working under bad roof, etc., have convinced me that our safety system is open to a lot of criticism. These weak spots can easily be repaired by a get-together spirit among the mining fraternity which will culminate in not only the saving of dollars, but in reducing the number of cripples, widows and orphans. Negligence and ignorance are our two worst enemies. One man through either of these openings can endanger his own life, and at the same time jeopardize the lives of every other man in the mine.

In conclusion, I will state that one suggestion is worth a dozen find-faults. I have thought the matter over and followed the dictates of duty by giving the idea for publication to be taken at its worth. Whether the subject is open and worthy of discussion, or not, must be decided by others.

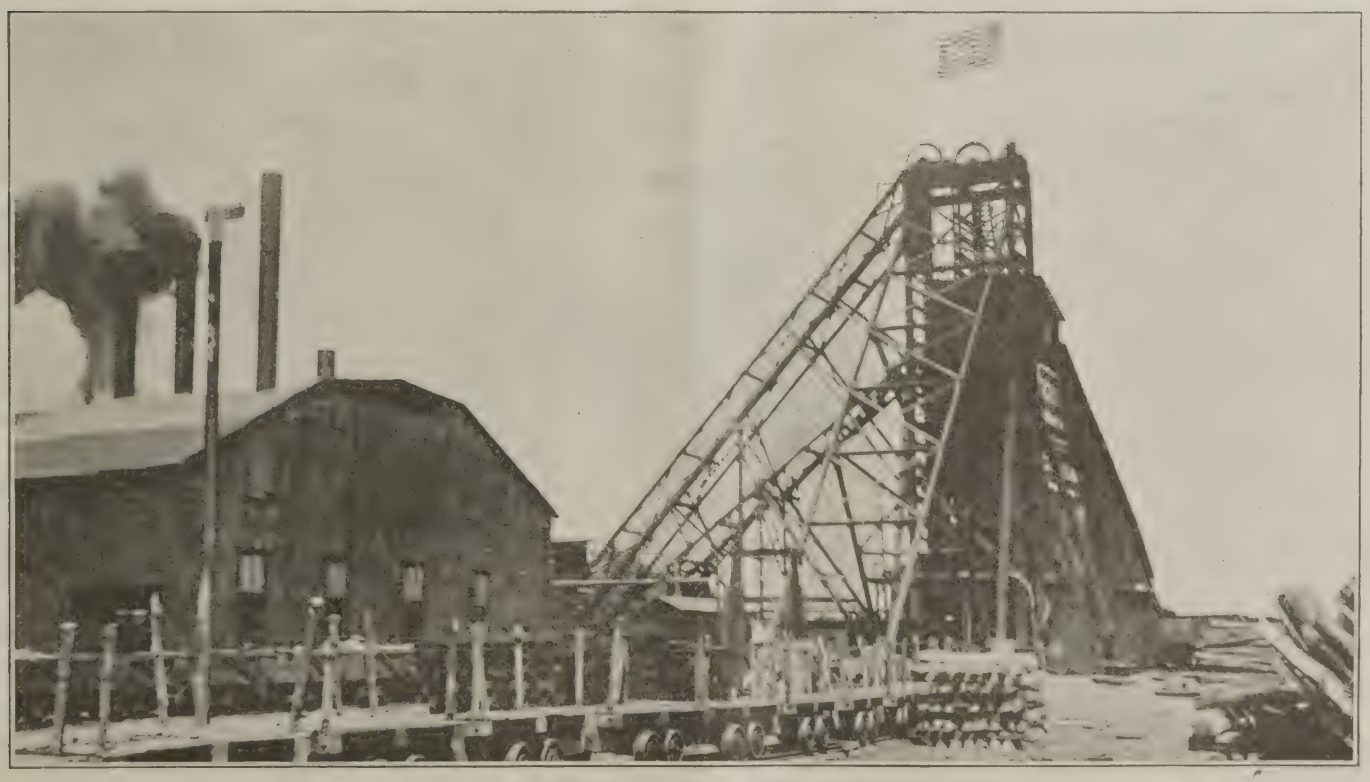
Plant Operates by Storage

The plant of the Security Coal and Mining Co. is about three miles south of Duquoin, Ill., on the Illinois Central R. R. This is one of the mines operated by Rutledge & Taylor, a firm having offices in Chicago and St. Louis. About eight years ago this company bought a wooden tipple in Indiana, moved it to Illinois and installed it at the mine in question, as shown in the accompanying illustration.

While not one of the largest mines in the state, it made a good showing for the year ended June 30, 1917, when it produced 550,261 tons of coal. Of this amount, 20,932 tons were used at the mine, or about 4 per cent. of the total production of the plant. This seems like quite a modest demand on the resources of the company compared with the requirements of most Pennsylvania anthracite mines, which often use 10 to 11 per cent. of production for power purposes at the plant.

The Security mine worked 179 days during the year 1916-17. The coal here is entirely machine mined, 12 mining machines doing the undercutting. The coal is hauled to the shaft by 17 motors, while 35 mules assist in gathering from face to main partings. During last fall transportation reached such a state of inefficiency that the men at this mine were only working from two to three days a week. Finally, the company purchased the necessary equipment and arranged to dump coal in a field adjoining the plant.

A storage bank was started last fall close to the Security mine. This was added to until about Feb. 1. When the railroad did not furnish cars, run-of-mine coal was run through the tipple and loaded into side-dump cars of 20-ton capacity, by means of which the coal was dumped out on the ground for storage. On Feb. 1 there were some 90,000 tons of coal in the bank. About the middle of April the Illinois Central R. R., having acquired the stocked coal, began to load it into railroad cars. A siding was laid along the bank and coal was loaded into railroad cars with a steam shovel. On one special occasion, 35 flats were loaded in this way in one day. This plan not only enabled the company to hoist more regularly, but after the storage bank was instituted the men worked three to four days a week.



TIPPLE AND POWER PLANT AT THE SECURITY MINE

Handling Mine Water

By HENRY E. COLE
Pittsburgh, Penn.

SYNOPSIS—*The work that a pump must perform, the character of the water to be handled, the ultimate position in which the machine will be placed, its efficiency and service—all must be considered before a pump is purchased. Frequently, in times of emergency, various makeshifts may be resorted to to keep the mines in operation.*

AMONG the big problems of the coal-mine operator in securing maximum production is the successful handling of the mine water. The quantity of water to be moved varies according to the general locality; the depth of the coal; the character of the overlying and underlying strata; the area of the water shed; the season of the year and the amount of rainfall. In some mines little water is encountered, while in others 20 or more tons of water must be taken out for every ton of coal.

In this article I will not try to deal more or less exhaustively with this subject, but mention chiefly some things which result from study and experience, and hope that the matter presented can be used with good results.

Since the water problem is of such importance, the proper selection of pumping equipment is imperative and the following points should be taken into consideration: Work to be done; character of water; ultimate position of pump; efficiency; service.

By work to be done is meant the use to which the pump will be put. This will be either unwatering the mine, gathering from the face of the coal or from local dips, or main pumping—that is, taking water from a central basin or sump and discharging it outside of the mine. The number of gallons per minute and total head are also considered under this heading.

The character of the water must be considered in order to secure a pump which will last a reasonable length of time. If highly acidulous water must be handled, an effective acid-resisting metal or iron properly protected should be considered. If water contains sand or gravel in suspension, rapid wear on the parts exposed to high velocities will result. Often pumps are installed which are made of anti-acid metal to protect against acid waters, but this metal is so quickly worn away by the solids in suspension as to make the extra cost unwise.

A possible change of location should be carefully considered in the purchase of any pump. That is, will the pump be moved so that the length of the suction or discharge pipe will be changed or the total head be increased or diminished? How will the power available be affected? Will the same electric or water lines be used for other apparatus, and with what result?

Efficiency should always be taken into consideration, but should not be the deciding factor. This point should be carefully considered in large units and also with pumps that are to operate continuously. As some pumps are efficient when first installed, but rapidly lose their efficiency with increased wear, this point should be taken into account. Few pumps are efficient on heads of less than 10 ft. Piston pumps will show good results up to 100 or 125 ft. Centrifugal pumps vary according to design, size and service. Low head centrifugal pumps and those of small capacity will seldom show more than 40 per cent. efficiency, while many larger machines

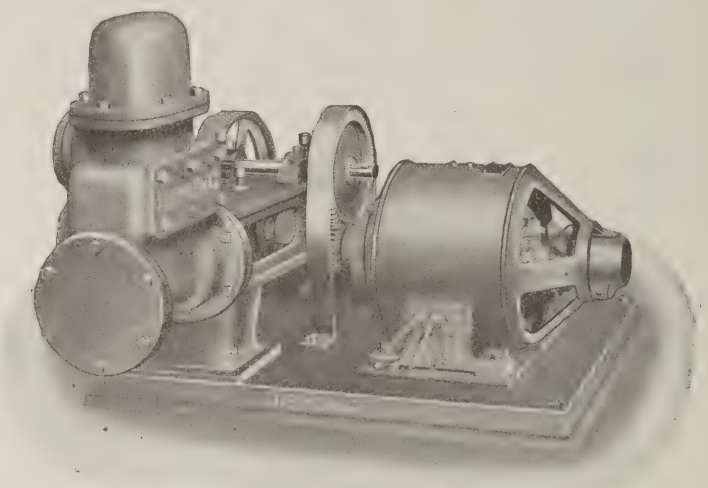


FIG. 1. A TYPICAL GATHERING PUMP

working on heads from 75 ft. and higher will show efficiencies of from 65 to 80 per cent. Plunger pumps for high heads and large capacities often show efficiencies of 85 to 90 per cent., although an assumption of 70 to 75 per cent. is safer in calculating the power required.

Service should also be given careful consideration. Will the pump selected operate satisfactorily with a minimum of attention? Are all parts easily accessible for adjustment or renewal? Can the company furnishing the pump make quick shipment of repair parts from stock, or will they have to be made up? What are the transportation facilities for new parts with least possible delay?

By gathering pumps are meant machines that take the water from the face of entries or rooms or from local dips and deliver to a central sump or basin. Pumps for this service are often used to discharge water entirely clear of the mine. As a rule piston pumps are best adapted for this work because they are light in weight, moderate in price, seldom require priming and will handle a certain percentage of air or small particles of solids. The Deming Ajax pump shown in Fig. 1 is a typical electric motor-driven gathering pump.

Small plunger pumps will often render good service where the water is bad and where the discharge pressure is high. Pumps with only a small amount of clearance will do better work where much air is taken in with the water. Centrifugal pumps are often used for this work but must be primed before starting and usually quit pumping when any air gets into the casing. They

will easily pass small solids, however, because of absence of valves of any kind.

Fig. 2 shows a typical plunger pump for gathering or use as a main pump. It is shipped with frames slotted for wheels and axles to make it portable.

To the main mine pumps much attention should be given. If the operation is extensive, requiring a number of large units, a reputable engineer should be consulted and all points mentioned above carefully considered. In general it may be said that for heads of 100 ft. or less, piston pumps usually show good results. For high heads outside packed plunger pumps should be given careful consideration. When the water is highly acidulous and the quantity small, pumps with anti-acid bronze water ends usually meet the conditions; but if the capacity is great and the pressure high, wood-lined plunger pumps will usually give best results in the long run.

On moderate heads where large capacities must be handled the centrifugal pump properly fitted and adapted to conditions will usually give splendid results. This type of pump is also usually cheapest per hundred-gallon capacity of any type of electrically driven machine.

Compressed air is frequently used for mine pumping. In some cases it is employed in a displacement pump designed for steam. This, however, is highly inefficient and not recommended. Air is often used in an air lift. In this case a pocket is drilled about 120 per cent. below the water level to give the air lift the necessary submergence. In such cases large capacities are obtained with efficiencies varying from 15 to 40 per cent.

The term "head" is often much misunderstood, but is nevertheless important, for it represents the equivalent in vertical elevation of several existing factors. For example, 100 gal. of water is to be elevated each minute 100 ft. through a given size of pipe. The static or still-water head is 100 ft. If the water has to pass through a 2-in. pipe it offers resistance equivalent to a column of water about 25 ft. high; therefore, the friction head would be 25 ft. Since the water must flow at the rate of about 10 ft. per second, and as this water must be accelerated from a state of rest to this high speed, we have an additional velocity head of nearly 2 ft., making a total head above the pump of 127 ft. To this must also be added the suction lift and the friction head in the suction line. Except in the case of large low-lift centrifugal pumps, the velocity head is usually so small as to be neglected, leaving only the static or actual difference in elevation and friction in pipe. It should be remembered that 1 lb. pressure represents an equivalent head of 2.31 ft., or 1 ft. elevation of still water exerts a pressure of 0.434 pound.

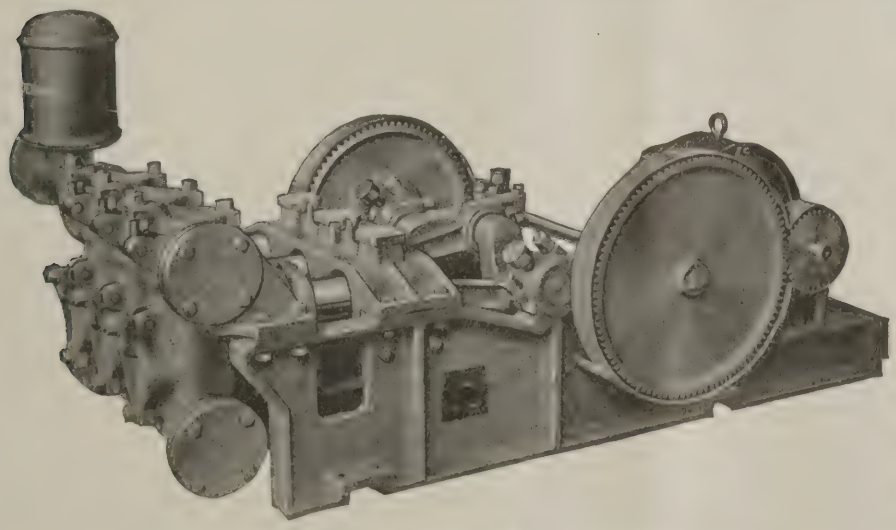


FIG. 2. TRIPLEX GATHERING OR MAIN STATION PUMP

Great care should be exercised in the selection of suction and discharge pipe for pumping units. It is a great error to install the same size of discharge pipe as the pump is fitted for. All suction and discharge pipe should be figured in each case for the service to be performed. One of the greatest errors in thought is to consider that as a larger pipe carries more weight of water, more power will be required to move it. Such reasoning neglects the fact that the velocity is correspondingly reduced, thus decreasing the friction.

In general it should be remembered that doubling the cross-sectional area of the discharge pipe decreases by one-half the velocity for the same quantity of water and lessens the friction head to one-quarter its former value. Also, doubling the amount of water means four times the friction head. The cross-sectional areas and consequent carrying capacities of pipe vary as the squares of their diameters. Thus a 3-in. pipe will carry 2¼ times as much water as a 2-in. pipe, while a 4-in. will carry 16 times as much as a 2-in. pipe. It will therefore be seen that it is usually economical to select relatively large pipe. It should also be noted that acid waters attack iron and steel much more readily at high velocities than at low ones. This also favors the larger pipe. Where an operator has an overstock of a given size of pipe, but requirements show that a larger pipe should be used, a double line can be laid so that each line will carry one-half of the total amount.

There seems to be a general feeling among pumpers that no air should be allowed to accumulate in an air chamber on a pump discharge. This is a grave error. Few types of pumps will deliver a uniform flow at the pump, and wherever the flow is not steady there will be a wide variation in pressure on the line, a consequent stress on all parts of the pump and a loss in power in operation. These may be small in some cases or result in great damage in others. Stripping of gears and breaking of connecting-rods and shafts often arise from this cause. A small petcock placed in the suction line of a piston or plunger pump and opened as often as necessary will generally supply the needed air which gradually gets away from the air chamber. If the discharge line is long an extra air chamber made up of large pipe fittings and placed about halfway to the discharge outlet will be a decided help. Air in an air chamber is to a water line what springs are to a car, or what pneumatic tires are to an automobile.

An operator is frequently called upon to do what seems to be the impossible in order to prevent loss of the mine. It is of course impossible to foresee and advise in an article of this kind for every case, and I therefore suggest only a few emergency makeshifts.

Suppose that the discharge line is so small that the friction head entails a pressure too high for the pump. If the pump is a centrifugal machine, no harm will result. If it is of the piston or plunger type, run a parallel line if possible so as to divide the discharge. If this is impossible, connect a bypass from the discharge back to the suction or waste to the ground and control with a valve. This will reduce the pressure by reducing the amount of friction head.

Suppose that the main pumps break down and only low head pumps are at hand. If centrifugal machines are available, they may be connected in series; that is, the discharge of No. 1 may be connected into the suction of No. 2, so that if each pump is good for only 50 ft. both will be good for 100 ft. If one pump is built to stand a low pressure it should preferably be placed about one-half way from the sump or other source of water supply to the point of discharge. Centrifugal pumps may also be placed in the lines of other types of pumps to help out, as they easily adapt themselves to conditions. Suppose that the discharge head becomes too great for the centrifugal pumps. This may be remedied in a manner similar to that last suggested, but if compressed air is available several small air connections may be made into the discharge line of the centrifugal pump and the inflow of air regulated by a valve in the air line. The result will be to change the density of water in the line, reducing the pressure on the pump nearly one-half; consequently, the pump will discharge against an elevation nearly double that for which it was intended.

The following general suggestions may also be appropriate: Prepare as far as possible for emergencies. Have faith in the traveling representative of the pump house with which you deal. See that pumps purchased are adapted to conditions both present and ultimate. See that total head stated includes all friction head, suction and discharge heads. Don't overstate conditions in buying centrifugal pumps, but name conditions as they exist. As centrifugal pumps must have correct speed, make sure your electric lines are large enough and that the voltage is right. Remember that coal, slate, or other solids may clog up the impeller of a high lift pump so that it may shut off the capacity almost entirely. Use your common sense liberally.

A war-saver is a life-saver.

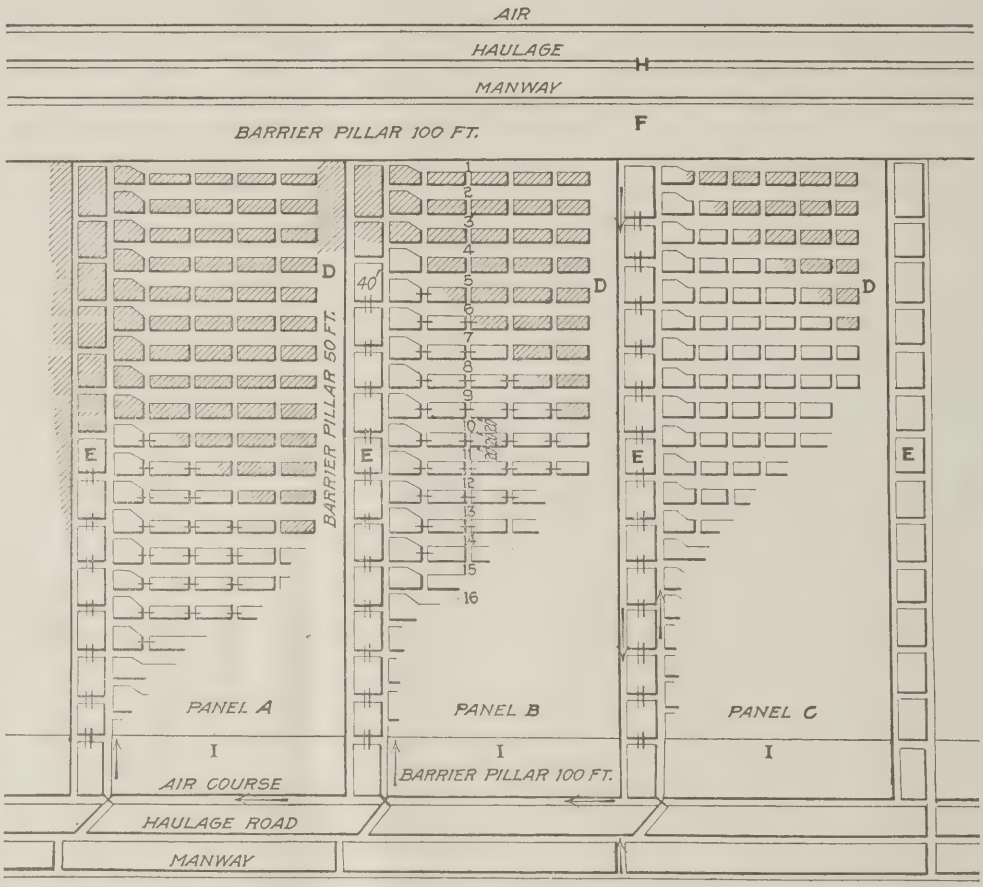
He also serves who stays and saves.

After all, saving is not sacrificing.

Many are giving their lives; you are asked to loan your money. Buy War Savings Stamps.

Standardized System of Mining

The North Western Mining and Exchange Co., at its mines situated near Dubois, Penn., has standardized its system of mining by the adoption of the panel plan of working shown in the accompanying illustration. These panels are 1200 ft. long. The rooms are driven 300 ft. off one entry only. The 50-ft. pillar *D* is left between the ends of the room and the next butt entry *E*. The 100-ft. pillar *F* is left between the ends of the butt entry *E* and the next set of cross-entries *H*.



PANEL SYSTEM OF OPERATION ADOPTED

The 100-ft. pillar *I* is left between the cross-entry and the first room on the butt entry.

The butt entries are driven to their proper length before the rooms are turned off, after which the rooms are driven on the retreating principle. When the second room has been driven up robbing is started on the pillar between rooms Nos. 1 and 2; then, as the next room is driven up, the pillar between rooms Nos. 2 and 3 is drawn, and so on, six pillars being robbed at the same time and six rooms being driven on a butt entry at one time.

Bituminous coal will probably continue to be used under steam boilers but to a lesser extent. In the future its principal use will be in the byproduct plants because of the higher commercial value of the products that can be made from it. The higher the percentage of volatile combustible the higher will be the commercial value of the coal. The time may come when we shall consider anthracite as of minor importance as compared with the high-volatile bituminous.

The Credit of the Coal Man

By J. C. TAYLOR
Louisville, Ky.

SYNOPSIS—*Just at present the coal business, especially the portion of it in charge of distribution, can operate upon a strictly cash basis. Such operation, however, may be unwise, as a refusal of credit may seriously inconvenience a customer and cause him to seek his fuel elsewhere when present abnormal conditions have changed to those more nearly normal.*

ONE of the interesting features of the coal situation today is that of credit. At first glance there may not seem to be any question of moment involved, because the average coal man has no need to extend credit. If one man is not willing to buy coal and pay cash for it another is. Thus for the first time on record the entire coal trade, including mine owners, jobbers and retailers, is in a position to arbitrarily eliminate credit.

It is here that the danger lies. It is this that makes it a feature of the situation. The future standing of the coal trade in the public eye hinges considerably upon how this matter is handled, whether the constituent members of the trade handle it in a manner to acquit themselves creditably, or whether they regard the whole affair as a cold business proposition and proceed to collect the cash regardless of the feeling of customers and the practices that have prevailed heretofore and still prevail in most lines of business.

There are two sides to this question on which endless argument may be produced and many phases and wrangles can be developed and enlarged upon. It all boils down, however, in the final analysis to the point where the coal trade is being put on trial. Will it or will it not so conduct itself as to justify the abuse, the hard feeling and the harsh words that have already been forthcoming to the coal man from the general public?

The Present Opportunity

One way of looking at the matter is this: The coal man has now his opportunity to retaliate for past unkindnesses on the part of the public in classifying him and to allow the public to sweat and pay its bills promptly.

There is another way to look at it, however, a way that presents more appeal and promise, for the future welfare of the relations between the coal man and the public. To point out this way and make a plea for a proper extension of credit on the part of the coal trade is the purpose of this article.

The coal man, collectively speaking, needs to improve his standing in the public eye. It may be no fault of his that he has been the subject of abuse and has been wrongly classified in the public estimation. It is easily apparent, moreover, to one who is familiar with the situation that the fault in this case is more with the public than with the coal man. At the same time, while it may not be the fault of the coal man that he does not command more of the confidence and good will of the public, it is plainly the duty of the coal man to strive for a better understanding and relationship.

There is a question of sentiment involved here, and while some will argue persistently that sentiment is not business, and that business is a cold-blooded proposition, the fact remains that sentiment is and will always be the most dominant factor in business and business relations.

And now for a consideration of the question of credit upon its merits as a purely business proposition. The coal trade, like many other lines of business, has long been afflicted with the evil of too much credit, in which much of the credit was bad. There have been losses of profit in the carrying of long time accounts, and there have been losses of money through extending credits to get trade where credit should never have been extended.

Now, there has come a time and a condition in which the whole slate can be swept clean at one stroke. The credit business for the time being can be entirely eliminated and the trade can swing to the other extreme for a brief period of prosperity.

The important question is, Will this latter procedure pay in the long run?

It is not sufficient answer to this to pass it off by saying it will pay for the time being, and we can let the long run take care of itself.

The Future Is Important

A proper conception of business involves a vision of the future as well as a casting-up for the day. And in the future of the coal business, unless this question of credit is thoughtfully handled and treated in a broad-gaged way, and more liberally than the trade at present seems inclined to treat it, there will be found an invitation to competition which will sooner or later bring disaster to the trade which now seems so well intrenched that it can demand cash or refuse to do business.

It may be good advice, so far as the consumer is concerned, which is handed to the public about borrowing money to buy coal during the summer so as to be provided against the winter's needs, but there is a question if this will be good for the trade in the long run.

The extending of credit is a form of service. This and the carrying of a stock of coal on hand sufficient to supply current needs promptly, constitute an important part of the service which justifies the existence and maintenance in the community of the institution known as a retail coal yard.

It takes some capital to do this. The larger the stock carried and the heavier the credits extended the more capital is involved. This may seem like a hardship, but if it didn't take capital to engage in such a business, if a man could go into the coal trade on a shoestring, financially speaking, it would mean an

open field and so much competition that the business would be neither profitable nor inviting.

So, in a way, the necessity for capital investment is of itself a safeguard against the open field and wider competition. The logical course for the coal man, therefore, is to figure the value of the service he is rendering, including the interest on the capital invested and the credits extended and include in the price of the coal enough to insure a fair return.

It is presumed in all this, however, that the extension of credit is properly made. There is no occasion to argue for the careless extending of credit, nor in this day is there much excuse for it. Practically all the larger towns and cities have credit-rating organizations, and any diligent business man can check up and classify his customers and readily understand in the main who are deserving of credit and who are not. There is always a percentage of the trade put in the C.O.D. class, but these bad risks are entirely aside from the credit proposition in its broad sense.

Now is a good time for the average coal man to do a little thinking along the line of putting himself in the customer's place. And this applies where the coal man is a producer selling to a retailer as well as where he is a jobber or retailer selling to the individual consumer. The jobber or the retailer who is refused credit service by the producer is likely to look back to those days when the producers extended credits from early spring to late fall, and then turn and look forward to the future with a feeling of resentment in which he will conceive the idea of buying his coal from some one else.

It is pretty much the same thing with the domestic consumer to whom the retail dealer has rendered the service of carrying accounts in the past. He will resent the withdrawal of this service and the refusing of credit more bitterly than he will protest against the higher cost of coal. He recognizes the higher price as one of the inevitable results of war conditions, but he will be offended as well as inconvenienced in many instances by the curtailment of service in the refusal of credit.

The coal trade is now going through a boom period to a critical condition in the future, and much of the future welfare of the industry as a whole as well as of the individuals engaged therein will depend upon the conduct of the coal man at the present time in his handling of the question of credits.

The Money Lost Up a Chimney

The accompanying chart has been developed by the Uehling Instrument Co., 71 Broadway, New York. It is of interest and value at the present time when the coal problem is so important, for it enables anyone to quickly and closely estimate the money now being lost up almost any chimney due to low CO_2 content in the products of combustion.

To use the chart simply connect the percentage of CO_2 (shown in column C) with the money now being spent per year for coal (shown in column A), and the intersection of the connecting line with column B immediately gives the dollars passing out of the chimney in the form of heated gases.

Example: If $20,000 is spent per year for coal burned in a furnace whose average CO_2 shows 9.3 per cent., what is the approximate money lost up the chimney per year?

Solution: Connect the $20,000 (column A) with the 9.3 per cent., (column C), as indicated by the dotted line drawn across the chart, and the intersection with column B shows the approximate yearly loss to be $5000.

The object of this chart is to show that a high percentage of CO_2 is highly desirable. To be sure, even

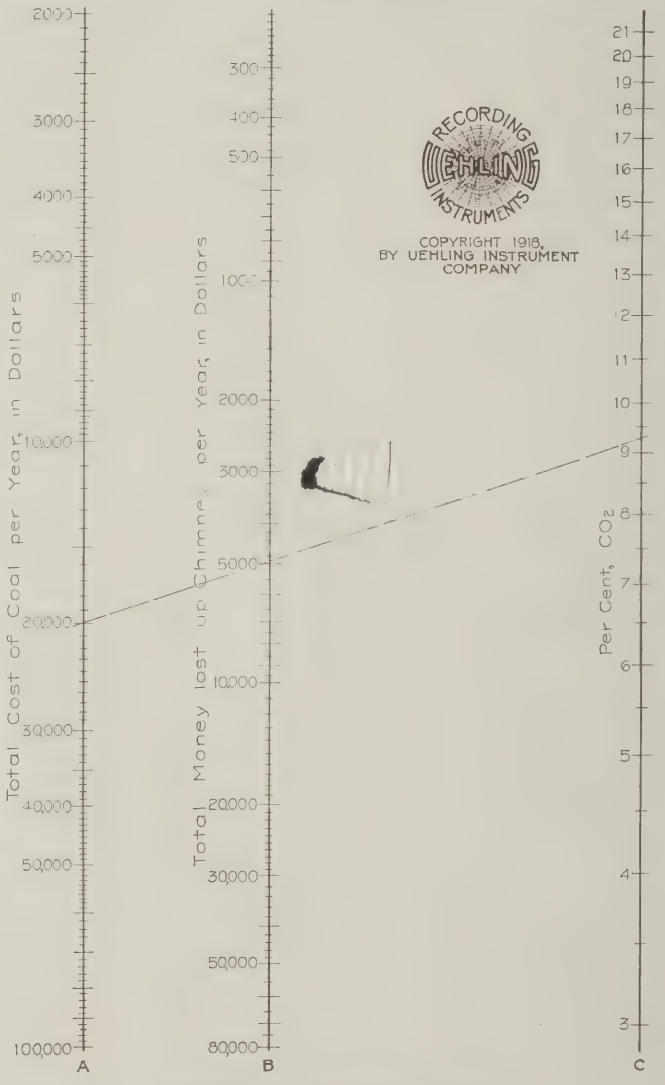


CHART OF CHIMNEY LOSSES

where the CO_2 is as high as 21 per cent., the theoretical maximum there is a loss in the average power plant because the flue gases leaving the boiler have a temperature as high as 500 or 600 deg. F. Loss, therefore, is inevitable unless a blower is used for exhausting the gases and some sort of apparatus installed for either heating the feed water or preheating the air before leading it under the grate.

This chart is based on a flue gas temperature of 600 deg. F. and an outside air temperature of 60 deg. F. Where the flue gas temperature is higher, or the outside air temperature lower, the money loss will be correspondingly increased. On the other hand, with a higher outside air temperature and a lower flue gas temperature, the money loss is proportionately decreased. Further, in the construction of this chart it has been

assumed that the coal has a calorific value of 14,500 B.t.u. per pound of combustible.

It may also be interesting to point out that where there is only 3 per cent. of CO_2 in the flue gases, 76 per cent. of the heat value of the coal passes up the chimney as waste under the conditions outlined above. It is impossible, however, for these gases to contain as low as 2 per cent. of CO_2 because this would show conditions requiring more heat than the original quantity of heat in the coal to heat the enormous surplus of air to a temperature of 600 deg. F.

Minecdotes

"Them Were the Happy Days"

Some fifteen years ago, the writer, then at a rather tender age, became "foresightman" for a surveying corps working chiefly underground in various mines near Wilkes-Barre, Penn. The transitman was an intensely energetic and rather eccentric individual named Gallagher, and known to most of his associates as "Spiker." The latter, although at that time not yet thirty, was almost as bald as the proverbial billiard ball. The years have been kind to Spiker, and in the successful mine superintendent that he has become there is little trace of the raving maniac who made life miserable for yours truly when difficulties arose in the old days.

He certainly was the limit at such times. I can hear him yet, standing with his transit set up on the gangway road, screaming and raging in a voice that used to break into a falsetto screech that was amusing to everyone but myself. "—— —— Harrigan, what *are* you doing? *Are* you doing anything, or must I come up and put that station in myself? How in —— do they expect me to get anything done with such —— —— help?" And so on continuously, for whatever length of time after his backsight was taken it might require for me to get a station point in the high roof of some pitching chamber.

Those were strenuous days, but as I look back at them nowadays lots of amusing incidents come to mind, not a few of which center around the counterattacks of firebosses who were always sent with us as guides and for our protection against possible danger. The firebosses were not directly under authority of the transitman—although expected to help out as much as possible—and without exception they disliked Gallagher for his hard driving, hard swearing ways. As a consequence they seldom failed to take advantage of any opportunity for putting something over on him, and one of the most amusing of these incidents happened in the old Black Diamond mine, on a day when we were being chaperoned, so to speak, by "Andy" Mack.

Andy was a shrewd old scout, and was always ready to take my part when Gallagher lost his temper, or demanded more than was reasonable. "For the love iv God, Gallagher," he'd say, "have ye no heart at all? Shure when ye were foresightin', ye wur so dumb we all had to take turrns doin' yer worrk, and now ye expect more of this lad than tin men could do. Yerr a wurse tyrant than old Naro iver was, a cursing and a swearing like a heathen; and you wit' nothin' but a tin cint cap between yerr bald head and the wrat' of God."

Gallagher had a way of alluding to himself in a more or less jocular manner as the "old man," offering his bald dome as evidence if anyone questioned his right to the title. On such occasions Andy would retort: "Yis, yer bald enough, all right, but it's not wit' age; its wit' rrascality."

On the particular occasion I have in mind, Andy had refused point-blank to attempt the climbing and examining of some pitching places from which the coal had been drawn out, and which stood smooth and bare, on a 35-deg. pitch, 300 ft. from the gangway road to their faces. "They're too steep, Gallagher," he said, "and they're drawn out clean, props an' all. Shure no man cud go up thim without cuttin' hitches. I'll not try it for you nor anywan else."

Gallagher became very sarcastic. "All right, Andy," he said. "All right. Give me the safety lamp then. I'll soon show you whether anyone can climb them or not. The trouble with you is that you're too old for this game and won't admit it," thereby stabbing Andy to the heart, as he well knew.

Andy handed over the safety lamp, and Gallagher, who, to give the devil his due, was game to the core, started climbing up along the rough projections of the rib. For as long as we could watch him he made very fair headway; and I took advantage of the welcome delay to go out along the gangway a few hundred yards to where our dinner buckets had been left. After refreshing myself considerably, I returned to the scene of action to find Andy sitting on the loading platform at the foot of the place Gallagher had started up, rocking and chuckling with glee.

"What's the joke, Andy?" I asked. "Listen," he replied. And I did. From far in the heights above us, a weak and evidently frightened voice was calling "Andy, Andy, Andy." It was Gallagher.

"He's shtuck," chuckled Andy. "He's shtuck, and can get nayther up nor down, and he's calling for Andy to come and get him out of his trouble. We'll lave him there a little while to think it over."

And "lave him there" we did for about fifteen minutes, which must have seemed to Gallagher like fifteen hours. Finally, with an air of great surprise, we answered his calls; secured picks and planks, and got him down safely. His hands were bleeding, and his nerve was completely gone. But he was soon back at his old tricks.

DURING A PERIOD of ten years in England, of a total number of 8683 accidents underground 5014 were due to falls of roof. The longwall system of mining is characterized by less accidents from falls of roof for the following reasons: (1) There is no second working—that is, removal of pillars of coal which hold up the roof. (2) The face is continually advancing and new unbroken roof area being exposed. (3) A gradual settling of the squeeze in rear of the advancing face. (4) Timber does not stand so long as in room and pillar, therefore less liable to decay. (5) The headings are fewer than in room-and-pillar mining.

This Record Would Put Blame Where Due

SYNOPSIS — *The operators in the Clearfield region are asked to keep an all-around record of the efficiency of their operations as producers. A miner, a foreman and a clerk are to form an efficiency committee at each of the larger mines and they will investigate the reasons for idleness and low tonnage.*

WITH the following preamble the Bulletin of the Central Pennsylvania Coal Producers' Association presents the blanks for recording efficiency that are presented below:

"In order to properly install this system it will be necessary to assign at the large collieries three men, a miner, a foreman and a clerk, and at the small units one man, who shall devote his entire time to determine the actual causes for lost tonnage including the causes of absence of employees, and to encourage the men to work full time. These men shall be known as the Efficiency Committee and shall report to the superintendent."

The first 5 columns of the first form which is known as Form M-4 is to be filled in daily by the time clerk. One set of these Forms M-4 are to be used for miners and another set for day men. All miners are to be shown on the daily list while other employees should only be listed if absent. At the close of the day's business the Form M-4 should be turned over to the Efficiency Committee which should, by personal investigation, determine the causes contributing to lost time or tonnage, and these should be entered in columns 6 and 7 of this report.

The second form is a summation of the daily Forms M-4. It is known as Form M-5. All miners are listed and all other employees who have been absent. The third form (M-6) is to be compiled from the payroll and from Form M-5. Sundays, July 4 and Christmas are not to be included as working days. For example line 2 should show 12 days for the semi-monthly period ending July 15, 1918. The following instructions are given:

The total days lost on Form M-5, Column 4, shall be extended on Form M-6, column A, line 4. The total days lost on Form M-5, column 5, shall be entered on Form M-6, column A, line 5. The total days lost on Form M-5, columns 6, 7, 8, shall be entered on Form M-6, column

Daily Record for Each Miner and Absent Employee

of _____
Name of Company

100% Effic._____Tons per day, Pick Mine

100% Effic._____Tons per day, Mach. Mine

Colliery _____ Colliery worked_____hours Date _____191__

Check No. or Name	TIME			Number of Tons Loaded	Reason for Loss of Time	Reason for Loss of Tonage	% Efficiency	Remarks
	Arrived	Departed	Hours Worked					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

Semi-Monthly Record for Each Miner and Absent Employee

of _____
Name of Company

100% Effic._____Tons per day, Pick Mine

100% Effic._____Tons per day, Mach. Mine

Colliery _____ Complied from Form M-4 _____half of_____191__

No.	NAME	Bad Place	No Hours Lost Due To													Total No. Tons Loaded	% Efficiency
			No Railroad Cars	Sickness	Floods and Fires	No Purchase Power	Breakdown	Intoxication Holidays Etc.	No Rails in Place	No Timber in Place	No Mine Cars	Place Not Cut	Air and Water				
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]
	TOTAL NO. HOURS LOST																
	TOTAL NO. DAYS LOST																

A, line 6. The total days lost on Form M-5, column 9, shall be entered on Form 6, column A, line 7. The total days lost on Form M-5, columns, 10, 11, 12, 13 and 14, shall be entered on Form M-6, column A, line 8. Percentages (in column B) shall be determined by dividing the numbers shown on lines 4, 5, 6, 7, 8 and 9 (column A) by number shown on line 3. Line 10 shall be determined by dividing the tonnage shown on line 11 by the difference between the percentage shown on line 9, column B and 100 per cent. Line 11 shall show the tonnage produced, including boiler fuel, during the period covered by report. Line 12, subtract line 11 from line 10. Line 13, divide line 10 by line 3. Column C, lines 4, 5, 6, 7, 8 and 9, shall be determined by multiplying line 10 by each percentage shown in column B.

The fourth report M-7 is to be posted at the colliery. Column 5 shall be determined by subtracting the percentage shown on Form M-6, Column B, line 9 from 100. Column 6 shall be determined by subtracting the percentage shown on Form M-6, column, B line 7 from 100. Column 7 shall be determined by subtracting the percentage shown on Form 6, column B, line 8 from 100.

Semi-Monthly Tonnage and Attendance Record

for _____
Name of Operator

Colliery..... .....half of.....191....

(1) Total Employes on Pay Roll - - - - - - - - - - - - - .....

(2) Total Number Working Days - - - - - - - - - - - - - .....

(3) Total Possible days to Work (Multiply 1 by 2) - - - - - - - - - - .....

	(A) Days Lost	(B) %	(C) Tonnage Lost
Loss Due Unavoidable Causes:—			
(4) Railroad Car Shortage - -	.....	.....	.....
(5) By Employes - - - -	.....	.....	.....
(6) By Company - - - -	.....	.....	.....
Loss Due to Avoidable Causes:—			
(7) By Employes - - - -	.....	.....	.....
(8) By Company - - - -	.....	.....	.....
(9) Total - - - - - - -	.....	.....	.....

(10) Full Time Tonnage - - - - - - - - - - - - - - - .....

(11) Actual Tonnage Produced - - - - - - - - - - - - - - .....

(12) Tonnage Lost - - - - - - - - - - - - - - - - .....

(13) Tonnage Produced Per Man Per Day Worked - - - - - - - - - - .....

EFFICIENCY REPORT

for _____
Name of Operator

Colliery _____

for Period ending _____ 1918 Compiled from Form M-6

Semi-monthly period ending or Name of Colliery	NET TONS			Per cent of Efficiency			Tons Produced per man per day
	Colliery Rating	Full Time Tons	Tons Actually Produced	Colliery	Employees	Company	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

DEPARTMENT OF HUMAN INTEREST

"Safety First" As Usual

Operators have somewhat divided opinions about first-aid meets. On the one hand, there is a disposition to oppose them as holiday affairs at this time, when every ton of coal is demanded by the nation at war. On the other hand, many operators feel that it is just as necessary to save life now as at any time, to the end that a large industrial death rate may not be added to the death rate on the field of battle. Saving and economy of material embrace the saving and economy of life, limb and working time, as well as of goods and chattels.

Moreover, companies which had good first-aid teams protecting the lives and limbs of their men have seen these teams dismembered by the war. The young men of whom such teams are composed have been the first to volunteer and the first to be drafted. The work has largely to be done all over again, and the enthusiasm which started the corps in the first place has to be recreated—and will have to be more than recreated; for the men who are to be drawn into the first-aid service now must perforce be those men who failed to answer to the safety-first call when it was first made.

Many also are the operators who look upon service in the first-aid team as a valuable lesson in altruism. The man who trains himself to help his fellow workman is the same man who examines himself and his daily life to find out how he can help his nation in the war. Patriotism and first-aid service go hand in hand. One stimulates the other.

The views of these operators—who will deny that they are right?—will prevail in Somerset County, and a meeting will be held at Sipe's Race Track, near Jenners, on Saturday, Sept. 7. The chairman of the executive committee is Fletcher W. Cunningham, state mine inspector, and the other members of the committee are Samuel Steinbach, of the Consolidation Coal Co.; C. F. Roy, of the MacGregor Coal Co.; M. M. Truax, of the Victor Coal Mining Co., and S. C. Halverson, of the Quemahoning Creek Coal Company.

Teams have already been entered by the companies just mentioned, and by the Brothers Valley Coal Co., of MacDonaldton; the Knickerbocker Smokeless Coal Co., of Hooversville; the Baker-Whiteley Coal Co., of the same place; the Davis Coal and Coke Co., of Boswell; the United Coal Corporation, of Jerome, and the Gibson Coal Co., near the same town. Last year 22 teams entered the field. It seems likely that this year there will be more. If possible, all the judges will be physicians; but as they are difficult to secure, expert first-aid men may have to act in that capacity. The Industrial Department of the Y. M. C. A. is still the backer of this splendid work, and if a team desires to enter application may be made, as in former years, to George B. Landis, the industrial secretary of the Y. M. C. A. at Harrisburg, Pennsylvania.

Work Will Win the War

A meeting held by the Pittsburgh Terminal Railroad and Coal Co.'s mine workers and officials illustrates the meetings being held everywhere to emphasize the truth that "Work Will Win the War." Unless we are ready to back the fighters with our services, the war cannot be won. The meeting in question was held at Bruceton, Penn.

Safety Inspector J. W. Bowles and W. E. Houston arranged a most appetizing out-of-door banquet on the lawn adjoining the Bruceton Hotel. To this dinner all the employees who had completed the first-aid training course in 1918 were invited.

After the repast talks were made on "Safety First" and "Win the War" topics by General Manager F. B. Lincoln; W. G. Duncan, senior inspector of the Associated Companies; Edward Stauffer, Pittsburgh Terminal Railroad & Coal Co., and C. D. Mason, mine safety engineer, and Leader Morey, of Pittsburgh's Four-Minute Men. The speeches were heartily applauded and the men returned confirmed in their determination to mine more and "cleaner" coal than in the past, so as to bring the successful termination of the war a little nearer.

Safety Congress To Precede Bond Issue

At the request of the United States Treasury officials expressed through Dr. Royal Meeker, of the Department of Labor, a director of the National Safety Council, the latter organization has been requested to hold its meeting no later than Sept. 20, so as to leave the safety engineers and others at liberty to boost the Fourth Liberty Loan, the sale of the bonds commencing Sept. 28 and ending on Oct. 19.

Something of this kind has long been anticipated and the date of the safety congress has consequently been in doubt, for the boosters for safety are as keen for the safety of the nation as for the safety of the individual and they desire to be on hand to sell bonds from the time the whistle ushers in the drive till the whistle blows for its close.

The Y. M. C. A. drive, so long postponed and so badly needed to reëstablish the funds of that organization, will follow the Liberty Loan campaign in the end of October. Consequently there is every reason why the business of the safety congress should be advanced to the dates chosen—Sept. 16 to Sept. 20, both dates inclusive. The mining sectional meetings will probably be held on Sept. 18 (Wednesday) and in the morning of Sept. 19 (Thursday). St. Louis is the place chosen for the meeting and a large attendance is expected.

The meeting will furnish an excellent opportunity for comparing notes regarding the plans to float the new Liberty Loan, which is now placed at five billions of dollars, equivalent to $125 per wage earner.

Significant Electric Locomotive Accident

John Reider, a night pumper at the Sykesville shaft of the Cascade Coal and Coke Co., Jefferson County, Pennsylvania, had an accident which illustrates the probable cause of many electric-locomotive accidents. He was engaged in running the locomotive from pump to pump, that being his mode of traveling in performing his duties as pumpman. The motor blew out a fuse, scaring him so that he attempted to jump to safety. Unfortunately his clothing caught in the motor, and he was dragged for some distance before being released. His right leg was broken in three places.

The causes of the accident are possibly two: Loose clothing and inexperience. However, it is a fact that such blowing out of fuses and short circuitings of current do sometimes and perhaps quite frequently scare or stun the locomotive engineer, causing him to leap or be thrown from his seat and fall beneath locomotive or cars. If the accident is not observed and is fatal, no one can explain its occurrence. Every provision possible against such accidents should be provided.

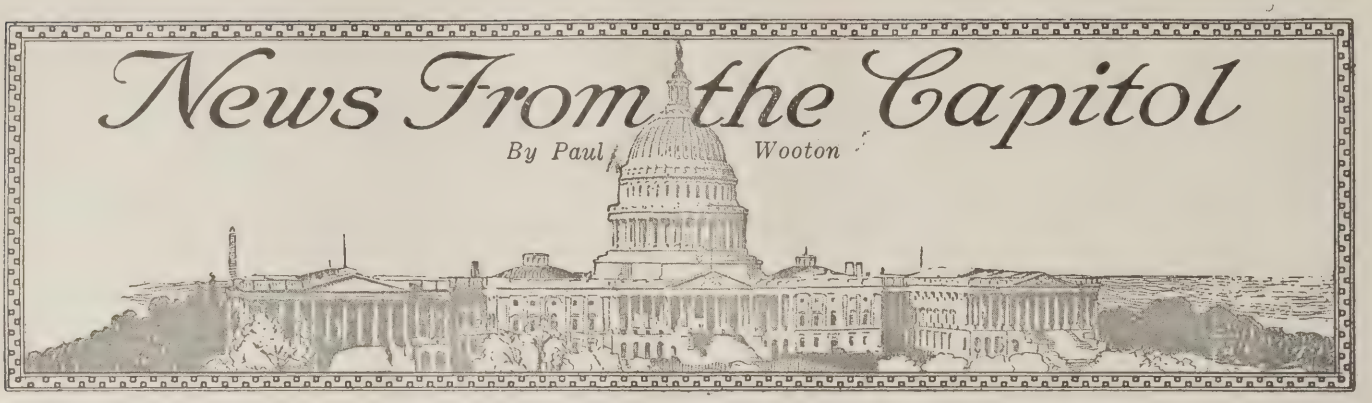
Dangerous To Carry Tools up Ladder

The illustration below, for which we are indebted to "The Anode," published by the Anaconda Copper Mining Co., shows the right and the wrong way of taking tools to one's working place in a heavily pitching seam. If carried up a ladder, the tools foul all the way. The man who tries vainly to hold both the tools and himself finds them slipping from his grasp without his being able to get a new purchase.

This makes him take risks which should never be taken, and, as a result, he loses his hold and falls to the level below, accompanied, or perhaps even followed, by his tools. The result is apt to be fatal. How much better to haul the tools up a boarded chute. In this way not only is the workman protected, but also the persons who may be traveling on the level. The Anaconda Copper Mining Co. provides these chutes at all stopes. The genius of a pick or saw for finding projections in a rise cannot well be exceeded. One makes a long and trying trip if one attempts to carry tools up a ladderway. For this reason chutes should be provided.



ILLUSTRATING BOTH AN UNSAFE AND A WELL-ORDERED WAY OF DELIVERING TOOLS TO THE WORKING FACE



Coal Mining Is War Work

Coal mining is classified by the Department of Labor as "wholly war work." In announcing the policy which would prevail in the control of the recruiting and distribution of unskilled labor for war production, the department defined war work as follows:

1. The manufacture of products or erection of structures directly or indirectly supplied to some department of the Government for use in connection with the war. "Indirectly supplied" includes goods delivered under subcontracts to Government contractors.
2. Coal mining is wholly war work.
3. Railroads and farms are engaged in war work to the extent that under this program they are protected from all recruiting by other industries.

Apportioning Available Coal Supply

A budgeting plan for the apportionment of the available supply of coal which has been under consideration for some time was brought a step nearer realization last week when Dr. Garfield discussed the matter at length with representatives of the Railroad Administration, the War Industries Board and the Shipping Board. It was revealed at the conference that no less than 110,000,000 tons of coal will be required to make and transport the steel necessary to meet the Government's requirements.

No More New Industries for New England

The order prohibiting the establishment of new industries in the East and in New England came too late, in the belief of several officials at the Fuel Administration. Not only must additional industries be kept out of that territory, but it is believed that a portion of those now located there must be shifted to other sections of the country. As it is there are many areas into which it is physically impossible to transport the requirements of coal in addition to handling the finished products and taking care of other essential transportation needs. Outside of these congested districts, the steam-coal situation is not bad. From the Ohio line west there are more screenings than operators know what to do with. The situation in steam sizes is particularly easy. It is believed that many industries could be transferred to the Middle West and to the South where they could be near an adequate coal supply. If this were done, the problem of distributing coal would be simplified considerably and industrial efficiency increased, it is believed.

A Shortage of West Virginia Coal

Demand for high-grade West Virginia coal is outstripping production so decidedly that the situation was the subject of a conference last week between West Virginia operators and J. D. A. Morrow, who is in charge of distribution for the Fuel Administration. Additional coal is needed urgently for Lake shipment, for byproduct use and at tidewater. Various means for stimulating production in West Virginia are under consideration.

Storage Conditions Unequal

Great inequality exists throughout the country as to the amount of coal held in storage by consumers. This is shown by the returns to the Fuel Administration from the recent questionnaires sent to consumers. The storage is to be equalized as much as is possible. There is no idea of taking away any of the coal accumulated by a consumer, provided, of course, it does not amount to hoarding. When a reasonable reserve has been secured, a greater accumulation will not be allowed so that others may be given an opportunity to get their share of coal for storage.

Returns are coming in from the consumers' questionnaire at the average rate. Three-fourths of the consumers in New England already have made returns. A considerable number of large consumers, however, have not responded. It is believed that this is due to the fact that the matter did not come to the attention of the proper official. A little prodding may be necessary, but as a rule, the large concerns are not the ones which delay statistical compilations based on replies to questionnaires. A number of men are on the road examining the veracity of the returns. Every effort will be made to make examples of those making erroneous reports. The complete program which it is hoped will result in the stimulation of coal production is now before the President. Pending his approval, the details of the plan are not available.

Better Prices at Pittsburgh Wagon Mines

The local fuel administration at Pittsburgh, Penn., on July 30 prescribed new prices for the wagon and truck coal mines of that district and certain rules governing the operation of such mines.

First—For coal not moving by rail, a manufacturer or large consumer who makes a blanket contract with a wagon mine for the entire daily output of any one or more of these mines, delivery to take place each day of

the week as the coal is produced, the maximum price shall be $2.45 per net ton, f.o.b. mine platform.

Second—For all coal so purchased in large quantities for public institutions, hospitals, office buildings, large apartments, small manufacturing operations, mercantile establishments, and like institutions, including a supply to retail coal dealers, the maximum price (where not taking the full and complete output of the mine and providing for its continuous operations without interruption) shall be $2.75 per net ton, f.o.b. mine platform.

Third—For those consumers of coal, ordinarily covered by the term "domestic users" and taking only small quantities, and especially any consumers not in the first and second classes above mentioned, the maximum price shall be $3 per net ton, f.o.b. mine platform.

Hauling rates based on the delivery of coal to stock piles, or to the street, or curb, and not including the handling of it in any way, have been fixed as follows:

First mile or part thereof	$0.70
Over 1, up to and including 2	.80
Over 2, up to and including 3	.95
Over 3, up to and including 4	1.15
Over 4, up to and including 5	1.30
Over 5, up to and including 6	1.50
Over 6, up to and including 7	1.85
Over 7, up to and including 8	2.15

The rates arrived at by the administration were determined after many conferences with representative bodies, such as the executive committee of the Pittsburgh Truck Mine Coal Producers' Association, a committee representing those purchasing coal from wagon mines, and a committee representing the manufacturers of trucks.

The prices are to be in effect from Aug. 1 to Nov. 1, and the prices apply to screened coal. The hauling rate is based on the loaded mile. For example, a six-mile round trip from the mine will be charged at the three-mile loaded rate. The prices apply only to clean coal, and should dirty coal be delivered 50 cents less per ton should be charged.

Restrictions on Anthracite from Lake Docks

Anthracite coal may be shipped from Lake docks to the following sections only:

1. The states of North Dakota, South Dakota, Minnesota and Wisconsin.
2. The upper peninsula of the State of Michigan.
3. That portion of the State of Iowa located on the north of a line coincident with the Illinois Central R.R. from Dubuque to Sioux City, Iowa.
4. The following-named counties within the State of Illinois: Cook, Stephenson, Winnebago, Boone, McHenry, Lake, Ogle, Dekalb, Kane, Dupage, Lee, Kendall and Will.

An order to this effect has been issued by the Fuel Administration, which carries into effect the plan formed several months ago to restrict the use of anthracite in distant regions. It also is impossible from a transportation standpoint to provide the East with any other fuel for domestic purposes.

In order to provide a fuel adapted for use in base burner stoves, in the districts from which anthracite has been cut off, regulations and prices have been issued for sized screening.

For all special sizes passing over a mesh over ½ in. in size the mine price for prepared coal is allowed. For special sizes passing over ¼ in. and under ½ in. in size, the mine price for run of mine coal is allowed.

For all fine sizes passing through a mesh ½ in. or smaller, the price fixed is 30c. per net ton less than the prevailing price for standard screenings. If fine screenings or "carbon" passing through ½ in. or smaller mesh as the result of producing special sized screenings are mixed with other coal, the selling price shall not exceed the applicable government price less 30 cents per net ton.

Tests on an Odor Warning

A series of tests with stenches as a warning for miners is being made by the Bureau of Mines. A liquid chemical is injected into the compressed-air line at the engine room. The vapor thus is carried quickly to the farthest opening of the line. About five minutes are required for the warning to be received at a punching machine which is approximately 1800 ft. from the compressor. The odor soon diffuses to all near-by parts of the mine, and is carried along by the ventilating current. The laboratory work in this connection is being done in the gas section under the direction of Lieutenant Katz. The most disagreeable nontoxic odors obtainable are being tried.

Brief Washington Notes

Coke prices in Pike County, Kentucky, have been announced as follows: Blast furnace, $6.50; 72-hour selected foundry, $7.50. The prices do not apply to coke made at the plant of the Marrowbone Mining Co.

A price for modified mine-run has been established in Barton and Vernon Counties, Mo., and in Cherokee and Crawford Counties, Kansas. The price is: Nut-run, or stoker coal, $3.05 per ton; mill coal, $2.95 per ton.

Contracts now may cover a longer period than one year. A ruling to this effect was issued last week by the Fuel Administrator. Any extension beyond one year, however, must be approved specifically by the Fuel Administration. If such approval is granted, contracts may be entered into without a limitation or with a limit in excess of one year.

Bituminous coal production during the week ended July 27 totalled 12,802,000 tons. This is a decrease of 121,000 tons over the week preceding, but is an increase of 13 per cent. over production during the corresponding week of last year. Anthracite shipments increased slightly. Forwardings during the week under review were 40,942 cars.

G. C. Foedisch, of Philadelphia, Allen C. Dodson, of Bethlehem, and Julian B. Huff, of Greensburg, Penn., have been selected by James B. Neale as members of a committee to assist him in the effort he is making to increase coal production.

F. W. Guthrie, president of the United States Coal Corporation of Pittsburgh, set 200,000 tons as the goal of production he wished his men to attain in July. He urged them to "go over the top" for that unprecedented production in the company's mines. Mr. Guthrie has advised James B. Neale, the director of production, that the month's production apparently was 210,000 tons.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The disheartening reduction in bituminous coal output still continues, though the fall in tonnage is less than last year. In the week ending July 20 the output of bituminous coal was 363,000 short tons less than in the week before, and in the week ended July 27 it was 121,000 tons less than in the week ended July 20. The tonnage has declined therefore to a point 484,000 tons a week or 80,000 tons a day below the record week ended July 13.

The car shortage has much to do with this condition, but it must be remembered that if in any section the coal industry is itself to blame and in that same section the railroad industry is blameless it will not serve any good purpose to show the railroad industry to blame elsewhere. It is the hope of our industry to show that the railroad industry is always, everywhere and in all cases, to blame except perhaps in the anthracite region.

As stated, however, the railroads were principally at fault. The car-shortage percentage was 3.9 in the week ended June 20; and it was 5.1 in the week ended June 27. On the other hand the labor shortage including strikes rose only from 4.2 to 4.4 per cent., but with a declining car supply surely it should not have increased at all.

The car shortage increased in Illinois, Indiana, markedly in southern Ohio, in Westmoreland County, Pennsylvania, in central Pennsylvania and in Somerset County of that same state; it increased lamentably in the Fairmont region of West Virginia (from 8.8 to 19.3 per cent.) and in the Cumberland and Piedmont district only less lamentably. The Hazard field in Kentucky received less cars, so did the northeastern and western Kentucky fields. The southern Appalachian area saw its car shortage increase from 7.6 to 16.3 per cent. Southwest Virginia suffered somewhat more than before; so did Kansas and Missouri; Oklahoma and Arkansas and so also did Iowa. Even the Rocky Mountain area had less cars.

Some sections showed a trifling improvement as might be expected. In all, there were four of them. Northern and central Pennsylvania which is grouped as one, western Pennsylvania, the New River and Winding Gulf region, also grouped as one, and the high volatile region of southern West Virginia. The railroads are doing less well than before. It will now pay to store coal, especially slack.

The attitude of Provost Marshal General Enoch H. Crowder is rapidly getting more and more favorable to the giving of miners deferred classification. Perhaps we shall ultimately arrive at the point that we shall not summon men at all to service whom we do not want to serve. We shall not ask them to come to the draft boards to make their excuses. We shall not demand that they give reasons why they should not do what they so much want to do and what we do not want to them to do at all. But Crowder is not making the laws. If he will only continue to advise mine workers to make pleas for exemption and will continue to favor the placing of mine workers on the deferred list no one can file objection to the fact that he does not subvert the civil authority by setting up laws of his own writing and devising.

Though James B. Neale, director of production of the Fuel Administration, is not succeeding wholly to the liking of the insistent public he is doing much to maintain and increase tonnage. He has chosen as a production committee: G. C. Foedisch of Philadelphia, Alan C. Dodson, of Bethlehem, Penn., and Julian B. Huff of Greensburg. He is endeavoring to induce the mine workers to give up their holidays, fairs, picnics and other festivities. It is pleasing to note how successful has been his work in this direction.

Barnesboro, Penn., is a near neighbor to Spangler whose renunciation *Coal Age* recorded the week before last on page 180 when Spangler gave up the Firemen's Convention. At this town of Barnesboro an annual picnic was to be given by the Northern Cambria Scottish Club. A protest from James B. Neale brought about a cancellation of the event. The Scots remained loyal to the spirit for which America went to war, and there are other like abstentions from merriment, all on behalf of that great cause in the support of which our mine workers are engaged almost more importantly than any other civil workers.

In the Somerset county region the mine workers have greatly figured on the Meyersdale meet of the Western Pennsylvania Firemen's Association, Aug. 12-18. The people at Meyersdale and the vicinity want the event held as scheduled and to this end S. A. Kendall left for Washington to assure the Washington authorities that the mine workers had been working overtime that they might earn the right to attend, that they would put out 100 per cent. production while the fair was in progress and would try to induce all the miners of the region to sign formal pledges binding them to do their utmost to produce a maximum tonnage. But what sort of maximum tonnage is it that is produced by men who go fairing when the mines should be working?

In Alabama, where formerly slackness ruled, the mine workers are doing admirably. In Walker and Winston counties in the Warrior River Basin, they are beginning to give 49 hours to their work, working 9 hours for the first 5 days and 4 hours on Saturday. What is more the quality of the coal is much improved.

The temperance question, as always, is one of the most important of all questions and one of the most dangerous to approach. Seward E. Button, chief of the Department of Mines has succeeded in drawing the fire of the union by his remarks on the intemperance of miners. He does not appear to have said anything amiss. Doubtless someone in authority needed to say what he has said. "It must needs be that offenses come, but woe unto him by whom the offense cometh," and the name of that man is Button. His statement will do a great deal of good—but not to him.

Frank J. Hayes has attacked him somewhat childishly. Some miners certainly do drink to excess. No one can deny it, and if there were only one miner who so drank

Men of draft age employed in the coal mines will best serve their country by remaining where their experience and skill will assist in maintaining and increasing the production of the fuel with which the munitions and supplies are manufactured, and by which the locomotives and ships are propelled. It is not only the right of such men to continue in their present employment, but it is their patriotic duty to remain at their posts, and local and district boards have been instructed by the provost marshal general to impress this fact upon the men employed in the mines who come before them for registration. It is just as much the duty of such a man to remain at his post in acceptance of the action of his local or district board in placing him in a deferred class as it is for a man in uniform to obey the orders of his commanding officer.—Provost Marshal General Crowder.

the tonnage would be reduced. President Hayes is reported to have said that he could prove by figures provided by prohibition statisticians that less beer is consumed at present in the coal-region towns than at any time within the past quarter century. If that is true, then it only shows a reduction in intemperance, not its abolition.

President Hayes also declared that the statement of Chief Button that anthracite production had been reduced through intemperate habits of miners was the basest and most deliberate insult he had ever heard as coming from a state official. He pointed to the fact that with 35,000 men less in the anthracite field than during the same period 16 months ago, production had been increased.

All this is extremely interesting, but if the tonnage is to be maintained and increased the intemperate men must all be made to mend their way. It is of no use to try to clear the reputation of the industry as a whole; it is of no use to try to show that the ship workers are more intemperate. The question is, are there or are there not men in the industry who lose time owing to drunkenness?

Few or Many, Those There Are Reduce Tonnage

If some of the Lehigh Valley Coal Co.'s men had been alleged not to have done their duty in the purchase of Liberty Bonds would it have been an answer to show how much the generality had done? The mine workers of the Lehigh Valley Coal Co. evidently thought not, for they made every man take out his bond. If they would only duck the men who booze so much that they cannot, or do not care to, work and do it just as thoroughly and industriously as they ducked those who would not buy bonds the mines would be full and the saloons deserted. We commend this thought to them.

The way to honor is not by making protests and threats against the useful gossip but by reformation. Let the miners compel the booze slackers to be temperate, and there will be an end of criticism. Then if Seward E. Button and his inspectors permit bad air and unsafe conditions, as Messrs. Hayes, Matthews and the board of District No. 9 assert, there will be a good opportunity to push the case against them.

On Aug. 2 the director of production announced his plan for a production manager in each producing district and at each mine a committee of six—three representing the mine workers and three the operators. These committees will be selected for the purpose of stimulating patriotism and arranging for local meetings at which the need for increased production will be brought home to the men.

Draft Board Assaulted for Active Exemption

The Schuylkill County miners in the anthracite region are angry with the district draft board at Shenandoah for trying to force exemption on them. A number appeared on July 22 ready to go to Camp Lee. These men refused to accept exemption and one of them knocked down Chairman Ditchey when he insisted, while another upset a policeman who tried to prevent him boarding the train. Others climbed through the car windows while still others left in automobiles for Mahanoy Plane, where they caught and boarded the train.

It has been decided, it is said, that the "coal and iron" police who guard the mines against fire, theft and pro-German violence come under the rule "Work or Fight." Many of the patrolmen are ex-regular army men and almost all are within the draft age. The coal operators of the Lehigh field are instituting an inquiry to see if these highly-essential men are, by a mere technicality, to be compelled to enter other employment.

It is said that at one of the Lehigh Valley Coal Co.'s operations the men have refused to work with any man accepting exemption. Coal company officials at Shamokin, Penn., went before the board and made an appeal to the patriotism of the board members, declaring that their failure to hold back the mine employees would seriously impair coal production at the local collieries. At a meeting of the selective-service men the board put the issue squarely up to the men themselves, declaring a willingness to exempt all those who chose to stay at their employment in the mines or who felt that they were actually needed. Not one of the 15 coal mine workers who were drafted elected to continue at their mining work and the board accordingly certified them into the service.

The breaker boys of the Pond Creek colliery of the East Point Coal Co. struck Aug. 1 for more pay, and the carpenters and outside laborers took their places at the pickers and chutes and kept up the production.

The mine workers of the Ninth District, which includes Shamokin, Lykens, Pottsville and the Panther Valley, have been threatening to demand a 100 per cent. increase in wage and the check-off, with the wage increase to date from Apr. 7 of this year. They also say that this advance can be given without an increase in the price of coal. This would involve paying back wages to the extent of $3,000,000 up to Aug. 1. It is a most preposterous demand, of course, and could not be made by men with any knowledge of conditions or any good judgment.

Secretary of War Newton D. Baker has shown his appreciation of the 150 mine workers in Mercer County who have returned to work in their declining years after having retired from the mines. Mr. Baker in his letter to H. A. Garfield says: "This is the spirit which free and liberal government always engenders and which insures the triumphs of our arms and aims. I should like, through you, to send a personal greeting to these heroes of the pick."

English Little Spoken in Central Pennsylvania

In the central Pennsylvania field it has been ascertained for the Fuel Administration that 29,000 men speak English, 10,200 Italian, 10,000 Slavish, 7500 Polish, 4000 Magyar, 2100 Russian and 7000 various other languages.

In Illinois Frank Farrington, the president of the union in that state, has strongly condemned the bonus system. He says that "trouble is brewing in the mine fields, and selfish mine owners and operators, and not the miners, are stirring it up." Some operators are trying to induce the men to change their working places in return for premium payments of various kinds.

In Ohio, 30 hoisting engineers employed by the Ohio Collieries Co. in Athens County struck on July 25. Governor Cox opened negotiations with them and on July 26 they went back to work, the wage question to be submitted to the Labor Board of the Fuel Administration at Washington. Thus 1000 mine workers producing about 4000 tons per day were enabled to go to work.

Strike Against Paying Uncle Sam a Penny a Day

In the Saginaw (Mich.) field nine mines were idle on July 23, despite orders directing them to return, one from the Federal Fuel Administrator and one from the mine district board. Some men appeared at the railway stations ready to go to work; some merely appeared as spectators; others came to keep the men from going to work. The upshot was that the "miners' train" was emptied and no work was done. The miners want 10c. a ton increase. They have never been satisfied with the so-called Washington agreement. The 10 per cent. increase in the commutation fare has made the miners still more insistent, though it is an insignificant trifle per day and it is still less as figured per ton mined. The five largest mines in Bay County were idle on July 23. Here the rise in the commutation fare deprives them of 1c. per day. These hard-fisted slackers cannot stand to pay this cent per day to the United States Government, but they are ready to vote millions and billions per annum from the pockets of their employers.

James Lord, president of the mining department of the American Federation of Labor, has been appointed head of a special section of the Federal Employment Service in charge of recruiting and supplying labor for mines. He will coöperate with the Fuel Administration, the National Coal Association and the United Mine Workers of America.

The domestic coal mines of the North Alberta district, Canada, have been running slow for some time and on Wednesday, July 24, the Bush mine near Edmonton was shut down and again on July 26. The Humberstone mine which has been producing 550 to 600 tons a day out of a total capacity of 1000 tons shut down for a week owing to shortage of orders.

Selective Service Act Not To Blame

The statistics gathered by Provost Marshal General Crowder are regarded as proving that the scarcity of mine workers in the coal-producing districts is not attributable to the selective-service law. Slightly more than 2 per cent. of the total number of coal miners in the United States have been inducted into military service.

General Crowder's figures show that there are 706,012 coal-mine operatives in the United States. Of this number only 177,502 are subject in any way to the selective-service law. This is approximately 25 per cent. of the entire number of coal-mine workers. Of this latter number, however, 130,749 or 73 per cent. already are in a deferred class. Only 6.5 per cent. of the coal workers of the country are in Class 1. The total number of coal miners in Class 1 is 46,253, or 26 per cent. of the men subject to the draft. From investigations which have been conducted by the provost marshal general and by the coal-mine operators themselves, it is said to be evident that it is the higher wage obtainable in other industries which has caused the exodus from the mines.

The draft machinery is said to be functioning perfectly. The local boards in the coal-mining regions have been liberal in the granting of deferred classification to miners. A condition, however, which cannot be met by the provost marshal general is the refusal of many miners to accept deferred classification. When put in a deferred class, many of the coal miners quit their jobs.

"Have Got to Get Where I Can Kill a German"

It was evident in many coal-mining districts, according to reports reaching General Crowder's office, that the men have not been convinced that they are striking more powerfully at Germany by staying in the mines than by getting on the firing line. "I have got to get where I can kill a German," or something to that effect, is a remark frequently heard when coal miners are urged to accept deferred classification.

General Crowder and his staff cannot well be expected to make a law of their own. All they can do is to administer the law as provided. General Crowder cannot undertake to educate the mine workers of the country to the point where they will realize that it is their duty to the country to continue in their regular line of work. This, it is believed, should be undertaken by the coal-mine operators and by the leaders among the men.

Miners Always Have Been First in the Fight

General Crowder himself called the attention of the correspondent of *Coal Age* to the military record of the coal-producing districts in the Civil and the Spanish-American wars. The spirit of the populace in these districts, he said, is such as to make it extremely difficult to interest the men in duties away from the front-line trenches. The task of persuading these men to continue their peace-time pursuits with the Huns shedding American blood is one which General Crowder feels must devolve upon someone else. He is anxious that Class 1 be cleared of the few bona fide coal miners, who are thus classified, but he thinks someone else should undertake to persuade the miners to accept the deferred classification which he is ready to give them.

The effect of the draft on the coal mining industry was discussed last week at a conference between James B. Neale, the director of production, and representatives of a number of producing districts.

The conference was addressed by Col. Roscoe Conklin of the provost marshal general's staff, who explained the attitude of the United States Government in regard to the drafting of coal-mine workers.

It was stated by those familiar with labor conditions in the mining districts that there was a disposition on the part of some mine workers to regard those of their comrades who obtained deferred classifications as slackers. Director of Production Neale declared that it should be most thoroughly understood that the Government and th United States Fuel Administration regards the man who remains at the mine doing his work, increasing the production of coal, as serving his country quite as truly and bravely as if he were on the firing line in France.

Reports from the most prominent coal-mining districts in the country were to the effect that everywhere the coal operators are exhibiting and the mine workers are displaying the most patriotic earnestness in trying to increase the production of coal. Voluntarily they are giving up many of their cherished recreations and are sacrificing their holidays. It was reported from the Connellsville district, for instance, that the men who voluntarily worked on July 4, turned out enough coke on that day to build 20 steel ships.

Production Director Neale explained fully the details of the proposed production campaign, with its appointment of production committees in every mine and the steps that are to be taken to insure full hours of labor each day and six full days a week.

Bonus Nuisance To Be Ended

Not only in central Pennsylvania is the bonus nuisance found to be undesirable. The Pittsburgh district has long ago taken action against it. Only on July 15 the Jackson district in Ohio, through the Jackson District Coal Association, decided by unanimous vote that bonuses must end. The resolution, however, did not use the word "bonus" except in the title, where it is termed the "Resolution Abolishing Bonuses." The resolution describes the offenses merely as "violations by operators. . . . of the Washington agreement entered into between operators and miners of the Central Competitive Field, Oct. 6, 1917, at Washington, D. C." The resolution requests that the Fuel Administration "order such mines, as are violating said agreement, closed down as being too expensive to operate longer under the wage rates and conditions contained in such Washington agreement."

Although the payment of bonuses to miners to hold them or to get them away from other mines is believed to be less general than formerly in the Illinois fields, charges were made at a meeting of the Southern Illinois Mine Superintendents' Association at Duquoin, Ill., a few weeks ago that certain operators are paying their men a cash premium to keep them from going to other mines. Evan D. John, of Springfield, Director of the State Department of Mines and Minerals, and State Inspector Henry Bannister, of Herrin, were among the speakers. Mr. John urged a more vigorous enforcement of laws pertaining to labor.

H. A. Garfield in an interdict on bonuses issued Aug. 5 said: "I hereby announce that if any operator hereafter undertakes to pay a bonus in any form in violation of the terms or spirit of the agreements . . . I shall assume that the mine price of coal allowed the operator is too high and I shall accordingly order reduction thereof."

Will Not Wait on Law To Act

"Loyalists" among Illinois coal miners continue to take the law into their own hands. William Knauel, a miner of Staunton, Ill., was tarred and feathered a few days ago by an "Americanization" mob after his wife complained that he had torn down and destroyed a service flag she had placed in their home in honor of her son, Knauel's stepson. After the man had been given a coat of tar and feathers, he was run out of town and ordered not to return. Staunton was one of the first Illinois communities to adopt tar and feathers as Americanization arguments.

Germany is still asking questions about the lynching of Robert Paul Prager, German enemy alien, at Collinsville, Ill. Circuit Clerk Mellon of Madison County has received a communication from Henry Nussle, Swiss Consul at Chicago, in charge of German interests in Illinois, asking for a statement of the exact facts in the case. Prager was lynched after a controversy with coal miners of Maryville, Ill., who refused his application for membership in the union and accused him of being a German spy.

EDITORIALS

Foreign Coal Trade After the War

NEW ELEMENTS will enter into the coal trade after the war and are quite likely to make it possible for us to ship our coal to Europe. The principal element will be the lessened wheat export. Great Britain is learning to feed herself. Before the war she furnished food for 11 weeks in the year, now she supplies enough for 40 weeks. It is easy to see therefore that we shall be likely to ship her less food than we have hitherto, and, that being so, the bottoms that formerly took wheat will probably go to Europe with coal.

We used to be somewhat heavily in Great Britain's debt; we now are Europe's creditor. The interest on that debt will make it necessary for her to ship us of her substance. Consequently there should be outbound empty bottoms crossing the Atlantic and these we may, presumably, fill with coal. Of course, we shall not ship this fuel to Great Britain, but we shall probably supply many of her former customers.

However, it is never safe to prophesy. Many changes have been brought by the war and as many may result from peace. Probably an attempt will be made to keep in wheat all the British acres that have been tilled during the war. Yet there will be many who will not wish to keep ancestral parks under the plough. Besides where will the men be found if Great Britain is to keep her many new factories working as well as her acres of farm land? She will not long approve of the use of female workers for strenuous, uncleanly labor; of this we may be sure. Certainly she will be opposed to long hours of work. The little amenities of civilization—flunkyism and personal service—will work their way back despite the growth of democracy and even despite the growing distaste for such occupations.

The workers also will once again advocate their doctrine that the less work everyone does the more work there is for all. Their old restrictive trade practices will resume their unhealthy growth. The spirit of the past will rise again. The plants will be more modern and progressive, but the men in them will seek as ever to reduce efficiency, arguing that the efficiency of the worker has ever been his undoing.

England may be merry England once again; that is, it will tend to seek merriment first and business afterward, a procedure which does not make for much real merriment for the workingman. He is merriest and happiest when he works a busy eight-hour day and seeks to attain a maximum product in that time. Unfortunately the war has not convinced him that his theories are wrong. The genius of his race is against him. John Bull will go back to his easy-going, benevolent way of doing business and some forms of industry will suffer for lack of sufficient labor to keep all the industries going.

Will Great Britain then have the power to be a manufacturing and a wheat-growing nation in face of competition from a regenerated Turkey-in-Asia, Russia and Mesopotamia? Probably not. It seems more likely that manufacturing and agriculture cannot both survive and that manufacturing will again win out. Should conditions allow agriculture to retain its present place among British industries, then the coal trade of America will be able to fill the ship bottoms that the farmers of America no longer use.

Coke Region Precedents Broken; Some Still To Be Broken

THE Connellsville coke region is making some new precedents these days with a fine disregard of time-honored customs. It also indulges the hope that it may be able to make still other changes in the established order. It is not to be inferred from these statements that the producers of beehive coke have been set hard and fast against innovations, improvements and other evidences of progress, for quite the contrary has been the rule, faith and practice. Few industries have been quicker to adopt new devices of proven utility or more constant in its search for better methods. It is merely to be noted that the region, always safely conservative, has been doing things which aforetime were accounted as apparently impossible. Similarly, events that were seemingly improbable of happening have been coming to pass. On the other hand, others appear almost as remote in their realization as ever.

Thus, as is noted elsewhere in these columns, when the W. J. Rainey interests, one of the leading independent merchant producers of beehive coke, formed a business alliance with a maker of steel to jointly build and operate a byproduct coke plant, one of those things happened which but a few years ago would have been considered most unlikely. That this union of interest is now regarded as a prudent and forward-looking venture shows the changes time and new conditions have wrought in an industry one time hedged about by perhaps more than the usual number of conventionalities, and certainly by some of unusual character.

Interesting as this incident is in its significance and relation to the future development of the whole coking industry, there occurred during the week of July 4 another history-breaking episode. For the present, this is important as an illustration of one of the many transformations war can bring about in the sentiment and attitude of men who are several degrees removed from the man behind the gun but who are, like him, susceptible to influences that stir to patriotism though the sentiment is expressed in a different form.

During the 37 years the Connellsville region has been identified with the production of beehive coke, the Fourth of July has been regularly, but never exactly religiously, observed as a holiday. True, there have

been years when a greater or less number of plants, under the stimulus of high prices and an active market, have worked a "short day," but not until this year of the Great War has the general order been given and obeyed to make a "full run" on Independence Day. Thus has a new precedent been established that is somewhat more than a precedent. It is concrete evidence of the fact that the workers of the region can change the old order when they will; it is tangible proof of the value of a campaign of education when stimulated by patriotism and directed by a variety of forces working with one end in view.

A year ago, when the suggestion was made to run on the Fourth of July, it met with so chilling a reception that its impracticability immediately became evident. The temper and spirit of the men was such that they would have very determinedly resisted any attempt to change their habits of work on our Natal Day. They were receiving the highest wages ever paid in the history of the industry, and their earnings were limited only by their efforts and their application. They were making "big money" and spending it freely, and were totally indifferent to any appeal savoring of a hint to restrain their propensity for laying-off work upon the slightest pretext. "Me plenty money; plenty beer; me no work!" was the expressive, sometimes insolent, but always conclusive rejoinder to the urgent request to be on the job next day.

During the intervening months there has been a noticeable change in mental attitude, even though the change has not embraced the habits of work in an all-inclusive and permanent reformation. Wages have meantime been twice advanced and earnings have swelled pay envelopes to the bursting point. Measured by personal necessities, there is less incentive for men to put forth unusual or long-continued effort to maintain output to the individual standard, if not increase it. Hence, to break precedent by working on a day which long-established custom has set aside as a day for the suspension of activity, indicates that some strong impelling force has moved the workmen to this action. Persistent, patient and long-continued efforts and the employment of every known persuasive means have failed, and are still failing, to induce the practice of greater industry and more regular habits of work on ordinary days. The conclusion seems to be that, having acquired a better appreciation of the situation and the significance of Independence Day than has generally been credited them, the appeal of patriotism was potent in moving the coke workers to respond to the call to pull and fork coke on the Glorious Fourth.

The Liberty Loan, Red Cross, Y. M. C. A., K. of C. and War Savings Stamp drives, the departure of draftees, the dedication of service flags and activities immediately associated with the coke region's part in the war, have given the men a better comprehension of the war situation, but they still lacked the understanding contact to impel them to industry. The money-raising campaigns excited a spirit of friendly rivalry between plants or teams and quickened the sporting blood more than they deeply stirred patriotism. The patriotic meetings, addresses by war veterans, Four-Minute Men and others were informing to the superintendents, foremen and other English-speaking men, but the influences were slow to reach the foreign-born. When, therefore, preparation for making the Fourth a workday were made, every man on the job was seen and, no matter what language he spoke, he was fully informed of the object and purpose. He not only learned what his fellow workers were going to do, and why, but he was enabled to definitely make up his own mind as to the obligation resting upon him. The response came with a unanimity that was surprising.

The success of the Fourth of July work program proves that the coke workers, just like other citizens, are not wanting in patriotism nor backward in showing it once they are given to understand that it can be expressed in more than one form. Gratified over the splendid showing of the Fourth, the operators are now mildly hopeful that other precedents can be broken that will institute a Fourth of July order of work six days every week by every man on the job. To accomplish this will be breaking all precedent-breaking records.

What Makes the Tonnage Drop?

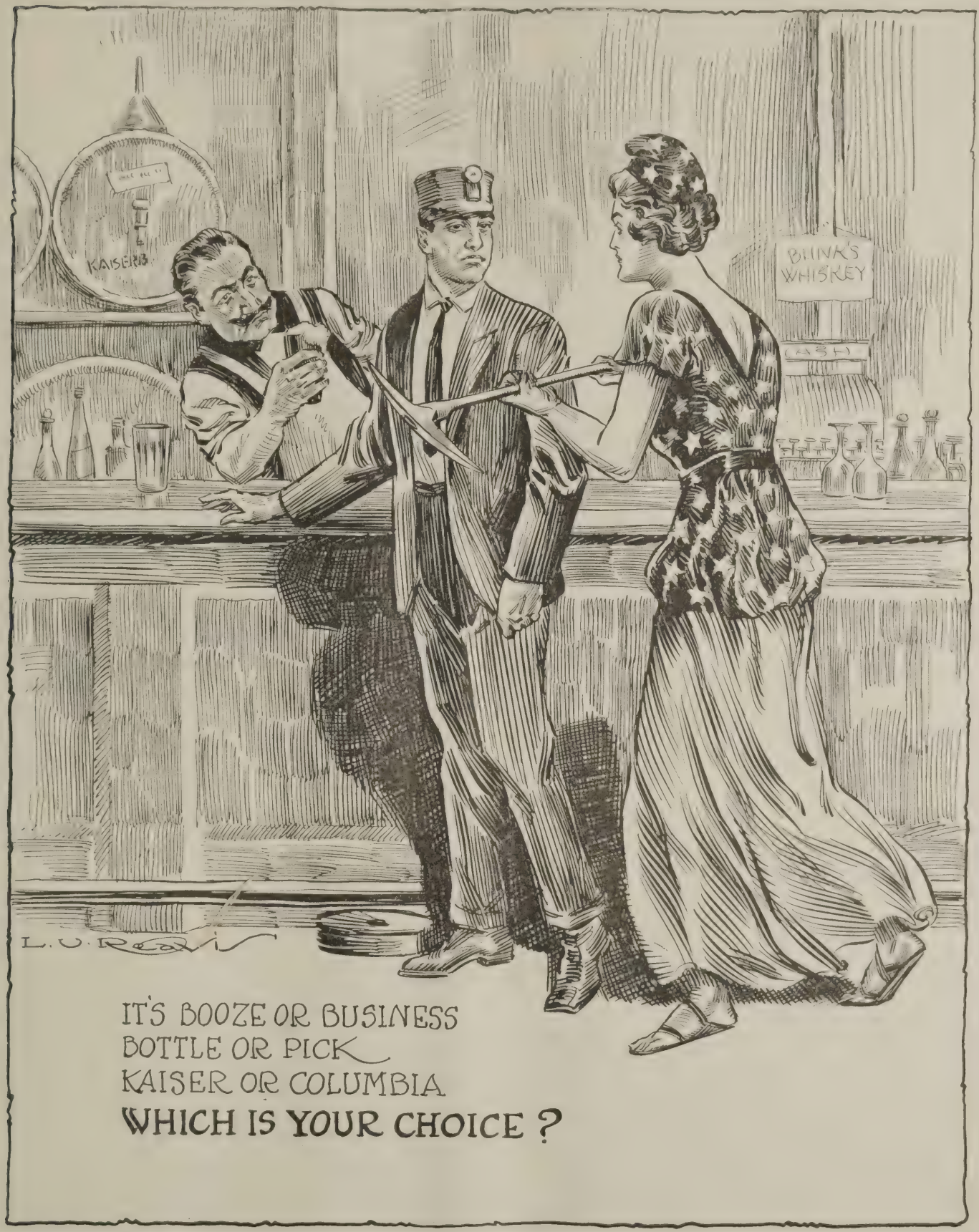
WITH ALL OF US the impulse is to look for steady accretions in coal tonnage. Records once made are regarded as merely footholds for another advance. There was consequently great disappointment when the big bituminous tonnage of the week ending July 13 was followed by a drop despite all the propaganda and effort.

It is possible, however, that the great production of the second week in July was the outcome of the holiday in the first week of that month. This put the railroads in better shape to supply cars, and it made the miners more willing to work in the week that followed. Such miners as were idle for several days over the Fourth began to feel the necessity for bringing up their tonnage to its customary biweekly level. The half month, over which a pay period extends, was ending, and the first half having been partly wasted, it was necessary to end up the period with a more generous output or the pay would be less large than usual. This probably accounts for the large tonnage of the second week of July. But how account for the lower production of the third week?

Perhaps the harvest had something to do with that decline. Miners in some cases, men who have left the farm for the mine, especially when living at or near the old home, help in the harvest and assist in threshing. The unpleasantness of the work in the broiling sun is compensated by the pleasure of working with one's kith and kin and neighbors, the joy and excitement of harvest home, and the profit that a few days work will bring, for they are almost the only profit-bringing days of the farmer's year. No one has kept a tab of the number of mine workers who help in the harvest.

In fact few of the operators have attempted to realize the effect that the mobilization for the farm yearly has on the production of their working forces. That mobilization comes unexpectedly, and as the men depend on one another's work the dislocation of the working force adds to the difficulty. Not only the time of the absent men is lost. Other men are laid idle by the idleness of those who are absent.

You Can't Combine Patriotism With Booze



Soldiers and sailors are not allowed to drink in their leisure time—because booze interferes with their business. Mineworkers are cutting out liquor because it prevents them from doing their best at their work, which is mining coal to fight the Kaiser.

DISCUSSION BY READERS

The Wagon Mine a Menace

Letter No. 1—The discussion of the relation of the wagon mine to the present mining situation, which was started some time since in *Coal Age,* seems to have fallen short of its purpose. The intention evidently was to show that that class of so-called mines is a menace to legitimate business.

With the inflation of the selling price of coal, due to the increasing demand imposed by war conditions, wagon mines, or what may be better termed "country banks," have multiplied by leaps and bounds. Such has been the effect on the coal industry, which is now regulated by Government and made to conform to established methods of mining, that the enormous growth of these smaller mines can only be likened to that of a gigantic cancer that is slowly but surely sapping the vitality of the industry.

The fact is hardly appreciated that these mines have, within the past year, dumped upon the coal market hundreds of tons of material resembling coal, but which upon closer inspection is found to be a mixture of bony coal, bands, slate and the refuse of gob piles and rock dumps, mixed with a limited quantity of inferior coal. Had the mines been subject to the same Government regulations that control the output of larger mines, they would have been abandoned long ago as being unprofitable. It is a fact that the product of these mines could not be properly cleaned and the output made to conform to the restrictions imposed by the Government, without subjecting the operations to a prohibitive expense that would have shut down the large majority of them.

THE MINES UNSANITARY AND UNSAFE

Aside from the impurity of their output, these mines are, as a rule, unsanitary and unsafe. The workings are poorly drained and ventilated, and the miner must often work in peril of his life, owing to insufficient and poor timbering. Little or no provision is made for ventilation and drainage. In most cases, these conditions only exist through the fact that the mines do not employ a sufficient number of men to bring them within the regulation of the mining laws of the state.

Only those familiar with mining practice can appreciate to what extent a properly regulated mine where discipline is maintained, is injured by reason of being located in close proximty to smaller openings where the miners are allowed to come and go as they please and are subject to no discipline and where they are not required to clean their coal when loading, but throw bone, coal and slate into the car together. It is not strange that mines where the men are compelled to properly clean their coal have difficulty to hold their men when the opportunity is presented of finding work where they are subject to no such restrictions.

As is well known, the oldest coal-producing companies are standing loyally and faithfully by the Government and striving to satisfy every demand made upon them. The injustice of the situation is apparent to all, and it goes without saying that relief measures should be adopted in the way of Government interference that would place these mines on the same working basis in respect to their product or compel them to close down.

What I have written is the result of personal observation. It is not based on hearsay or the report or experience of others. The keen competition between all mines to secure the needed workmen has never been greater than at the present time, and this fact alone makes it important to urge every measure that will assist legitimate mining and improve the coal situation.

Confluence, Penn. H. E. GRAY.

Loading Coal at the Face

Letter No. 1—How many tons of coal can a man load in a day of 8 hr., when driving a 15-ft. place in a 3½-ft. seam of bituminous coal? I am led to ask this question after reading the announcement of the Poster page of *Coal Age,* July 6, p. 29.

The Poster states that Ed. Blagg, 27 years old, a loader in No. 1 mine of the Buckeye Coal & Railway Co., San Toy, Ohio, loaded 508 tons of coal in 22 working days of 8 hr. each, in the month of May. This would mean an average of 23 tons a day; or, practically, a ton every 20 min. But assuming the cars, in this thin seam, have a capacity of about 1½ tons, we will say that the man must load 16 cars in 8 hr., or a car every 30 min. if he loaded continuously.

Now, for the sake of argument, let us assume that a 6-ft. cut has been made with the machine, in the man's place, during the night. When this coal is blasted down, there will be between 11 and 12 tons of coal ready to be loaded. We will say then that this man loads eight cars from his first machine cut, which is the work he must perform in the first half of the 8-hr. shift.

Arriving at his place in the morning and finding his coal cut, the miner proceeds to drill two or three holes, which he charges and fires. This work, together with the time required for the air current to sweep away the smoke of the blast, will consume, say, one hour and a half, under fairly favorable conditions for performing the task.

The miner must then arrange his track and bring a car to the face for loading, and we will say that, making a fair allowance for rest and some little delay, there remains two hours for loading the eight cars. As each car is loaded, it must be moved back and an empty brought forward in its place. Also, it will be necessary to shift the track from side to side as the work proceeds, or much of the coal will have to be moved some distance in loading. Again, it cannot be assumed that the rib shots will always square the place ready for the next machine cut, and there will be some pickwork that must be done to get the place in readiness for the machine.

The work described as being done in the first half-shift will need to be duplicated in the second half-shift. However, there is nothing to prevent the supposition that, in this case, the miner may have alternated his work between two places, devoting the first half-shift to one place and the second half-shift to the adjoining place. But, to say the least, that the man kept up this daily tonnage for 22 working days, in a single month, is a remarkable achievement, and it must be assumed that things were working uncommonly smooth during the entire time. Most practical mining men will agree that the record is worthy of more than passing notice.

THOMAS HOGARTH.

Coal Run Mine, McIntyre, Penn.

First Aid to the Uninjured

Letter No. 8—I have read with much interest the numerous letters on this subject, especially that of W. H. Noone, *Coal Age*, June 29, p. 1210. I was forcibly impressed with his remark suggesting that, "More than anything else in coal mining is the necessity of aiding men to recognize the dangers with which they are surrounded and take precautions to avoid possible accidents," adding, "This aid must be given to the man before he is injured."

In speaking of the responsibility resting on a mine foreman, however, Mr. Noone says, "He will find it necessary to enforce a rigid discipline in respect to the timbering of working places;" and in another place he states, "It may be necessary to punish a man for carelessness, in order to bring him to appreciate means taken for his safety."

It appears to me that our friend approaches this question of discipline from the wrong side. Let me suggest that a mine foreman's first duty is to establish a system, in the working of the mine, regarding every detail of the work, particularly that of timbering. Without such a system there can be no true discipline. The distances apart of post timbers and timber frames should be specified to conform to the working conditions, so that men would know exactly when and where timber is needed. Miners should then be held responsible for standing the timbers in their places.

What Mine Discipline Means and Involves

Mine discipline does not mean the punishing of men by using harsh or cruel measures. It is my belief that these are not necessary to make men appreciate what is done for their safety. As I regard it, mine discipline simply means operating according to a fixed system and rule that everyone will understand and follow.

Discipline among workers involves three principles: (1) Willingness to obey orders. (2) Perfect understanding of orders. (3) The training necessary to enable the man to do the proper thing at the proper time, even though no one is present to see that this is done. It should be the motto of every man working in a coal mine to perform his work in the same manner whether the boss is present or absent.

The statement that "accidents from blasting are not so many" may be true; but, in the large majority of cases, it is more by good luck than good management, as few mines take sufficient steps to eliminate this class of accidents. Many are following the usages and practice of 100 years ago, using black powder instead of permissible, and allowing miners to fire their own shots instead of employing competent shotlighters for this work. On every hand we find men using short fuse, crimping a cap with their teeth, smoking and using open lights in places known to generate gas. Miners will make up their charges with their lights on their heads and ride motor trips with explosives on their person.

Attention was drawn to the need of greater care and caution in the handling and use of explosives, in the Foreword, Feb. 23; but how many of the suggestions made in that Foreword have received the thoughtful consideration of mine operators and managers. Instead, mine officials are too prone to blame the men for carelessness when proper system and discipline are not used in their mines.

Illinois Mining Law Regarding Explosives

Allow me to refer here to the explicit manner in which the Illinois Coal Mining Law treats the question of explosives. Sec. 19 of the law requires that the delivery of powder in the coal mines be made by the company after the shotfirers have come out of the mines and before the dayshift enters for work, in the morning, and when all electric current is turned off.

No explosives can be carried in the same car with tools and other materials. The miner must keep his powder in a locked wooden box, which must be placed as far as practicable from the track and from other boxes, and no high explosives shall be kept in the same box with black powder; also, detonating caps must be kept by themselves. The law further specifies that not more than five standard charges of powder shall be used in a single shot, in 5½-ft. coal; and not more than four standard charges in seams where the coal is thinner. In closing, let me say that no aid is given to the man before he is injured, unless the management lays down a system of performing the work and maintains a proper discipline.

J. M. RODDIE.

Springfield, Ill.

Mine Rescue Work

Letter No. 2—The subject of mine rescue work opened for discussion by J. S. Gelston, *Coal Age*, July 6, p. 32, is one of the utmost importance to all persons connected with the coal-mining industry. Notwithstanding the fact that we have improved mining laws and mine regulations that afford a greater measure of protection than was possible before their enactment, disastrous explosions and mine fires still occur with great frequency.

When these calamities come and rescue work is needed, there is no necessity to issue a call for volunteers. The trouble, then, is to prevent men from rushing headlong into the mine, regardless of their own safety and heedless of the dangers that will confront them in the wrecked passageways, now filled with poisonous gases, the afterdamp of the explosion. But, being overcome in the afterdamp is not the only danger rescuers must face. In many cases, fires have started and there is every possibility of a second explosion occurring, owing to the presence of gas and dust clouds that have escaped ignition in the first explosion.

Mr. Gelston has asked the question, "When is a man brave and when is he foolhardy in the face of danger, and what is the dividing line; or is that a matter of individual judgment?" In my opinion, the part taken by men, at a time of danger, is the result of their individual judgment. In every walk of life, some men will do things at such times that others of calmer judgment would regard as foolhardy; or, to say the least, fraught with unwarranted risk.

We will all agree that, to accomplish any dangerous work, certain risks must be incurred or no good will result. The willingness to assume risk will vary with the individual's judgment. The old saying is "Nothing risked, nothing gained." However, the more intelligent the judgment, the greater will be the good accomplished, and this thought brings me to consider the value of breathing apparatus.

The Hope That Animates Rescuers

In the letter to which I have referred, Mr. Gelston remarks, "While breathing apparatus can often be employed with advantage when exploring a mine ahead of the air, or in fighting mine fires, it is generally the case that where the mine air is sufficiently foul to require the use of breathing apparatus it is too foul to support life, and there is little hope of rescuing men by this means."

Admitting the fact that the hope of finding men alive, in a mine where they are entrapped inside of a fouled atmosphere, is generally slim indeed, it must be remembered that *hope dies hard in the heart of the miner,* at such a time. Instances are on record where men have been rescued under just such circumstances, by men wearing breathing apparatus, without which they could not have been reached by their comrades. Also, men have been brought out by their rescuers, through the use of "salvators," or half-hour apparatus, applied to the men to bring them safely through the fouled atmosphere, filling the entries.

Again, there are instances where men have been lost, because aid could not reach them for the lack of the needed breathing apparatus. Later, they have been found to have lived hours and even days, in hope of rescue, but finally succumbing to exhaustion. Another instance when men were lost because no breathing apparatus was available at that time was the explosion at the Edge Green colliery, Lancashire, England, in 1902, which I recall vividly because my own father was numbered among the victims.

The "Cherry" and "Bellevue" Disasters

A notable instance is that of the rescue of 21 men, after they had walled themselves in, in a section of the Cherry (Ill.) mine, and were rescued eight days later when all hope had been abandoned. A full account of the Cherry mine-fire disaster, which cost the loss of 259 lives, Nov. 13, 1909, will be found in the Illinois Coal Report for 1910, pages 459-509, inclusive.

Let me cite, in closing, the two Bellevue mine explosions, which occurred Oct. 31 and Dec. 9, 1910. A full report of the disaster is found in the Annual Report of the Department of Public Works, for the Province of Alberta, Canada, for 1911, pages 119-136. In the second explosion, in December, Robert Strachan, an inspector of mines of British Columbia, together with other rescuers wearing breathing apparatus of the Draeger type, succeeded in penetrating into the workings and rescuing several men who would otherwise have been lost.

It is my opinion, also, that artificial resuscitating apparatus, to which Mr. Gelston has referred, in his closing paragraph, has been the means of saving hundreds of lives. If the appliance is kept thoroughly clean and in a sanitary condition, as it ought to be, there is little danger of death from respiratory disease mentioned by Mr. Gelston. James Touhey.

Vancouver, B. C., Canada.

Travel of Electric Current

Letter No. 4—In connection with the discussion of the question as to whether an electric current travels over the surface or through a conductor, which I am not competent to say, it may be of interest to cite the following incident in my own experience.

In our mine, we had used a 00-wire on our trolley road, until the extension of the system and a 3 per cent. grade against the loaded trip made it advisable to use a 0000-wire on the extension.

Everything went well for a time. But, it was noticed that the 00-wire became quite warm whenever the trip reached the 3 per cent. grade. One day when the locomotive was hauling an extra heavy trip up that grade, the 00-wire became red hot. Under the heat, this wire stretched and sagged in the entry. I am inclined to think that this fact would tend to show that the current flowed through the entire body of the wire. If the flow was only on the surface of the wire, it would hardly seem possible for the entire wire to become heated to that extent.

This subject is of importance in connection with the requirements of the bituminous mine law of this state. The law requires that all electric conductors shall be of sufficient size to transmit the required current without danger. In other words, the current capacity of the wire must be such as not to injure the insulation of a conductor or start a fire by the heating of the wire.

Leckrone, Penn. W. H. G.

Elevation of Outer Rail of Track

Letter No. 1—For many years past, my particular line of work has been the laying of mine tracks and switches. On this account I was much interested in reading the brief answer to the inquiry regarding the proper elevation to be given the outer rail of a track when rounding a curve in a mine. The simple rules given in reply to this inquiry struck me as very complete and easily applied.

In this connection, kindly allow me to cite an instance that occurred recently in my own practice when I was required to lay tracks for a cut-off which has given good satisfaction from the start. At the time, I was employed as trackman for the Saline County Coal Co. at Grayson, in this state. We were starting to extend the motor haul into a south entry off the main east. Mules had been employed to haul the coal from this entry, over a back switch onto the main east.

Starting a sufficient distance back on the main east, the plan now was to cut through the pillar so as to

give an easy curve for the motor to reach the south entry. This plan required the laying of a right-hand switch on the east entry and driving a cut-off to the south entry on a curve having a radius of 70 feet.

Coming out of the south entry, the conditions were such that there would be a natural grade of 1 per cent. in favor of the loaded cars, and to overcome this grade on the outer rail of the curve, I decided to raise that rail, starting about the center of the curve and making that the high point so that there would be practically a rise of 1 per cent. to that point and a fall of 3 per cent. from there to the switch on the main east.

Calculating Ordinates for Curving Rails

In order to expedite the work and make the change as quickly as possible, the foreman asked me if I could not curve the rails beforehand so that they would be ready to lay when the cut-off was completed. I agreed to do this and, for that purpose, calculated the middle ordinate for any desire chord, by dividing the square of the chord by eight times the radius, using the formula $o = c^2/8r$.

For example, assuming a chord of 20 ft., the middle ordinate would be $20^2 \div 8 \times 70 = 5/7$ ft., or say 8⅛ in. The quarter ordinates I then took as two-thirds of this, or say 5⅜ in. When all was ready, we laid the iron, surfaced and tamped the ties, bracing the track well against the rib to keep it from moving until the roadbed was set and solid.

Ten-Ton Morgan-Gardner Locomotive Hauling a 40-Ton Trip

The motor was a 10-ton Morgan-Gardner, and hauled twenty 2-ton cars in a single trip. The first day the switch was used I asked the motorman to run slowly and worked up all the low points. The result was that, in a short time, we had a uniformly smooth track all around the curve. Later, the motorman came out over that curve with his controller set on parallel.

Let me say, in closing, that the elevation of the outer rail of a curve depends not only on the radius of the curve and the speed of the trains; but, if the trip is pushing the motor, as it is coming down a grade, the outer rail must be raised more than when the motor is pulling the trip. However, to raise the outer rail too much is as bad as not to raise it enough. It is important to have the curve and the rise of the outer rail as uniform as possible, in order to prevent the swaying to and fro and knocking of the cars against each other when rounding the curve. G. D. York.

Harrisburg, Ill.

Sealing Off Fire on Intake

Letter No. 10—The inquiry of "Ancora," *Coal Age*, June 22, p. 1173, regarding the sealing off of a fire found burning on the intake side of a pair of headings driven in solid coal and generating so small an amount of gas as not to require the use of safety lamps, presents a subject that is always of interest in coal mining.

The fact that these headings are driven in solid coal greatly simplifies the problem of extinguishing the fire, since there are but two openings to consider. Where rooms have been turned, and especially where pillars are being worked, the sealing off of a fire will often require the building of several stoppings in as many different openings. The difficulty is increased greatly where the drawing of pillars and the settlement of the roof have opened crevices to the surface.

Collecting Material and Building the Stoppings

In the present instance, however, all needed material, consisting of the necessary posts, 2-in. planking, nails, loam for filling and cement or clay for sealing all cracks after the stoppings are built, should be sent into the place at once. While waiting for this material, work can generally be started by erecting a temporary brattice of canvas or boards and this should be done at the first opportunity.

An opening should be made in the first crosscut outby from the fire where it is possible to work. A temporary stopping is then first built on the return just inby of this crosscut. The placing of this stopping will greatly reduce the quantity of air passing over the fire and cause the major portion of the current to be short-circuited at the crosscut just opened outby from the fire. If it is necessary to further reduce the quantity of air reaching the fire, a canvas can also be hung in the intake airway just inby of the same crosscut.

When the material arrives on the scene, heavy 6 x 6-in. posts should be set close to either rib and 2-in. planks spiked to them to form the inside wall of a permanent stopping. In the same manner the outside wall of the stopping should be started so as to leave a space of 12 in. between the two walls. This space should be filled with loam and well tamped. When the stopping is completed to the roof, it should be thoroughly sealed with clay or cement. The second stopping should now be built, in like manner, on the intake airway.

Assumed Condition of Air Behind Stoppings

The inquirer also asks, What would be the nature of the air confined in the space behind the stoppings; (1) assuming the first stopping is built on the intake; and (2) when the first stopping is built on the return of the headings? In answer to these questions, let me say it is my opinion that the condition of the air behind the stoppings would be much the same in either case. The oxygen of the air would be consumed by the fire, and carbon dioxide together with a certain amount of carbon monoxide would be produced. If sulphur was present in the coal there would probably be some sulphurous fumes produced besides.

My reason for closing the return heading first is that the pressure of the air on the intake side would then be exerted to restrict the emission of gas from the coal and other strata. On the other hand, if the first stopping was to be built on the intake, it would appear to my mind that a suction would be formed by the air current passing through the crosscut outby from the fire. This suction would be exerted on the return side and tend to increase the emission of gas from the strata.

I confess that this reasoning is not wholly satisfactory to myself, and I have never been able to quite understand why textbooks advise the building of the first stopping on the return air-course, but have hoped that this discussion would make the reason clear.

Cassidy, B. C., Canada. J. W. Powell.

[Mr. Powell should read carefully the explanation given in the letter of William Dickinson, *Coal Age*,

July 25, p. 187, which gives clearly the logical reason for building the first stopping on the return entry, in this case. A like reason is also given in the letter of Thomas English, Aug. 1, p. 236. It may be stated, here, that the emission of gas from the coal and other strata would not be appreciably restrained by the slight change in pressure caused by building the first stopping on the return airway as Mr. Powell has suggested.—Editor.]

Americanizing the Foreigner

Letter No. 1—I was deeply interested in the reading of "Observer's" letter, bearing on the human side of our relation to foreign-born mine workers, which appeared in *Coal Age*, July 25, p. 189. In justice to the efforts put forth by all worthwhile coal companies I cannot agree with his suggestions, in the second paragraph, that we fail to properly assimilate this class of mine workers, and do not appreciate their traits and peculiarities.

As I have stated, practically all of our large coal companies are doing everything in their power to Americanize the foreign element employed about the coal mines of this country. They have insisted that good schools be built to house the pupils and competent teachers employed to educate them.

Work Among the Foreign Women and Children For Their Education and Training

At many of the larger mines, professional nurses and housekeepers have been employed by the larger companies and are at work in the various towns, trying to educate foreign women in the ways and customs of the American people. Playgrounds, equipped with adequate apparatus, swimming pools, community reading rooms and poolrooms have been established. Moving picture theaters and athletic fields, where sports may be conducted, are also a part of all progressive mining towns. In fact, everything that will tend to improve the condition of the foreign-born worker is at hand.

Mine superintendents and the inside and outside officials of all coal mines now do everything in their power to Americanize the foreign-born element in their midst. It is my honest belief that they *do* meet these people with the ready sympathy and the distinctly human attitude that their condition demands, and they *do* try to help them to carve their own destinies as true American citizens.

Results Show the Average Foreigner Will Not Be Americanized

That this work on the part of executives of coal companies and operating officials, at the various mines, has seemingly failed in its purpose is because the average foreign-born worker refuses to become Americanized. The most of these people come here for one purpose, which is to accumulate enough money to return to the old country to spend the remainder of their days on a little farm and live among their own people in comfort. Some, it is true, come here seeking a new home and a place to bring up their children in peace and comfort. They become Americanized and make good citizens, but their number is so small as to be almost negligible.

In spite of all work done by community workers, in various mining towns, the foreign women still run around in their bare feet and retire at night without washing them. In fact, they seldom wash them for several weeks, and this is also true of the children. Those familiar with mining conditions know that foreign children are still born as they were in the old country and American ideas have failed to change this custom. A doctor's services is rarely required. This is one of the things that ready sympathy and the distinctly human attitude have failed to change.

Use Made of Improvements in Houses

In regard to improved living conditions, where bathrooms are a part of the house occupied by the average foreign family, the tub is still used by a good many to hold the supply of coal necessary to heat the rooms. It will certainly take a lot of education on the part of our teachers to impress upon the minds of the average foreign family the fact that the bathtub is to be used to take a bath. They still prefer to do their bathing in the kitchen in front of all the assembled members of the family and boarders, using for the purpose a common washtub.

It has been almost impossible for the average mine superintendent to cure the foreign element of the practice of stabling their cows in the cellar instead of in stables built for this purpose, and in many instances the stable is still there, but the cow is kept in the cellar. There have been cases where chickens were housed in upstairs rooms and the fact only became known when the families removed to other towns.

Foreigners Resent Interference

It is hard for mine officials, at the various operations, to get very close to the foreign element for the simple reason that they resent interference of any kind. In this respect, they resemble the Chinese. It is true that they wear American clothes and, after a long time, do away with celluloid collars and ridiculous neckties; but the things they do not change are the things not apparent, except to the close observer.

In view of these conditions, I admit that, at many of the mines, the management has given up the idea of improving the condition of the foreign element, simply because they realize that the average of the foreign element will have nothing to do with anything that will tend to improve their condition and since they must have labor to carry on the production of coal, it is necessary that they do not go too far in this direction, else this labor will leave and go to a place where they will not be continually interfered with.

I could go on and cite incident after incident where much has been done to improve the social atmosphere surrounding the foreign-born miner, but such improvement has failed in its purpose. This is testified, too, by the fact that our jails are still crowded with such people, as are also our saloons and our streets. In conclusion, I must say that it will take more than motion pictures, hearty handshake or a slap on the back, or the work of missionaries, to inspire these foreign people in the direction of increased patriotic zeal and fervor.

Pittsburgh, Penn. EXPERIENCE.

INQUIRIES OF GENERAL INTEREST

Ventilation Problem

Kindly permit me to present a rough sketch of a section of our mine, lying about 6000 ft. from the main entrance, consisting of the 9- and 10-E and W entries, off the 9- and 10-N. We are not intending to push the north entries further ahead for a long time, as there is enough coal in sight on the east and west entries to last us ten years.

By way of explanation, let me say that the 9-N and the 9-E and W entries are the haulage roads and the

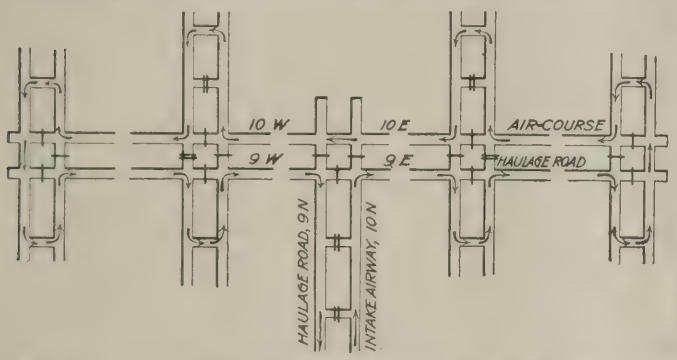


FIG. 1. SHOWING PRESENT COURSE OF AIR CURRENT

return airways, or will be when the present plan is put in operation, while the 10-N and 10-E and W entries will then be the main intake air-courses. At present, the air is coursed through this entire section of the mine in a single current, as shown in Fig. 1.

As indicated in Fig. 2, it is proposed to build an overcast at the point where the 9-E entry crosses the

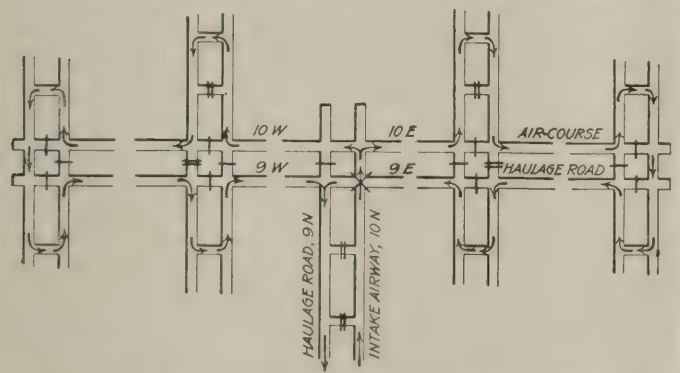


FIG. 2. SHOWING PROPOSED CIRCULATION

10-N. The main intake current will then pass over this air bridge and divide forming two air splits for the ventilation of the 10-E and 10-W entries, respectively. In the development of the mine, rooms will be turned to the right and left of each pair of the butt headings shown in the figure. Owing to the distance of these entries from the mouth of the mine, the air circulating in this section is deficient and will require, the installment of a booster fan to assist the circulation. There will be about 150 men working on the east and west entries, and the question is, Where should the booster fan be placed to produce the best results?

Allow me to ask, Will a "booster" work better when drawing the air or when forcing it through this section? I am inclinded to place the booster in the return current, either on the 10-E or 10-W entry. But, if the booster will work better forcing the air through the section, I would say it should be located on the intake airway near to the overcast. I hope this question will be taken up and discussed by those who have had experience with booster fans.

———, Ill. MINE SUPERINTENDENT.

The question of utilizing booster fans was widely discussed in the columns of *Coal Age*, some years ago, and aroused much interest. There were advocates for and against the installation of boosters in mines, the chief arguments against their use being the possible destruction of the fan, and its inaccessibility in case of accident when it would be most needed. It was shown, however, that there are conditions that exist at times in mines and which require the use of a booster; but emphasis was placed on the fact that such a fan should not be installed as an *essential factor* in the general ventilation of a mine. It will be generally conceded that all essential ventilating apparatus, in fan ventilation, should be located on the surface, where it will not only be better protected and cared for, but will be available and accessible in case of accident in the mine.

In the opinion of *Coal Age*, the province of a booster fan is, as the name suggests, to assist or strengthen the circulation of the air current at a point where it is practically stagnated. Owing to leakage through poorly built stoppings, doors and air bridges, it frequently happens that there is practically no circulation of air at the working face.

Under such circumstances, it will generally be the case that the future development of that particular section of the mine will not warrant a large outlay to overcome the difficulty and improve the circulation by repairing stoppings or rebuilding doors and air bridges. The installation of a booster on the return end of the air circulating in that section will frequently overcome the tendency of the air to leak through bad stoppings, and doors, by creating a depression in favor of the return airway, in the proper course of the current.

A booster fan should never be placed in a position to force the air through a leaky section, as this would only increase the leakage and fail to improve the circulation. The location of the booster must always be on the return side and the fan must be operated to exhaust the air from the intake, inby of the leak.

There is no doubt but that a large number of our practical readers will be glad to give their experiences and suggestions on the use of booster fans. It is a question that should be carefully studied from the standpoint of utility and economy.

EXAMINATION QUESTIONS

Mine Foremen's Examination, Shenandoah, Penn., Apr. 23, 1918

(Selected Questions)

Ques.—What are the factors determining the quantity of air passing in a mine at any given time?

Ans.—The reading of this question is slightly ambiguous. The factors producing the quantity of air passing in a mine, or that determine what quantity of air will be circulated, are the *power* applied to the air current through the action of the ventilator, and the *resisting power* of the mine, as determined by the extent of the rubbing surface and the sectional area of passage; or, more accurately, the *mine potential*, which will depend not only on the rubbing surface, the sectional area of the airways, and the number of splits, but where the splits are located in the mines. For the same potential, the quantity of air in circulation varies as the cube root of the power on the air.

On the other hand, taking the question to mean, What are the factors used in ascertaining the quantity of air passing in a mine, the answer is, The sectional area of the main intake airway and the velocity of the air current at that point. These two factors multiplied together give the quantity of air.

Ques.—A fan driven by a steam engine supplies air in a mine through several miles of air-course. A door is suddenly opened, allowing the air to go directly from the air shaft to the return. Will the opening of this door cause any change in the operation of the fan? Give the reason for your answer.

Ans.—The opening of the partition door at the shaft bottom, thereby allowing the air current to short-circuit at that point, cuts out the mine resistance against which the fan is operating, leaving only the resistance of the fan drift, shafts and the short underground connection between them. The cutting out of the mine resistance will cause the fan to run slower, assuming that the power applied to the fan shaft remains constant. The reason for this is that the volume of air passing through the fan is greatly increased, because of the decreased resistance to its passage when the mine is cut out of the circuit.

But, the work absorbed within the fan varies as the cube of the quantity of air in circulation, for a constant power applied to the fan shaft. This increased absorption of work within the fan itself throws a greater burden on the fan and, as a result, the fan wheel turns slower under the same power applied to the fan shaft. The same is true whether the fan is blowing or exhausting. As far as the action of the fan wheel is concerned, the direction of the flow in and through the mine makes no difference.

Ques.—What particular dangers are there in pillar drawing, and what, in your opinion, should be done to prevent accidents in the performance of this work?

Ans.—Drawing the pillars in a mine causes the roof to fall as the work progresses. It frequently happens that gas is located in the overlying strata of a coal seam, in which case, the breaking of the roof is followed by an outflow of gas, which is liable to accumulate over the falls and endanger the work, since any slight fall of slate may force the gas down on the workmen.

The breaking of the roof may also open a crevice to the surface and permit an inflow of water from surface streams. In any case, the workmen are always in danger of being caught under a fall of roof or coal, owing to the bending pressure that is exerted heavily on the loose end they are working.

In order to prevent accident in pillar drawing, only competent men familiar with the class of work should be employed for the purpose. A plentiful supply of timber should be kept on hand and used. Posts should always be kept standing behind the workmen and these should be carefully watched to observe the effect of the gradual subsidence of the roof.

Except it is known that there is a complete absence of gas, none but safety lamps of an approved type should be permitted to be used, and a good current of air should be made to pass around the pillar and sweep the fall, which should be tested for gas at regular intervals each day. The work of drawing back pillars should be continued regularly, as the dangers increase when the pillars are allowed to stand idle for a few days.

Ques.—Are you in favor of mixed lights in a mine where explosive gases are generated? Give full reasons.

Ans.—No. A mine generating gas should either be worked entirely with open lights, when this can be done with safety by maintaining a sufficient air current to dilute and sweep away the gas that would otherwise accumulate; or, the mine should be worked exclusively with safety lamps. The use of open lights in a mine where safety lamps are required in portions of the mine is always a menace to safety. This is true, not only because an open light will often be carried, unconsciously, into a working place where safeties are used, but a heavy fall of roof in a section generating gas may force the gas out onto the road where open lights are employed.

Ques.—In a mine ventilated by several splits of air, how would you ascertain if any split was passing more than its share of air?

Ans.—The quantity of air required in each split or district will depend on the conditions with respect to gas or dust in that district and the number of men employed therein, and the total quantity of air in circulation on the main intake airway must be divided between the several districts according to these conditions. The mine foreman knows the volume of air that should pass into each district, and it is his duty, when making his rounds, to measure the quantity of air at the mouth and at the inside breakthrough in each district.

COAL AND COKE NEWS

Harrisburg, Penn.

Seward E. Button, Chief of the Department of Mines, during the week held a conference with the bituminous mine inspectors regarding the coal situation, and states that he feels assured that although the number of workers has been reduced at least 15 per cent., the output will be increased at least 15 per cent., in which case the production for 1918 will be about 190,000,000 tons. Every effort is being made by the mine inspectors to see that properly prepared coal is sent to market.

The department is anxious, Chief Button says, to prevent a recurrence of the experience of last winter, when coal of most inferior quality was supplied to the consumers, and the inspectors have been instructed to give every possible aid to the Federal Fuel Administration in the efforts being made to protect the public.

Bituminous Production High

The soft coal production has been moving quite satisfactorily for the month of July. This is said to be due to the common-sense basis put into effect recently, of letting each mine have as many cars as it can load regardless of rating. The evil of the rating system, it is said, is that a mine which might have been a 50-car producer when the rating was made will get 50 cars even though it can load no more than 40, while a neighboring mine, rated at 25 will get only that number and will have them loaded perhaps around the noon hour. Operators say that distribution as per rating must be set aside again, or that mines be rerated, unless Pennsylvania production is to suffer.

Some Interesting Statistics

Figures given by the Central Pennsylvania Coal Producers' Association for two large companies in the central district show that among 3592 employees listed there has been a military registration to date of 846 men—indicating a possible labor loss of 23.5 per cent.

The actual miner, the cutter of coal, has increased his efficiency in spite of handicaps, according to other figures given out by the same association covering the records of 244 operators. Actual miners, loaders, cutters, and others were 8.3 per cent. less in number in May, 1918 than in March, 1917, but the tonnage produced per miner in May, 1918 was 99.6 against 99.5 in March, 1917. Other employees had increased 13.20 per cent. in the period mentioned, so that the tonnage per employee was but 66.5 tons for May, 1918, as compared with 70.9 in March, 1917.

Maximum Prices for Wagon Mines

Maximum prices that may be charged by wagon and truck coal mines in the Pittsburgh District for coal, and certain rules and regulations governing the operations of mines have been established by the local fuel administrator.

The following are the rules, issued July 30, controlling prices:

(1) For coal not moving by rail, a manufacturer or large consumer making a blanket contract with a wagon mine for the entire daily output of any one or more of these mines, delivery to take place each day of the week as the coal is produced, the maximum price shall be $2.45 per net ton, f.o.b. mine platform.

(2) For all coal so purchased in large quantities for public institutions, hospitals, office buildings, large apartment houses, small manufacturing operations, mercantile establishments, and like institutions, including a supply to retail coal dealers, the maximum price, (where not taking the full and complete output of the mine and providing for its continuous operation without interruption) shall be $2.75 per net ton f.o.b. mine platform.

(3) For those consumers of coal ordinarily covered by the term "domestic users" and taking only small quantities, and especially any consumers not in the first and second classes above mentioned, the maximum price shall be $3 per net ton, f.o.b. mine platform.

Charleston, W. Va.

A special appeal was made by both D. R. Lawson, district representative of the Fuel Administration and by C. F. Keeney, president and Fred Mooney, secretary of the Mine Workers of District 17, last Monday to the miners in the Fairmont region urging them to produce every pound of coal possible in order that the government order of 150,000 tons of coal to be shipped to Curtis Bay last week might be complied with without failure. As a result of such an appeal and with a better car supply than was available the week before, production jumped in the Fairmont district, both operators and miners bending every energy to fulfil government expectations. The Baltimore & Ohio R. R. was under special orders to have an ample supply of cars on hand.

Cars were more in evidence last week in the Fairmont field than during the week previous when there was a decided slump but numerous factors led observers to believe that the output would fall short of the quantity expected. At one mine for instance, most of the miners laid off to go to a funeral. That has been the case elsewhere and has resulted in an agitation for the adoption of the practice now in vogue in the hard coal fields of designating a small committee to represent the miners at funerals in the future. With the Fairmont region mines under order to supply Curtis Bay with 150,000 tons last week, manifestations of indifference on the part of some miners caused apprehension in some quarters lest the district fail to meet the requirements for these shipments.

While production has undoubtedly increased in this state as reflected in figures made public at Washington, the maximum output has not been reached by any means and labor shortage still gives operating companies much concern. The Kanawha district has shown as much of an improvement as any one region, but producers in that district feel that if every man will only exert himself to the utmost, production can be still further increased. Speakers—soldiers and civilians—in mining towns and in the moving picture theaters have been talking nothing but production for the last few weeks and this campaign has made itself felt, but the miners are not yet fully awake to the responsibility resting upon them and this, it is believed is due solely to the tactics practiced by a few local leaders. As soon as this trouble reaches a head, mine workers will begin to produce startling results.

Weekly Production Is High

While the weekly production of the Pocahontas and Tug River fields is averaging over 450,000 tons a week, there is still a production loss. An improvement has been noted there within the past week but there is still a labor shortage which precludes maximum production. In no coal district now is lack of cars interfering to any appreciable extent with production.

New River operators are confident of being able to exceed all records for production in August, unless unforeseen circumstances interfere with their plans. Producers had hoped to be able to do this in July but the Fourth of July holidays disorganized their plans and production fell off that week.

While the average output in the New River district is about 310,000 tons of coal a week it has been better than that in the recent past. There has been absolutely no complaint on the score of car supply and in the New River field labor is exerting itself to a greater extent, though there is said to be room for further improvement.

The Kanawha district went "over the top" during the last week in July with the biggest weekly production of the year—221,407 tons—and likewise July was the biggest month, the total loads delivered being 42,620. The increase of about 20,000 tons over the week previous was due to greater efforts on the part of the miners, the total hours, worked being 6265, only 532 hours being lost through shortage of labor. Car shortage was responsible for 393 hours loss. The Chesapeake & Ohio R. R. has announced that the coal movement for July was the biggest the road has ever had by 300,000 tons.

PENNSYLVANIA

Anthracite

Wilkes-Barre—The Lehigh Valley Coal Co. on Aug. 1 put into effect a redivision of its districts in the anthracite field so as to better meet the heavy demands for fuel. Through the change more intensive effort is aimed at and greater concentration of activity on the part of officials, whose territoral units have been decreased. The rearranged divisions are grouped as follows: Lackawanna division: Sheldon Jones, headquarters, Wilkes-Barre; Luzerne division: George P. Gallagher, division superintendent, headquarters, Wilkes-Barre. Wyoming Division: John H. Heartter, division superintendent, headquarters, Wilkes-Barre. Lehigh division, headquarters, Hazleton, D. S. Wolfe, division superintendent, George Wood, division engineer. Hazleton Division: headquarters, Hazleton, H. W. Montz, division superintendent, C. A. Garner, division engineer. Delano division, headquarters, Mahanoy City, John W. Price, division superintendent, M. I. Terwilliger, division engineer. Girard division: headquarters, Lost Creek; F. H. Wagner, division superintendent; E. O. Holderman, division engineer. Locust Mountain division: H. J. Heffner, division superintendent. Blackwood division: Headquarters, Blackwood; C. N. Mortimer, superintendent.

Jeddo—Although not completely housed, the new Jeddo No. 4 Washery of G. B. Markle Co. is preparing coal. The gift of two war savings stamps to each employee engaged in its erection was much appreciated by the men.

Freeland—During August "movie" goers throughout the country will see a moving picture of the G. B. Markel Co. employee's community garden, a New York moving picture house having taken a view of it on July 29.

Port Blanchard—On July 25, No. 14 colliery of the Pennsylvania Coal Co. had the biggest day in the history of its production, loading 150 railroad cars of coal in 24 hr., shipping 6500 tons. Company officials and men are alike elated over this Hun-crushing achievement, ranking with the launching of a ship in importance to the nation at war.

Harwood—Lightning forced the local station of the Harwood Electric Co. out of commission on July 30, and as a result several mines which receive electrical power from the plant had to suspend operations. Work was resumed the next day.

Powder used in the mines in the Lehigh region, which in the past has been shipped over railroads to the collieries, is now being hauled by motor trucks. This being done to relieve the railroads and insure the prompt delivery of the explosives so as not to interfere with mining operations.

Duryea—After battling with a serious fire that originated in the William A. Colliery on July 27 for many hours the employees of the Lehigh Valley Coal Co succeeded in getting it under control, thus saving the mine from being flooded. The fire was discovered by a fireboss making his rounds, who immediately gave the alarm. The fire in the mine started in what is known as Bates plane, on the east side of the Lackawanna River, and affects 18 places. Considerable timber is used in that section of the mine and how the flames originated no one seems to know. The men were worked in teams of five and could only work 15 minutes at a time.

Coal Township—Disregarding the state law by opening a safety lamp in a gaseous section of the Henry Clay Colliery that he might light a cigarette, John Conovage, a miner, set off a body of gas and both he and his laborer were probably fatally burned.

Beaver Meadow—High water affected production in the mines of the Lehigh Valley Coal Co. in this region on Aug. 1. Miners were driven out of No. 2 workings when Sulphur Creek overflowed its banks and broke into the mine. Suspension was imperative, despite the national demand for fuel, and the situation was made worse for the Valley output when the Beaver Meadow silt dam burst and the column pipes at the Jeansville breaker gave way.

Pittston—In compliance with the decision that all draft boards can exempt all mining men of vital importance to the coal industry, the Pennsylvania Coal and Hillside Coal and Iron Companies have established a central city office at room No. 11, post-office building, this city, and from this point all matters in connection with drafted employees will be handled. It is the intention to investigate each case and only seek exemption for those whose positions cannot be easily refilled. No claims will be filed for exemption of those men who are known to be habitual loafers and men who lose time weekly.

Browntown—The settling of the surface in Cork Lane, which started on July 27, still continues and the working had not ceased on July 31. A large force of men were at work dumping in ashes and raising the Delaware & Hudson and Central R. R. of New Jersey tracks. The Delaware & Hudson passenger station is badly affected as the whole business has settled.

The settling covers a big area and is said to be caused by workings in the Hillside Coal and Iron Co.'s mines.

Hazleton—Many miners in the employ of the Lehigh Valley Coal Co. have objected to the action of that corporation in exchanging First Liberty Loan Bonds for those of the later issue paying higher interest. The men took out the bonds on the installment plan, through which deductions were made semi-monthly from their wages. The bonds are to be distributed the first of the month and when it became known that they are of the second issue requests began to pour in that these were not acceptable. The men want the honor of having the bonds of the first allotment as evidence of their patriotic spirit.

A special grade of anthracite leaves the Hazleton field each week by express for use in the Government factories making gas bombs.

Bituminous

Connellsville—Operators in the Connellsville region engaged in salvaging screened coke from ash dumps are well pleased with the recent fuel administration order fixing a maximum price for screened coke of $1 less than the maximum government price for selected foundry coke f.o.b. cars. The order means that any cleanly screened coke from ash dumps which can be used as domestic fuel can be sold at a maximum of $6 whether it is shipped for domestic use or not.

Punxsutawney—The Anita Coal Mining Co. has re-opened the old Horatio No. 2 mine of the Berwind-White Coal Mining Co. at Horatio near here. This mine was abandoned by the Berwind company 22 years ago on account of the high cost of getting the coal. The mine was a "wet" one and when a fault was encountered at the face of the main slope it was stopped. The Anita company has installed large pumps and retimbered the main heading the entire length, cut through the fault and opened a fine field of coal. Shipments will be made over the Pennsylvania Railroad.

Indiana—The first move toward bringing the general offices of the Rochester & Pittsburgh Coal and Iron Co. to this city was announced last week when it was stated that the electrical and mechanical engineering departments would be moved from Punxsutawney. The offices will be located in the Savings and Trust Building with the other offices of the company until the new office building is erected on Church Street.

Iselin—The Lowther Coal Co. has begun shipments from its mine near Clarksburg. The opening is on the Marock farm in the Pittsburgh gas seam. A Galion steel hoist and tipple has been installed at the foot of the incline plane. Shipments will be made over the Buffalo, Rochester & Pittsburgh Railway.

WEST VIRGINIA

Charleston — A new power unit will shortly be added to the plant of the Gauley Coal Co., this to be a 150 kw. plant. New motors, mining machines, etc., will be installed.

Welch—Another opening has been made by the Flat Top Coal Co. on the Welch seam above the present opening at its English plant. The same tipple is being utilized in connection with both openings.

Fairmont—After two years of almost constant activity in repairing the damage wrought by an explosion in 1916, mine No. 7 of the Jamison Coal Co. will probably be reopened by Sept. 1, according to an announcement made by J. M. Wolfe, superintendent of the West Virginia division of the company.

Clarksburg—W. M. Hornor, L. W. Garrett and other business men of this city have purchased a large tract of coal land owned by the late George M. Whitescarver of Grafton and are making arrangements to open several mines on the property acquired in the near future. The coal is situated on Coal Run a few miles south of Grafton.

Elkins—By November 1 the West Virginia Coal & Coke Co. expects to have its No. 12 mine near Bower, on the Coal and Coke Ry., in operation, work having been started on this development. No. 12 is to be a drift mine located about a mile south of Bower. The tipple is to be so constructed that shaker screens may be installed later, if desired, but immediate plans provide for dumping run of mine coal only. No. 12 mine is to work an area of approximately 500 acres of Pittsburgh coal. The mine will be worked on a retreating room and pillar system and in order to hasten development, a number of headings will be started from the outcrop, with an outside tram-road to the tipple. This will be abandoned when the inside hallway is connected through.

ALABAMA

Birmingham—The Birmingham Coke and Byproducts Co. announces that it will construct a battery of byproduct coke ovens and plant for the recovery of the byproducts of the coal, on a site near Boyles, Jefferson County, the new enterprise to cost in the neighborhood of $3,000,000. Work on this plant will commence as soon as materials can be assembled, it being the intention to have it ready for operation in about ten months. The Federal Government will render financial assistance toward its construction and has contracted for the output of coke, to be used at the air nitrate plants at Sheffield, and will also take the production of toluol, sulphate of ammonia, etc., for use in munition plants. The coal for supplying these ovens will come from the mines of the Majestic and Imperial coal companies, which are located a short distance from the site of the by-product plant, and which are owned by the incorporators of the new company. The new firm is officered by Morris W. Bush, president; Horace Hammond, vice president and treasurer, and H. L. Morrow, secretary, all of Birmingham. A. P. Bush, of Mobile, is also a stockholder in the company.

KENTUCKY

Madisonville—It is reported that the small mines around Madisonville, which recently were cut off from the car supply by the Louisville & Nashville R. R. Co., are again securing cars.

Hazard—The Solar Coal Co., operating at the mouth of Willard Creek, has started loading out coal, shipping its first car a few days ago. The company has made improvements to the property which cost about $150,000. J. W. Estep is superintendent of operations for the company.

Sturgis—Fire breaking out in Mine No. 8, of the West Kentucky Coal Co., during the night of July 23, was not discovered until the morning of July 24, when it had obtained such headway that it became necessary to abandon the mine temporarily, and seal it up. It is stated that A. E. Anderson, who had charge of the pumps, was caught in the mine. Rescue parties were driven back by heat and gas. According to the most recent reports the fire was still burning, and the man's body had not been recovered. The blaze is thought to have started from a short circut.

OHIO

Mortonville—William B. McCracken of Lancaster, O., has leased from the Buckeye Coal & Ry. Co. a tract of 160 acres on the Toledo & Ohio Central RR. near Mortonville which will be developed at once by driving an entry. The seam is the usual No. 7. The product will be sold through the Buckeye Coal and Ry. Co.

INDIANA

Petersburg—The Globe Coal Company, operating a stripping mine at Sugar Ridge, four miles east of Petersburg, is building a sawmill plant and will saw lumber with which to build houses at a town site now being developed. A reservoir is being built and a railroad switch four miles long, with a bridge over Patoka River, is under construction. The company has appealed to the state for 50 more prisoners to work on the railroad grade. Already 52 men are on the job, in addition to scores of others employed in Petersburg and neighboring towns.

Carlinville—Work on the Standard Oil Co.'s No. 2 mine, northeast of here, has been stopped on account of the quicksand and water encountered at a depth of about 100 ft. It is expected that the abandonment will be only temporary. The plan is to resume work as soon as material to make the working conditions safe is received. In the meantime work is being pushed night and day at Mine No. 3, on the same tract. But for the difficulty encountered in Mine No. 2, work would not have been begun on No. 3 until No. 2 was completed. Mine No. 4 is expected to be ready for operation by Oct. 1.

Virden—Fossils of what are believed to have been prehistoric reptiles are being found in considerable numbers in the North Mine here. One specimen is 14 ft. long and 7 in. in diameter and has a wedge-shaped tail. Another is 6 ft. long and a third 3 ft. long, all of the same general characteristics. They are found between layers of rock and slate and the miners say that there are many visible in the formation.

Springfield—The first national convention of co-operative stores will be held here Sept. 25. Hundreds of delegates are expected. The sessions will be held at the hall of representatives. Governor Lowden will deliver the address of welcome. There are now more than 1000 co-operative stores in this country.

Duquoin, Ill.—Evan D. John, director of the Illinois Department of Mines and Minerals, announces the following itinerary for the Miners' Examining Board for August: Benton, Aug. 5; Harrisburg, Aug. 6; Herrin, Aug. 8; Duquoin, Aug. 10; Belleville, Aug. 12; Collinsville, Aug. 13; Litchfield, Aug. 14; Taylorville, Aug. 15; Danville, Aug. 16; Peoria, Aug. 17; Canton, Aug. 19; Springfield, Aug. 20.

Personals

Charles H. Eskridge, who for a number of years has been with the traffic department of the Chesapeake & Ohio R.R., has resigned to go to Ashland, Ky., to take up traffic work for the Ashland Iron and Mining Co. He made the change on Aug. 1.

Delwyn Wolfe, new superintendent of the Lehigh Valley Coal Co., will make his home at Jeanesville and have charge of a part of the present Hazleton Division, which has been divided with the present superintendent, Mr. Montz. Further changes in the operating personnel are expected.

J. H. Walker, president of the Illinois Federation of Labor, has announced his candidacy for international president of the United Mine Workers of America in the coming election on the second Tuesday in December. Mr. Walker lives in Danville, Ill., and is a member of Local No. 503, of Westville, Ill.

W. P. Burgess, engineer in charge of the Birmingham mine rescue station for several months past, has tendered his resignation to the government and will enter the service of the Bessemer Coal, Iron and Land Co. as superintendent of the Belle Ellen division. Mr. Burgess' successor has not been announced.

J. Fred Morlock, manager of the Morlock Collieries Co., has taken a controlling interest in the Victor mine at Strattonville, Penn., and will be made president of the company. He has also added several new business branches to his office operations at Buffalo, N. Y., among them the Tri-states Securities Co., for the handling of coal lands and other properties. Other coal mines are under negotiation.

Obituary

John R. Powell, pioneer squib manufacturer of this country, coalman and banker, died at his home, in Plymouth, Penn., on July 29, of uremia. Mr. Powell was born in Wales, May 6, 1847, and emigrated to this country in 1865. He erected a squib factory in 1878 and immediately began the manufacture of squibs used in mining throughout this country. The industry was a success from the start and has continued so during the intervening years. He secured his first patent in 1879. While Mr. Powell was interested in a number of coal properties and in numerous concerns which turn out mining supplies, it was in the squib business that he established a reputation, as the product of his factories is in use in every coal and other mines throughout the country. He is survived by his widow and one daughter.

Industrial News

Bluefield, W. Va.—The Pocahontas and Tug River districts produced during week ending July 27 the greatest tonnage ever mined, 473,896 tons.

Fairmont, W. Va.—Automatic scales are to be installed in all the mines of the Consolidation Coal Co. in this region in the near future.

Petersburg, Ind.—A Vincinnis coal company has leased 2500 acres of coal land, just west of Hesmer, six miles south of Petersburg and will open a railroad mine this fall.

McDowell, W. Va.—A number of new houses for miners are being built by the McDowell Coal & Coke Co., of which H. W. Rawson is superintendent, at its plant at this place.

Gillespie, Ill.—The Illinois Pyrite Co. has been incorporated with a capital of $25,000 to deal in pyrite coal and other minerals. The directors are William Watson, Fred E. Long and R. M. Depew.

Hyer, W. Va.—The Bens Run Coal Co. has been organized with a capital of $50,000 to mine for coal in the Hyer district. C. W. Karns, J. E. McDowell and J. P. Gates are the principal incorporators.

Louisville, Ky.—The Union County Mining Co. has been recently organized with a capital of $300,000 to develop coal properties in Union County. The incorporators are William Jarvis, Fred Reiss and R. F. Peters.

Armor, W. Va.—The Dempsey Coal Co., recently incorporated with a capital of $50,000, has perfected its organization and is planning for the immediate development of about 300 acres of coal properties in the Inez, Ky., district. Lewis Dempsey is president.

Hawesville, Ky.—The Central Kentucky Block Coal and Mineral Co. has been incorporated with a capital of $200,000 to operate coal properties in the Hawesville district. Harry Myers, Charles E. McDavitt, and Stanley Allen are the incorporators.

Louisville, Ky.—The Elkhorn-Jellico Coal Co., operating near Whitesburg, Ky., has secured 2,000 acres of land, and plans opening a large mine, and the construction of a considerable mining town, including schools, churches, moving picture theatres, etc. M. K. Marlowe and others are interested.

Columbus, Ohio—Numerous wrecks and derailments have occurred recently on the Kanawha & Michigan, arising from the use of heavy foreign equipment. As a consequence the production of the mines along the line has been greatly reduced. One day recently 10 derailments were reported.

Columbus, O.—Engineers employed in the mines of the Ohio Collieries Co., in Athens county, who quit in consequence of a dispute over wages, have returned to work, with the understanding that the difference will be adjusted by the Federal authorities. The strike caused the idleness of 1000 miners for one day.

Charleston, W. Va.—Out of 55 counties in West Virginia, coal is shipped into only 14, according to a statement recently made by State Fuel Administrator J. W. Barnes. Little, if any, coal is used in some West Virginia counties, such localities having an abundance of natural gas and where that is not the case, an ample supply of wood.

Buckingham, Ohio—A partnership known as Summers & Chilcote has been formed by J. H. Summers and C. M. Chilcote of Columbus and has purchased from Charles Schroeder of Buckingham a tract of 30 acres of coal and considerable worked over land. The purchasers will increase the output, which will be marketed through the Buckeye Coal and Ry. Co., of Columbus.

Charleston, W. Va.—Work will be started at once on extensive improvements to be made to the plant of the Dana Coal Co. at Dana. The mine to be operated was recently purchased from the Canadian Pacific Coal Co. and will be completely electrified. Work is to start at once. The yearly output of the company will be 100,000 tons when all improvements are completed.

St. Louis, Mo.—The City of St. Louis is storing coal at Baden and Bissell's Point. The quantity now stored is about 7000 tons. The city's requirements are about 300 tons a day. Last year this was obtained for $1.90 f.o.b. mine. The contract is still in force and is subject to renewal, subject to increase in freight rate, which will make the approximate cost, delivered in St. Louis, about $2.85.

Oklahoma City, Okla.—The Gunther Coal Mining Co. of Tulsa, Okla., has been organized with a capital stock of $150,000 for the purpose of developing some extensive coal land leases near that city. The charter of the company has just been filed in the office of Secretary of State Lyon, and shows that the incorporators are: S. A. Gaskill of Claremore, and A. C. Gunther and F. A. Vernon of Tulsa.

East St. Louis, Ill.—Fuel Administrator Baxter gave another hearing Tuesday to East St. Louis coal dealers who are asking permission to increase the retail price 5 cents a bushel. After several had testified that they could not do business at the present prices, H. H. Mott of the Granite City Cooperative Coal Co. testified that a good profit could be made at the present prices. The administrator has the matter under advisement.

Dallas, Tex.—This town is comparatively safe from dangers of a fuel famine this winter, according to local coal dealers, who say that never before have there been as many and as heavy deliveries of advance orders for coal. Practically all yards have been running as many wagons making coal deliveries through the summer months as are operated during the winter months, and nearly every family in Dallas has sufficient coal in the bins to last through the winter.

Elkins, W. Va.—Three Y. M. C. A. buildings for miners are to be erected by the West Virginia Coal and Coke Co., one at Bower, one at Norton and one at Mabie, the latter to be somewhat of a community building, since other companies there are to share their proportional part in the erection and maintainance of the building. As soon as final plans are approved, construction work will be begun. The same company is building a number of houses of the bungalow type for miners at its Harding plant.

Columbus, Ohio—It is announced by the Ohio Fuel Administration that the plan to have all large users of coal sign questionnaires, showing their needs and containing much other information, will be put into effect in the near future. After the questionnaires are filled out and sworn to inspectors from the Federal Administration will be dispatched throughout the state to see if any saving of fuel can be made. It is estimated that a saving of from 25,000,000 to 50,000,000 tons can be made by more efficient methods of firing.

St. Louis, Mo.—Disregard of State Fuel Administrator Crossley's order to make last Monday night the first lightless night was so general that Secretary W. E. Mount of the St. Louis Fuel Committee wrote to the chief of police next day requesting enforcement of the order. The observance was better Tuesday night. The excuse made for violations Monday night was that competitors violated it and that orders had not been received to extinguish the advertising and ornamental lights. Curtailment of street lighting is also to be enforced.

Harmersville, Penn.—Four hundred new houses are being built at a new mining town three miles from this place. The houses are five and six room cottages, thoroughly modern, with water, sewer, gas and electricity and equipped with fireplace and two chimneys. The mines are now producing from 500 to 700 tons of coal daily and when the new houses are completed and occupied there will be labor enough to produce about 5000 tons a day. A spur railroad connects the new town with Harmersville. The town has a commissary and two privately owned stores. The mine is a new one.

Cincinnati, O.—The Hamilton County Fuel Administration, anticipating a heavier demand for the general supply of fuel next winter than can be met, is urging manufacturers, public institutions, and other consumers entitled to special consideration and priority in the matter of coal supply, to have their names placed on the preferential lists of the National Fuel Administration, in order that they may be as fully assured as possible of a coal supply. This attitude is one result of the prospect that virtually all West Virginia coal will now be sent to the East instead of coming West for Cincinnati and other cities.

Howe, Okla.—The large coke ovens built by the Mexican Gulf and Transportation Co., near Howe, Okla., have resumed operations after having been idle for more than 15 years. This plant, containing 100 ovens, was abandoned when it was found unprofitable more than 15 years ago, and the plant had fallen into decay. It was purchased last December by the Howe-McCurtain Coke Co., of Howe, Okla., and since that time has been completely renovated and put in good order. This company also operates the coke plant at McCurtain, Okla. The company is now sinking its No. 4 mine on coal land near Howe, and will use the entire output of coal for coking purposes.

Columbus, Ohio—No more Pocahontas coal may be shipped into Ohio for domestic consumption. J. H. Frantz, Ohio fuel administrator for the state, thus announced recently upon his arrival from Washington, where he spent most of the week conferring with the fuel administration. This kind of coal is to be reserved for the navy and for the production of byproducts in coke ovens. Mr. Frantz also announced that western Kentucky had been added to the Ohio coal zone and that coal from that section could be shipped into Ohio. This coal will be chiefly for Cincinnati, Hamilton and Dayton and contiguous territory. Hocking coal and West Virginia splints will be available for the Columbus territory.

Rockville, Ind.—T. F. Gaebler, fuel administrator of Parke County, is making a special campaign to save as much timber as possible for fuel purposes and thereby to relieve the shortage of coal. Mr. Gaebler is interesting farmers in cutting and hauling "dead and down" timber which ordinarily goes to waste. There are 65 coal mines in Parke County and with the burning of thousands of cords of wood, the county will be able to ship many more tons of coal than usual. Mr. Gaebler will refuse to issue permits to farmers to buy coal unless the farmer is able to show that there is no wood on his farm going to waste. Martin Rehfuss, Jr., fuel administrator of Marion County (Indianapolis) is following the same plan.

Uniontown, Penn. — Twelve thousand acres of the best quality of coking coal in Greene County, situated in Cumberland and Jefferson Townships with a frontage along the Monongahela River, recently passed into the control of the H. C. Frick Coke Co. and $7,000,000 was distributed to creditors of J. V. Thompson with the delivery of the deeds in the so-called Frick deal. This is the first tangible result of efforts made to liquidate the vast Thompson estate since the financial crash in January, 1915. Mr. Thompson's interest in the deal was 7,255 acres and the trustees were given $3,797,472.25 for distribution to mortgage holders. Other deals are now pending, one being for the sale of 5,000 acres of "back" coal for $2,000,000. The Frick deal was tangled in litigation for more than two years before the deed was passed.

St. Louis, Mo.—Barge line freight service between St. Louis and New Orleans will be in operation on a weekly schedule on and after Sept. 1, according to an announcement of A. W. Mackie, manager of the Mississippi River section of Federal Barge Lines, on his return from a trip along the lower Mississippi with M. J. Sanders, federal director of waterways. The Government has acquired 40 steel barges and will have four or five steamboats to tow them. Construction of equipment will be pushed and as soon as possible a twice-a-week schedule will be put into effect. The plans call for towboats with motors of 2000 hp. and over and barges of from 1000 to 2000 tons capacity. Mackie expects that a combination rail and water rate will be made which will enable shipments to be made over both transportation systems.

Fairmont, W. Va.—The record of loading coal and coke on the Monongah division of the Baltimore & Ohio R.R. during the month of June as compared to the three preceding months has been completed by F. J. Patton, secretary of the coal operators' association, and shows:

	East	West	Total
June	18,363	5,375	23,734
May	17,030	4,972	22,002
April	15,543	4,896	20,439
March	15,493	3,060	18,553

The figures shown above include 805 cars of coke and 852 box cars loaded by team track haulers. There was a total of 22,077 cars loaded at tipple mines during June which is 51.16 of the rating of the region. Mr. Patton has a list of 225 team track mines in the Fairmont district and is not certain that he has them all.

Philadelphia, Penn.—A "get-together" meeting of anthracite operators was held recently with the anthracite committee of the U. S. Fuel Administration. The object of the meeting was to "check up" on the anthracite output with a view to increasing it if possible. Operators, representing companies shipping to all destinations permitted by the Fuel Administration, had the situation explained to them. Special stress was placed on the companies seeing to it that consignees empty cars the same day as received, if humanly possible. A speeding up process was urged that would enable the railroads to return "empties" to the mines as quickly as possible. The operators agreed to follow all plans and suggestions likely to expand production. They wanted it understood that if it is in their power and no further depletion of the mine-worker's forces occurs by draft and other causes, they will do their best to see that retail dealers get their advance orders filled to the last ton by Nov. 1. They figured that no really cold weather will come before that date to entail any fuel hardship on the consuming public.

MARKET DEPARTMENT

Weekly Review

Production High, Car Supply Good and Lake Movement Heavy—Output Well Up to Present Requirements, but Consumers Somewhat Apprehensive for the Future.

PRODUCTION has dropped off slightly from the high records of the recent past. This diminution in the output is, however, not particularly serious and if the present rate can be maintained there can be no such suffering for want of coal as the country experienced last winter.

The car supply has been generally good, many localities receiving full rating. In other regions some mines and some districts have been served with only enough cars for a few days' work per week. Such cases have, however, been the exception rather than the rule.

The coal supply problem is still one of transportation rather than production. It has been fairly well demonstrated that if the mines are supplied with cars they are, as a general rule, able to turn out a heavy output and one well up to the needs of the country. One or two roads have had such heavy traffic in coal that much congestion with some wrecks and derailments has resulted.

In the West and Middle West production is well up to the demand and certain grades and sizes are still selling below the Government schedule. In the East, however, particularly along the Atlantic Seaboard, demand is strong and dealers are unable to accumulate any stocks except of one or two of the smaller sizes. Of these there is now a slight surplus but it is questionable if this would be maintained were bituminous coal available with which to mix the fine anthracite.

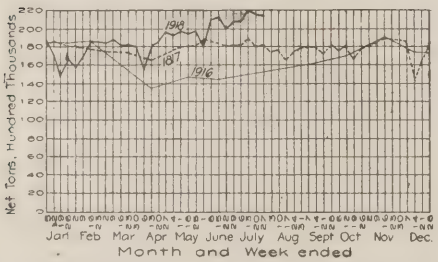
The Lake movement has been heavy but receipts at the Upper Lake docks are still behind the Government schedule. Every effort is being made to keep the shipments to the Northwest by water at a maximum as it is believed that by so doing all requirements of that region can be taken care of by the close of navigation.

One incident of the week, small in itself but which may be far-reaching in its results, was the closing of four small mines in the Pittsburgh district because they shipped dirty coal. It is evidently the intention of the Fuel Administration to tolerate no such practices in this respect as caused such justifiably adverse criticism of the industry as was heard last winter.

Particularly in the East no one is sure exactly "where he is at." Although receipts are about ample to present requirements it is recognized that the future is uncertain and in many quarters considerable apprehension is entertained.

WEEKLY COAL PRODUCTION

The output of bituminous coal in the United States declined approximately 1 per cent. during the week of July 27. The production (including lignite and coal coked) is estimated at 12,802,000 net tons, a decrease compared with the week pre-



ceding of 121,000 net tons but an increase over the corresponding week of 1917 of 1,471,000 net tons or 13 per cent. The average daily production is estimated at 2,134,000 net tons as against 2,154,000 net tons during the week of July 20 and as compared with 1,889,000 net tons during the week of July 27, 1917.

The present week's output while 343,000 net tons or approximately 3 per cent. in excess of weekly requirements of 12,459,000 net tons during the balance of coal year to make up the deficit to date, is nevertheless 1,300,000 net tons or 9 per cent. behind the weekly requirements during the balance of the summer months to make up the deficit to date. The difference between the summer requirements and those specified for the balance of the coal year is accounted for by the necessity to ship practically all lake coal during the summer months and 50 per cent. more tidewater coal to New England during the summer than in the winter. Production to date is approximately 15,000,000 net tons behind schedule, and in order to meet all requirements as outlined by the U. S. Fuel Administration it will be necessary that the output of coal during the last of the summer months, August and September, be equivalent to over 14,000,000 net tons per week, 714,000 net tons or 5.5 per cent. in excess of the record week to date.

Anthracite shipments increased slightly during the week, the total movement amounting to 40,942 carloads.

CARLOADS OF COAL ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended: July 6	July 13	July 20	July 27
Bituminous shipments, 123 roads.	180,090	235,291	229,770*	227,893†
Anthracite shipments, 9 roads...	31,493	42,419	40,664†	40,942

* Revised from last report. † Subject to revision.

Beehive Coke — Production of beehive coke in the United States declined slightly during the week of July 27. Preliminary estimates place production at 617,000 net tons, an average per working day of 103,000 net tons as against 105,000 net tons per working day during the week preceding.

The principal operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania report production during the week of July 27 at 348,180 net tons and operation of the plants at 77.5 per cent. of present capacity as compared with 76.6 per cent. during the week preceding. Yard labor losses amounted to 19.4 per cent. and losses of time due to all other causes to 3.1 per cent.

The same operators produced 168,650 net tons of coal during the week of July 27.

Byproduct Coke—Working conditions of the byproduct industry in the United States varied but little during the week ended July 27. The operators of the country produced 517,664 net tons, working their plants at 91 per cent. of their present capacity, as against 91.2 per cent. during the week preceding. Material increases occurred during the week in Maryland and Massachusetts, while Kentucky was the one state reporting a material decrease. The plants of three states, Massachusetts, Tennessee and Washington, were operated to capacity.

BUSINESS OPINIONS

Bradstreet's—Further marked extension of government control of production, of distribution and of labor, more urgent demands upon already full capacities for still greater efforts, some further shifting of the stream of war orders to western points from congested eastern areas, stimulation of fuel production in greater volume, a large, at some points, record volume of midsummer wholesale and jobbing distribution, fair to good retail buying, mail-order business in excess of 1917, improved collections, some shading of food crop estimates and a decided lowering of cotton condition due to drought in the southwest, a dull stock market, firm and even stringent money, high record bank clearings, close to low record failure totals, and a slightly quieter labor situation are the salient points in a week unusually full of important commercial and industrial happenings.

Dry Goods Economist—Cotton and cotton price fixing have engaged the attention of textile men this week to an unusual degree. The announcement in a prominent commercial paper of a percentage of 77.4 of the cotton crop on Wednesday was followed on Thursday by the Government's estimate of 73.6. The announcement of the Government's figures was followed by a raise in raw cotton on the New York Exchange of nearly 1c. per pound—or, as it is usually expressed, 95 points—in only a few moments. Analyzed, the figures mean that the estimate of Wednesday indicated a crop of 14,500,000 bales while the Government's estimate indicated one of 13,619,000 bales, both estimates being exclusive of linters which should be from 1,400,000 to 1,500,000 bales additional.

American Wool and Cotton Reporter—One favorable development in the wool market is the interest being taken in the purchasing of foreign wools, and in the regulation of the available supply. If agreements can be made and a satisfactory system devised it is possible that domestic manufacturers will be alloted a certain amount of wool which can be used for civilian purposes. The supply of wool seems sufficient, but limited by the existing shipping conditions, and possibly other causes.

Marshall Field & Co.—The wholesale distribution of dry goods for the current week is in excess of the large total of the corresponding week in 1917. Road sales, while light, are in excess of the same period of the previous year. Not quite as many customers have been in the market. Collections continue excellent, being larger than for the current week of last year.

Atlantic Seaboard

BOSTON

Average stocks in New England are but six weeks. Most buyers in cheerful mood, but situation hardly warrants it. Receipts

are maintained at July level. Railroad requirements to be handled from Washington. Wagon coal helps out the volume. Continued favorable shipments from Baltimore. Congestion at unloading berths here only temporary. Demand sags off for screenings. Anthracite receipts all-rail nearly up to quota, but disappointing at tidewater.

Bituminous—In well-informed trade circles there is an undercurrent of pessimism. Receipts have been favorable the past month and production has been maintained on an encouraging basis but this is a season of minimum consumption and maximum deliveries and our receipts should continue at their present level. No coal man in touch with the situation feels that this is possible for more than a few weeks longer.

The statistical section of the Fuel Administration at Washington regards its tabulation of receipts so complete that it is warranted in using it as an absolute guide. In other words, unless Washington has somehow found out that a plant exists not only is that plant not to receive coal but fuel for New England is to be allocated on the basis of such returns as have been made. Meanwhile, it is plain that heavy demands from over seas and from Government operations elsewhere will have to be met, and there is a turning toward New England as an area where a large tonnage can be spared. There is no shortage here of bituminous for current needs, but there is a serious shortage of storage coal which is usually accumulated during the summer months for winter use. Average stocks only cover about six weeks, and yet there are serious plans to divert coal from New England to requirements elsewhere.

The railroads, large utilities and the big textiles are far in arrears as compared with 1917 when, up to Aug. 23, coal was coming forward freely. If shipments to New England are now to be reduced instead of being built up, it will go hard with us next winter.

A large number of buyers were so influenced by the volume of coal that came forward in July that some are actually cautious about making purchases. There are plenty in New England today who are inclined to refuse coal. This, however, is no reason for the Fuel Administration to be shortsighted. Mr. Storrow made it plain at a conference in Washington last week that the situation would not permit any cutting of the allotment agreed upon last March.

At the five gateways receipts of bituminous thus far in August are about on the July level. The daily average for last month was 533 cars commercial and 153 cars railroad fuel or 686 cars in all. The number of box cars now being sent forward should increase during the next few weeks, although soon the enlarged demand for bunker and transport use will make itself felt keenly.

New England was depending upon increased receipts via the New York piers but obviously the prospect there is not hopeful. Plans of the usual distributors through ordinary trade channels have been considerably upset by the increased movement via Baltimore, thereby reducing the New England tonnage transshipped at New York. If now the Baltimore loadings for New England are also to be reduced there will be serious embarrassment.

Railroad requirements it is understood are to be handled directly from Washington, hereafter. This would seem like absent treatment, and already some of the results can be observed. Naturally the local fuel authorities are glad to be relieved of railroad requirements and to have the responsibility placed elsewhere, but this is hardly a prudent measure, as a matter of administration.

It is not known exactly to what extent wagon coal has been sent forward. Mr. Storrow's office saw to it that ample consignments were put on file and if the movement of coal in this equipment can be built up to 600 cars weekly it will be a distinct help especially to smaller plants and to retail dealers.

At Hampton Roads the coal available is sufficient to care for the bottoms that report and latterly there have been no serious cases of detention. It is probably only a matter of days when coal will be switched west and to the byproduct plants from which it was diverted a few weeks ago to relieve shortages at the piers. Aside from routine shipments on contract it is extremely difficult to arrange for cargoes.

Baltimore clearances still make a favorable showing for New England. Coal has been ordered to Curtis Bay to Mr. Storrow's order in considerable volume and steamers are regularly taking it on allocations furnished by him. Hampton Roads is thereby relieved, measurably, although a large tonnage of the coal ordered to Curtis Bay is diverted from shippers who would normally apply it to contracts via New York piers.

Some notice has been taken of delays in handling steamers at this end. Much of this is due to lack of berth room for ships bringing supply coal to the Boston & Maine R. R., a great effort having been made to send it in sufficient volume to give the needed reserve. Most of the delay has now been corrected, and where necessary the ships have been discharged at other berths for other consumers.

Anthracite—As a natural outcome of heavier shipments of bituminous the buying power for steam sizes has sagged to a marked degree. All-rail deliveries are still in large proportion, the July daily average having been in excess of 180 cars but there is decidedly less inquiry. Considering that the use of screenings and the buckwheats is new to most steam plants and the difficulty of getting improved stokers suited to the purpose, New England consumers show a good record in this respect. When bituminous shipments fall off again there will doubtless be a revived demand for steam anthracite.

The July average receipts all-rail of domestic sizes were well in excess of 600 cars. At Tidewater the movement is still slow and it is hard to see how the 1916 basic tonnage can possibly be caught up with for the coastwise towns even with the box cars that are being forwarded all-rail.

The whole question of distributing the increased quota seems much tangled and even recently there was no settled policy concerning it. Awkward questions such as the tonnage actually loaded aboard barges late in March, 1916, and sent to small towns where one cargo is a large proportion of a season's tonnage are not yet satisfactorily answered.

NEW YORK

Situation is easier, but apprehension continues. Anthracite dumpings increase, while bituminous decreases. Encouraging reports come from the mining regions. Bituminous moving freely but no opportunity for storing. Car supply in central Pennsylvania reported as slow. Complaint made of slow shipments.

Anthracite—The situation is easier but continues to occasion concern. Unfilled orders are much in excess of receipts and the trade fears that nothing short of a miracle can prevent a shortage of fuel next winter. Coal is moving easier and the cars dumped at the various local tidewater docks during the seven day period ended Aug. 2 show a substantial increase over the previous week.

State Fuel Administrator Cooke is getting the machinery of his office into working order and New York can expect to receive its full share of fuel now.

While the mine workers are doing everything within their power to maintain production, conferences have recently been held by representatives of the operators and mine workers at which methods to increase the output were discussed. The operators have also discussed among themselves further plans for the proper distribution of anthracite and they have agreed to follow all plans and suggestions that are likely to expand production, and have promised that if there are no further depletions of the labor forces, that dealers will get their orders filled by Nov. 1. Unless the Federal authorities step in it is likely that the army of mine workers will be further reduced 1000 in August when the next draft call is made, that number of mine workers being included in the call of men from Pennsylvania.

The migration of mine workers to other industries is expected to stop now because of the supervision of the labor situation by the Federal Employment Bureau. This bureau, it is expected, will prohibit war industries from combing the mining regions for men. Reports received here show that notwithstanding the labor difficulties, individual collieries are reporting record daily shipments.

Conditions in the district included in this market show some improvement. Coal is moving easier and dealers are slowly cleaning up their outstanding orders. In Manhattan Borough the retail dealers are optimistic. There is a heavy demand for both egg and stove, while chestnut and pea are easier. Efforts made to take care of the small outlying towns along the railroads are not so successful as it was hoped they would be. The residents of one town within commuting distance of New York complain that not all of the consumers there have yet received one-third of their requirements, although it is along the line of one of the largest coal-carrying roads.

The steam coals remain strong. Buckwheat No. 1 is practically out of the market, and few shippers have any to offer. Rice coal is also scarce. Barley and culm are much easier. Retail dealers are well stocked with these two sizes, but are short of bituminous to sell with them.

During July there were dumped at the New York Tidewater docks 31,284 cars of anthracite, as compared with 30,719 cars dumped in June, an increase of 565 cars. For the seven days ended Aug. 2 there were dumped 7609 cars as against 7054 cars, for the previous week, an increase of 555 cars.

Current quotations, per gross tons f.o.b., tidewater, at the lower ports, are as follows:

	Circular	Individual		Circular	Individual
Broken	$6.75	$7.50	Pea	$5.20	$5.95
Egg	6.35	7.10	Buck	5.10	5.90
Stove	6.60	7.35	Rice	4.65	5.10
Chestnut	6.70	7.45	Barley	4.15	4.30
			Boiler	4.60	

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates. Prices for buckwheat, rice, barley and boiler are not fixed by the Government.

Bituminous—Although dumpings at the New York Tidewater docks for the past week fail to show any increase, conditions are easier. Coal is moving in better shape and consumers are able to get plenty for immediate needs but there is no surplus. There were dumped during the week ended Aug. 2, 6619 cars of bituminous as compared with 6922 cars during the previous seven days, a decrease of 303 cars. During July reports of the regional director of railroads show that 30,372 cars were dumped here as against 31,129 cars dumped in June, a decrease of 757 cars.

Reports of the Tidewater Coal Exchange show an increase in the number of cars of bituminous dumped for commercial and bunker purposes. Last month 30,745 cars of coal were dumped, as compared with 28,913 cars dumped in June; 27,929 cars dumped in May and 23,839 cars in April. The average daily number of cars discharged during the same period was Apr., 795 cars; May, 931 cars; June, 963 cars and July, 1138 cars.

Reports received here from the mining regions indicate a good car supply in West Virginia, with labor satisfied and willing to work to keep up production. In central Pennsylvania cars are reported as not up to requirements. Labor is short, but efforts are being made to keep up production. Representatives of the fuel administration are continually at work checking up the working time of each miner and asking those who seem to be lax to sign a card promising to do their best to keep up production.

Reports prepared by the Central Pennsylvania Coal Producers' Association show that there has already been a loss of 6.3 per cent. in the number of miners, loaders, cutters, and scrapers in central Pennsylvania and that if the draft boards continue to call to the colors the skilled employees about the mines, who are in Class 1 and those who registered on June 5 of this year, there will be a further depletion of 4.3 per cent.

There is much complaint of the failure of the railroad companies to pay their bills promptly.

Bunker coal is moving quickly and shipping is not delayed. In connection with the formation of the new pools Nos. 71 and 72, it has been announced that all coals in the former Pool No. 9 in classifications "C" and "D" are changed to Pool No. 71 when the coal is used for bunkering purposes. Producers shipping their coals to Pool No. 10 have been allowed the privilege of shipping to Pool No. 72 when the coal is consigned for bunkers. When coal is shipped for commercial purposes Pool No. 10 applies.

This market is comparatively clear of free coals, nearly all of the shipments coming here being for regular customers.

Current quotations, based on Government prices at the mines, net ton, f.o.b. tidewater, at the lower ports, are as follows:

	Mine Gross	F. o. b. N. Y. Gross
Central Pennsylvania:		
Mine-Run, prepared or slack	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of-Mine	3.08	5.23
Prepared	3.36	5.51
Slack	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite situation unchanged. Egg coal grows easier. Full deliveries allowed. Pea coal somewhat freer. Stove and nut tight as ever. Buckwheat piling up in retail yards. Dealers compile more information. Steam stocks accumulate. Tide shipments rerouted. Bituminous car supply hit by change in rating. Fair shipments received.

Anthracite. The general situation continues without marked change. The dealers are in distress, due chiefly to the shortage of stove and chestnut. Whenever any stock of coal can be found it is without exception egg. Most of the yards are empty because the coal received is invariably delivered too promptly to allow any accumulation. Philadelphia proper has always been a poor market for egg coal and some dealers have already delivered the full two-thirds of all the orders they hold for this size. This week some dealers had been given permission to complete their orders calling for egg coal. It was an easy matter to convince the authorities that there was no wisdom in allowing their trucks to stand idle while they had coal in their yards and a place to put it. This condition is not general, for in the suburbs where the demand for egg is always heavy the dealers are still begging for it.

Pea coal, too, is not as scarce as it was and at least one large company reports being comparatively easy on it. The great demand for pea coal never comes until cold weather. On account of its price it has always been in great demand in the small homes. In other years the spring reduction never affected pea size, and the consumers as a whole have not as yet been educated to store it. There will be an active demand for this coal before the year is out and dealers are anxious to secure every possible car of it.

One firm reports a peculiar situation on No. 1 buckwheat. It has an oversupply and many of its steam-coal buyers are pleading for it. The fuel authorities are unwilling to have more than one day's supply furnished at a time to this trade. In the meantime the coal is piling up in the retail yards. While the dealers are anxious to use their equipment and store the coal in their customers' bins for next fall and winter use, the fuel people seem to think it the better policy to hold it in case of a shortage of the domestic sizes at that time, when it could be used as a substitute.

This week the dealers received another request for information from the local fuel authorities. They must advise promptly the number of tons of family coal they delivered during July; the number of tons on hand, and the number of tons of prepared sizes for which they have unfilled orders. In the letters they are advised that the information desired is most important, "particularly to learn how much coal is necessary to bring into Philadelphia during the next 60 days to take care of unfilled orders." To the uninitiated this would appear encouraging, and while the dealers will furnish the desired figures, they are none too optimistic of much help resulting.

While the dealers still appear anxious over the general situation there continues to be a note of optimism among the authorities, who feel they have the situation well in hand. A recent move that will help the local situation is the decision of the army authorities to use nothing but bituminous coal in the Southern army cantonments. This, of course, will release a heavy tonnage for the strictly anthracite domestic territory.

The lightless night plan is now in full working order, although it has been modified somewhat as to the curtailment of street lighting, in that it was found advisable to allow the use of more lights than was first thought necessary. There was also one prosecution of a store owner for violating the rule against show-window lighting.

All the shipping companies this week were checked up by the authorities on their shipments of gas coal to the New England territory, and those who had fallen behind the allotment of broken coal were directed to make it up at once.

The new ruling of the railroad administration requiring spot payment for freight did not appear to ruffle the retailers in the least. It did, however, have a tendency to cause the dealers to make their credit plans stricter than ever.

In the steam trade the demand does not diminish. There is no free coal of any size except culm to be had. Heavy shipments of this size continue to New England—so heavy, in fact, that some speculation is aroused as to whether it is not being overdone. Old-time users of buckwheat in this market, especially those on war work, are accumulating heavy stocks of this coal. Good tide shipments have also been resumed. A plan to expedite the movement of tide coal has just been put in force whereby a saving in time of 36 to 48 hr. is effected. This has been accomplished by rerouting coal via the Pennsylvania R. R. Schuylkill Division, where practically all passenger traffic has been withdrawn.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.25	Buckwheat	$3.40	$4.45
Egg	4.50	5.85	Rice	2.90	3.80
Stove	4.75	6.10	Boiler	2.70	3.70
Nut	4.85	6.20	Barley	2.40	3.30
Pea	3.45	4.70	Culm	1.25	2.15

Bituminous—The shippers of bituminous coal have been greatly upset by the change in the car allotment as adopted by the Pennsylvania R. R. in central Pennsylvania. Here they have gone back to the old system of rating based on the number of working places in the mines. As a consequence may mines have had far from sufficient cars, while others have had more than they can load. On the whole the average has been 60 per cent.

This change seems unfortunate just at a time when things had begun to run smoothly and a record tonnage was being gotten out. So far local industries have not suffered for want of fuel, although the storage plans of many have been upset inasmuch as they have received far below the average they have been getting for the past several weeks.

BALTIMORE

Strong appeals for relief in short bituminous situation here met by promise of 60 cars of soft coal for most urgent needs. Hard coal men preparing figures to demonstrate need of greater shipments.

Bituminous—While a fairly good tonnage of soft coal has been moving into the Baltimore district as viewed from the standpoint of railroad figures, the major part has been definitely destined for the use of war industries and shipping account, and some urgent industrial needs here have been neglected.

Slowly but surely the request list for first shipments as prepared by the Maryland Fuel Administration and forwarded to the district representative at Cumberland has grown beyond the shipments on that account. For several weeks the demands of the canners have piled up as the packing industry found that it could not get the coal it had contracted for.

The appeals of the state fuel administrator to the district representative were not met, and finally the local fuel administration put the case up to the national fuel body. It was pointed out that great losses of the fruit and vegetable pack had already taken place or were threatened, and on Wednesday, after days of delay, a promise came of 60 cars to be diverted to the fuel administrator here for the packing and other emergency business needs.

Many industries here are at present living practically from hand to mouth, and all thought of stocking up by other than war-preferential industries during the summer has been abandoned. Some of the preferential plants have a three months' supply or more on hand and are now getting regular shipments. It is thus only the non-preferred branches of business that suffer for the time while heavy movements of soft coal are forwarded to New England and the Northwest. That all coal wanted preferentially does not always come through has been demonstrated recently several times when vessels have been held to await finishing of cargo. A number of these were preferential loadings for the account of Starrow, of New England.

Anthracite—With monthly deliveries of hard coal falling behid past years' averages, the anthracite dealers are spending much time in figuring. It had been hoped to deliver two thirds of all orders before October, but this is now practically despaired of in view of the fact that the monthly receipts here are less than 60,000 tons, while there is 300,000 tons estimated still on the books of dealers undelivered and a considerable amount of orders applying for addition to that list.

In order to get down to "brass-tacks" so to speak the Baltimore Coal Exchange has asked all hard coal dealers to file reports of receipts of fuel so far since April 1, amounts of deliveries to customers, amounts still on the order books, estimates of business to come from old customers, promises of delivery from mine connections, etc., in order that a general estimate of needs of Baltimore can be prepared. With these facts the trade expects to be able to give the consuming public the information which it desires, and at the same time be prepared to appear before the fuel administration and urge additional shipment. War industries are eating deeper and deeper into the hard coal apportionment here, and this complicates the situation.

Lake Markets

PITTSBURGH

Heavy Lake shipments are under the mark. Four mines closed for shipping dirty coal. Regulations for wagon mines.

Shipments of Lake coal in July from the Pittsburgh district are estimated to have exceeded only slightly the original quota of 1,300,000 tons, although an effort was made to exceed that amount by as large a quantity as possible. Stocking of rail coal has been under ban since early in July. A few consumers, who are not on the preference list, have been cut off from supplies.

R. W. Gardiner, fuel distributor for the district, has closed four mines on account of their shipping dirty coal. These mines will open when inspectors are detailed to indicate precisely what coal shall be mined and what left. While the number of inspectors is not sufficient as yet to make periodic inspections of coal as shipped it is believed the closing of some offending mines will have a salutary effect upon others and thus secure a general improvement.

The local fuel administration has prescribed prices for wagon mines with a view to encouraging their operation. Manufacturers or large consumers making blanket contracts to take the entire daily output of the mine are given a maximum price of $2.45 or 10c. above the standard price. Hospitals, office buildings and the like are given a price up to $2.75, while to domestic consumers the price is set at $3 maximum, all these prices being at the mine platform. Haulage charges in addition are prescribed, 70c. per ton for the first mile or fraction, up to $2.15 for between 7 and 8 miles.

Essential consumers are being well supplied with rail coal according to their requirements and there is some stocking of truck and river coal. Transactions in the open market are light, it being difficult to secure coal except through action by the authorities. Prices remain: Slack, $2.15; mine run, $2.35; lump, $2.60, per net ton at mine, Pittsburgh district, with 15c. brokerage allowed to be charged in addition by brokers.

BUFFALO

Market tranquil, considering former unsettled conditions. Canadian trade quiet, especially bituminous. Much low-grade anthracite sold there. Lake shipments fair.

Bituminous—The supply would be sufficient but for the resumption of late of preferential orders, sending coal to points out of the regular course and leaving consumers short when they thought they had plenty. While these orders come from a larger survey of the situation than the local shipper is able to make they disturb the trade badly sometimes. Orders of coal to New England do not have a quieting sound and it is hoped that they will not be as numerous as they were last year.

At least one local shipper is taking the view of the case that tends to reduce the general feeling of uneasiness to the minimum. He finds that Canada has a good supply of bituminous and that Buffalo and New York state are pretty well taken care of. This means that a good many consumers have stocked up well and in Canada the good supply of bituminous has enabled consumers to buy it as a substitute for anthracite. This has also been done to some extent in this state.

The tendency to accept anything that looks like coal is said to have enabled many small producers of anthracite to ship into Canada what is called mine run, which is said not to have been picked over at all, but is full of impurities and sometimes so poor in quality that nobody will buy it. It was said that the authorities were preparing to stop the shipping of such coal, but some still appears to escape the inspectors.

Jobbers are not gaining much on their trade. They find it hard to get any coal and the prospect is not good for a larger surplus. All the average jobber can now hope to do is to keep along, meet expenses and be in readiness for trade resumption.

Bituminous prices are still hard to figure out, but the average jobber makes them out to be $4.65 for thin-vein Allegheny Valley, $4.45 for Pittsburgh lump, $4.20 for Pittsburgh mine run and slack, $5.85 for smithing and $6.20 for cannel, though cannel differs somewhat as to the region it comes from; all prices f.o.b. Buffalo with jobber's profit added.

Anthracite—The movement westward is not heavy. The city demand is active and it will continue so till the last cellar is well supplied, which is not likely to take place this season, and some will do well if they get a supply in any quantity during the winter. At the same time it is not believed that any severe shortage will occur. It is not expected to provide a large amount for consumers to carry several months, but all legitimate needs will be met.

The shipments by Lake are not equal to last season, but are of fair amount, being for the week 95,800 tons, of which 15,900 tons cleared for Chicago, 28,900 tons for Milwaukee, 7500 tons for Waukegan, 7300 tons for Green Bay, 600 tons for Mackinaw, 3500 tons for Ashland and 8000 tons for Port Arthur.

CLEVELAND

Bituminous shipments have decreased, due both to a reduced car supply in southern Ohio and to a more extensive diversion of coal to the Great Lakes. Lake shipments for the past week have been at the rate of 1,100,000 tons. The close of July, however, sees shipments 999,906 tons behind the Fuel Administration's schedule.

Bituminous—Receipts of soft coal during the past week have decreased somewhat. In accordance with the Fuel Administration's speeding-up plan for Lake shipments, and due partially to a lower car supply, the bituminous available for industrial and domestic consumers has fallen short of requirements.

Industrial stocking may virtually be said to be at an end. Retail dealers are considerably deferred on orders, though it is declared that the amount of coal householders have laid in for next winter is large. It is estimated that more than 50 per cent of the domestic coal that will be consumed in Cleveland next winter already has been stored. Some northern Ohio cities are reported to have more than 90 per cent. of their coal requirements already in.

The car supply in the No. 8 district has fallen off somewhat in the past week, though not to the extent production has suffered. Car supply and available labor have just about balanced.

No shading of the government maximum prices on bituminous coal is reported in this territory, nor is contracting flourishing even though the Fuel Administration has lifted the ban on contracts running longer than one year.

Operators here would not be surprised to see a fair amount of Ohio coal go east into Pennsylvania after the Lake season ends in order to release more Pennsylvania coal for New England.

Anthracite—On account of the zoning system practically no anthracite is coming through to this territory.

Lake Trade—July figures on bituminous shipments to the Northwest, which have just been announced, place the movement at 4,038.795 tons, as against the 4,900,000 tons called for by the schedule of the Fuel Administration. This puts the lake trade exactly 999,906 tons behind the schedule up to Aug. 1. However, at the rate coal has been moving the past week this is only one week's tardiness.

The following are detailed figures on the Lake movement to July 15—no comparisons up to Aug. 1 yet being available—which have been prepared by the Coal and Ore Exchange, of Cleveland, which is in charge of the lake pool this season:

	1918	1917	1918 Ahead of 1917	1918 Compared with Schedule
To April 30th..	861,157	651,479	209,678	—638,843
May....	2,970,326	2,428,118	542,208	+470,326
June....	3,429,716	3,250,149	179,567	+29,716
To July 15th..	1,791,320	1,780,409	10,911	—470,680
Total to July 15	9,052,519	8,110,155	942,364	—609,481

DETROIT

Distribution of coal to domestic consumers is still being retarded by scarcity of stock. Lake shipments are being increased.

Bituminous—With receipts of bituminous made up chiefly of mine run, local jobbers complain that it is not easy to get coal that is acceptable to household consumers. The incoming shipments, it is said, include little domestic lump or other prepared sizes. As most of the domestic buyers, who heretofore have used anthracite have been holding off through the earlier months of the year in the hope of getting their favorite fuel, the distribution of next winter's supply is not what it should be at this season of the year and is being further retarded by scarcity of supply, dealers say, since the date when regulations of the state fuel administrator made it clear that many former anthracite users must substitute bituminous this year.

Steam coal users are actively in the market for stock. Their requirements for present needs absorb practically all the coal reaching the city, the small excess going to help increase reserves of those of the larger concerns which have suitable space for storage. In many instances steam coal users, who in the past have been satisfied with day to day shipments, are attempting to accumulate a supply and are providing themselves with storage of somewhat limited capacity.

Anthracite—Some of the retailers find indications of a slight improvement in quantity of anthracite arriving, though the amount remains so small that not much progress can be made in deliveries. The special committee appointed by the Detroit Board of Commerce to call on the federal fuel administrator and seek an increase in the allotment of anthracite to Michigan and Detroit, is being increased by the addition of out-of-town business men. It is asserted that the importance of the work Detroit is performing for the government and the necessity of keeping labor in this city demand further relief, at least to the extent of making good with anthracite the 600,000 tons of smokeless and coke taken from Detroit domestic consumers.

Lake Trade—Lake shipments during last week were approximately 1,000,000 tons, having been the heaviest for several weeks. Instructions have been issued to mines to concentrate on shipments to the lakes and August is expected to far exceed the movement in July.

COLUMBUS

The diverting of a large tonnage to the Lake trade has caused a scarcity in domestic trade in certain localities. Domestic demand is still good and there is also a good trade in steam sizes. The tone of the trade is generally satisfactory.

Domestic demand is now attracting considerable attention in Ohio because of the recent ruling which diverts a larger proportion of the coal to the Lakes. Already retailers are asking for tonnage as their surplus stocks are generally small. The domestic demand is fairly active, although dealers have not the volume of business on their books as was the case several months ago. All teams and trucks are kept busy, however.

A large part of the coal in the yards is now mine-run, which is being accepted by most private users without complaint. Pocahontas is scarce and only mine-run is arriving. There are still some West Virginia splints on the local market. But the main bulk comes from Ohio mines. Retail prices are firm at the levels which have prevailed for some time. New freight rates are being worked out and still higher advances are expected.

The Lake trade is one of the busy departments of the industry. Lake shippers are exerting every effort to get a large tonnage to the Northwest. The deficiency caused by the late opening is being gradually made up, but there is still a marked shortage. The vessel movement is active as is that of coal off the docks of the upper Lake ports and no congestion is reported.

The steam trade is also active, as steam users are trying to accumulate a surplus. Their efforts have only met with partial success. The public service concerns have succeeded in laying in a fair surplus. Schools are mostly provided for and public institutions are now being looked after. There is still a considerable tonnage of screenings coming into the local market because of the activity in the Lake trade.

Production is active in all of the Ohio producing fields. The car supply has been better, amounting to practically 100 per cent. in all districts. On the whole the output of the Hocking Valley and Pomeroy Bend districts has been close to 90 per cent. and in other fields it has ranged from 80 to 90 per cent. of normal.

CINCINNATI

Increasing demands of East, tending to cut down local supply, are causing some worry among the trade. Domestic situation is good, but manufacturers are uneasy.

A factor which, it is declared both by operators and local fuel authorities, will be of increasing importance as the season advances, is the necessary diversion of much West Virginia coal which formerly came to Cincinnati and the Middle West to the East, to take care of the enormous needs of the seaboard, especially in the manufacturing centers. It is generally conceded that the inability of the industry to meet the high production figures set by the National Fuel Administration, and the consequent shortage in the amount of coal available for the East from its usual sources, make it unavoidable to divert to that section some coal which normally goes elsewhere; but, at the same time, the diversion of so large a proportion of the fuel relied upon by the great manufacturing districts of the Middle West is viewed with considerable concern, especially as there is at present no immediate prospect of finding a satisfactory volume of coal with which to supply the deficiency.

While the eastern Kentucky field, with large supplies of first-class coal, is virtually at the door of this market, and much of its fuel passes through the Cincinnati gateway bound to the Lakes and Northern points generally, it is stated by those in touch with the situation that much, if not all of it, is already contracted for, making it unavailable at this time to meet the emergency created by the diversion of the West Virginia product. The suggestion that Ohio and other parts of the Middle West may use Ohio, Indiana and western Kentucky coal meets with the same objection, aside from the fact that some of this fuel is much inferior to that for which it is proposed as a substitute.

The demands of the Lake movement are being met as usual just now, the volume of traffic being extremely heavy; and while there is, under the circumstances, comparatively little coal available for storage by local manufacturers, it is still felt that as long as domestic consumers are covered as well as they now are, the fuel which will be available when the Lake movement ceases, plus that which can be stored in the meantime, will meet the situation.

LOUISVILLE

General demand for all grades of coal continues strong, with supplies light. Car supply growing more acute. Retailers unable to secure enough coal to take care of domestic trade, much less build up, hard stocks.

There has been absolutely no let-up in the general demand for all grades of coal. Everything is selling as quickly as it can be had, although there is little stocking demand for western Kentucky nut and slack, as a number of large consumers have had bad experiences this season with such coal firing. During the last week of July several fires were going in local stocks simultaneously. No trouble of this kind has been reported from domestic consumers, many of whom have taken nut and slack.

General tightening up of credits has made it somewhat harder for the domestic consumer to secure coal this season. At the present time one concern is quoting 60 days' credit to old customers, and 30 days to new ones. Many others are quoting 30 days to old customers and cash to all new ones, while several houses are refusing to handle anything other than cash business. No orders are being delivered where the customer hasn't paid off his 1917-18 bill completely. In some cases dealers are accepting season orders with provisions that they will make deliveries of one and two ton lots as the consumer can pay for it, and take care of such orders before other rush business later on, but on the basis of the market price at time of delivery.

In eastern Kentucky it is reported that more coal is now moving into the North and South Carolina district than usual. Much of the coal from the Clinchfield region has been delivered by orders of the Fuel Administration, and rates over the Louisville & Nashville have been made which enable eastern Kentucky coal to go to the textile mills, and cotton oil concerns. Some coal is also going to Southern ports for export, but a large portion of the production is going to the lake district and to the coal byproducts plants.

Wagon mines of the state are now being forced to load in box cars entirely, and all open cars and gondolas are being supplied to the tipple mines. However, even box cars are scarce, and all classes of mines have been having trouble in securing cars during the past ten days, due partly to the fact that hauls into the Lake District are keeping cars on the road for long intervals, and returns are slow.

BIRMINGHAM

Trade conditions without material change, demand continuing strong for both domestic and steam product. Production gaining slowly. Labor working more steadily, with slight increase in working forces. Shortage of equipment for loading reported in some instances.

Alabama is making slow but steady strides in the production of coal, the output for the week ending July 20 reaching the highest figure of record for this district. Figures in the hands of the district representative of the fuel administration not yet compiled, indicate that the week ending July 27 showed a slight gain over the previous period. This is accounted for by steadier work on the part of the miners and some increase in the working forces.

The steam coal demand is steady, but the gain in production has not been sufficient as yet to noticeably affect the supply in contrast with requirements. The railroads continue to draw heavily on the output of commercial mines, the Southern having increased the percentage of its priority order for the present week. However, due to adjustments made in the rating of production at some of the mines, the additional tonnage to be taken is not large.

Wholesale and retail trade in domestic sizes is stiff, and consumers are stocking as rapidly as the supply will admit. Receipts by dealers would be satisfactory under normal trade conditions at this season of the year, but the propaganda of the fuel administration urging that winter coal be

laid in without delay has been 100 per cent. effective here and retail yards are kept barren of stocks.

Short delays have been experienced at some mines on account of equipment not being available for loading, but this has not crippled production materially.

Coke

CONNELLSVILLE

Set price on coke from dumps. Working conditions improved. Foundries evidently stocking.

The working over of old dumps at coke works has increased to such an extent that the Fuel Administration has fixed a price on the material, when it is cleaned and otherwise prepared, but not sized, the price being $1 under the foundry coke price, which makes it $6 in the case of Connellsville. Crushed coke, fixed long ago at $7.30 for sizes over 1-in., the screen being recently changed to ¾-in., is assumed by the trade to include these old screenings also, if they are sized, coke under ¾-in. being by regulation $1 under blast furnace coke, or $5 in the case of Connellsville. Coke breeze was recently fixed at half the blast furnace coke price, which makes $3 for Connellsville.

An excellent trade has been developed for the material obtained from old dumps and the market for the best material has been quite clearly defined for several weeks past at $6.50. Those who are producing the material will be disposed to make sure that it comes under the Fuel Administration regulations as to size, for otherwise they could charge only $6. On account of improvement in labor conditions several operators have within the past ten days announced their intention of going into this screening business. Previously they had been indisposed to do so by reason of not being able to spare the labor.

Working conditions generally throughout the region have improved, not through the accretion of men but through their putting in fuller time, as a result of the strenuous propaganda of the operators and of some Government activities. What concerns operators now is the prospective extension of the draft age limits, and the operators intend to see to it that the local and district draft boards impress upon registrants, to the extent permitted by Washington, the importance of remaining at preferred occupations.

The idea was entertained a few weeks ago that by this time coke would be visibly plentiful in the market and the possibility was considered of there being enough coke offered to depress prices. Since then production has increased by about 10,000 tons a week and yet there is not only no appearance of coke being plentiful, but there is practically no furnace coke offered in the market. The trade is seeking a reason for the condition and finds it in the stocking of coke by consumers. Blast furnaces do not admit that they are stocking coke to any extent but it is believed that many are doing so in a limited way.

Offerings of foundry coke continue relatively heavy, and all is absorbed. There is reason to believe that many foundries are stocking coke quite freely, prompted by the extremely scant supplies of last winter. Of the total make a proportion can be offered as foundry coke much in excess of the normal consumption of foundry coke. In times past foundry coke had to meet three requirements, among others, 72 hr. burning, careful selection, and shipment in box cars. Box cars having largely disappeared, that requirement is out of the way, and as to selection there is no definite rule. As to 72-hr. burning, the system of working always produces a large proportion of such coke. The market is quotable at the set limits of $6 and $7 respectively for furnace and 72-hr. foundry, per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended July 27 at 352,625 tons, an increase of 975 tons.

Buffalo—This territory rejoices that it has two large byproduct coke plants, but for which the supply might run short. A third plant is in process of construction, but it will not be ready for use this season. The output that is not turned out here is bought in the Connellsville district at Government prices. It is not always easy to obtain a supply, but the furnaces continue to run practically on full time. Jobbers sell a moderate amount of breeze only. The Lake receipts of iron ore for the week were 336,350 gross tons, which is quite up to the season's average.

Middle Western

GENERAL REVIEW

Situation good. Car supply almost perfect. Labor conditions better. Market holding up well to Government price. Railroads are heavy buyers. Eastern coal arrives in substantial amounts.

The coal situation in the mid-western territory is good. All the larger coal-carrying railroads, with the exception of the Wabash, report nearly a perfect car supply in their respective coal producing territories. Evidently there is also some improvement in the labor supply because early reports show that the tonnage for the week will perhaps equal, if not exceed, the records recently established. The outlook on transportation and labor is better than it has been for some time.

Market conditions remain without any radical or serious change. All the high-grade fuels, both steam and domestic, are holding firm on a basis of "Government price current at time of shipment." Some of the poorer-grade coals, however, from both Indiana and Illinois, are selling below the prices as set by the Government, but this only applies to steam sizes, as the demand for domestic coal is keeping up as steady as ever.

The railroads are buying a big tonnage, both for their current needs and for storage purposes. This, coupled with the large order placed a little while ago by the Government for its various training camps, etc., has brought about no apparent shortage. This augurs well for any tonnage that might be expected from this territory.

Eastern coal continues to arrive in this market in substantial lots. This is especially true of the Lower Lake ports. It is said, however, that there is a temporary shortage at Duluth, but to counteract this there is a big tonnage of Lake coal at Chicago. Last year one of the railroads with dock connections handled during the first 25 days of July 4764 cars of Lake coal. For the same period this year its figures show 5673 cars, or almost a 25 per cent. increase.

In short, today the coal situation, both from the standpoint of the producer and the consumer, is better than it has been for some time.

MILWAUKEE

Schedule of prices for anthracite finally announced. Small dealers claim to be at a disadvantage. Liberal receipts of hard coal during the week.

Coal consumers in the Milwaukee district are now able to figure the cost of their anthracite supply for the coming winter, as the scale of prices for anthracite has been made known. Chestnut, delivered at the curb, is now $11.30 per ton, stove $11.20, egg $11 and buckwheat $9.75. The usual charge of 50c. per ton applies where coal is carried in. All anthracite delivered between June 1 and July 27, when the new rates were made effective, must be billed 40c. under the above schedule. If the Fuel Administration enforces the ruling made early in the season, when the usual advance of 10c. per ton per month during the summer was discontinued, an addition of 30c. per ton will automatically apply on the first of September.

The soft coal schedule continues as follows: Pittsburgh, Youghiogheny and Hocking lump $6.80, pile run $6.55 and screenings $6.30; West Virginia splint lump $7.30, pile run $7.05 and screenings $6.80; Kanawha gas lump and egg $8.05, pile run $7.05 and screenings $6.80. The carrying-in charge of 50c. per ton applies to soft coal also.

Three cargoes of anthracite aggregating 36,672 tons, were docked since last week's report. A correction in the July report shifted 7,300 tons from the hard coal column to the bituminous total. The record of cargoes by Lake now stands:

	Hard	Soft
May	85,700	389,547
June	53,947	434,094
July	*99,616	*532,719
Total	239,263	1,356,360

*Subject to slight revision.

Last year's record, including receipts by carferry, which are not embraced in the above figures for 1918, was: Hard coal, 257,643 tons; soft coal, 1,266,644.

ST. LOUIS

Market is rather easy in a general way on practically everything. Steam is slow and domestic is letting up, excepting on Carterville. Country demand easier. Car supply poor, and unequally distributed. In a general way conditions are satisfactory.

The local situation is easy and there is not the demand that might be expected, and such as exists in other cities of this size.

The steam trade seems to be taking things rather easy and not giving much thought to the future. A recent survey made by the Manufacturers' Association shows that there is practically no storage coal in St. Louis for manufacturing purposes and the manufacturers seem to think that there is no need for any worrying, while the coal operators and the Fuel Administration are striving to prevent any serious shortage this coming winter by persuading users to store coal now. This has been brought about by the fact that there has been a surplus for the past few months and many consumers think that this is going to continue.

The domestic demand has been off for the last week and this will likely continue for the next month or longer, as far as Mt. Olive and Standard coals are concerned.

The shortage of Carterville continues and the demand cannot be met. There will be no change in this situation even though there may be a little more Carterville coming in than is expected now. It will be impossible to supply the Carterville demand.

The country business, which has been good up to the present, is letting up some and this has a tendency to throw an additional tonnage on the local market.

St. Louis is without question the best coaled city in the country today among the larger cities as far as domestic tonnage is concerned. The figures turned in by the retailers on Aug. 1 have not been totalled, but will show an enormous tonnage of storage coal.

Conditions in the fields seem to run about the same week after week. In the Carterville field cars have been a trifle better this week and a little more domestic tonnage has come through. Labor conditions are still poor and show little improvement.

The Fuel Administration has ordered that the Johnston City Coal Co. and the Searles Coal Co., both of Johnston City, discontinue shipping railroad fuel, and this throws a minimum of about 4,000 tons a week on the market. Other mines have had their railroad tonnage reduced, so that there will be more domestic coal from this field.

In the Duquoin field conditions are much the same as in the Carterville, with the railroads getting considerable tonnage.

The Mt. Olive field is the quiet, easy-going section of southern Illinois, with a supply that takes care of the demand, a fairly good car supply, good movement, and in a general way satisfactory conditions.

The Standard situation is still a problem. Some mines continue to get all the equipment they can handle and others get in only two or three days a week. This is causing considerable unrest among the miners, as they keep moving about from one mine to another.

Screenings are long and the market is not available for the tonnage produced, but if the railroad tonnage is cut down in the Carterville field it will force a greater tonnage from this district, which will take care of the surplus screenings. The market on this coal has been off some, but is commencing to come up to the Government maximum.

Two-inch lump is quoted around $2.45 and $2.50, while egg and nut and other lump sizes go at $2.55. Mine-run is selling at $2.25 and screenings at about $1.70.

There are no Eastern coals and a very large tonnage of Arkansas coming in.

The Government maximum price is, per net ton f.o.b. mines:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.55@2.70	$2.55@2.70	$2.40@2.70
3x6-in. egg	2.55@2.70	2.55@2.70	2.35@2.55
2x3-in. nut	2.55@2.70	2.55@2.70	2.35@2.55
No. 2 nut	2.55@2.70	2.55@2.70	.....
No. 3 nut	2.55@2.70	2.55@2.70	.....
No. 4 nut	2.55@2.70	2.55@2.70	.....
No. 5 nut	2.05@2.20	2.05@2.20	.....
2-in. scrgs	2.05@2.20	2.05@2.20	1.25@1.50
3-in. lump	.....	.....	2.25@2.40
2-in. lump	.....	.....	2.25@2.40
Steam egg	.....	.....	2.25@2.40
Mine run	2.35@2.50	2.35@2.50	1.85@2.00
Washed:			
No. 1	2.75@2.90	2.75@2.90	.....
No. 2	2.75@2.90	2.75@2.90	.....
No. 3	2.55@2.75	2.55@2.75	.....
No. 4	2.55@2.75	2.55@2.75	.....
No. 5	2.05@2.20	2.05@2.20	.....

Williamson and Franklin County rate is $1.10; Duquoin field, $1; Standard and Mt. Olive fields, 95c.

COAL AGE

Volume 14 New York, August 15, 1918 Number 7

Intemperance Hampers Production

By R. Dawson Hall

NO ONE will be disposed to criticize the defense of the mine worker's sobriety recently made by President Hayes, of the United Mine Workers of America. He was probably justified in believing that the worker in the coal mine is no more prone to alcoholism than the men in some other industries. At least, all in the industry desire to believe that this is true.

Nevertheless the chart we publish this week on page 302 shows that every pay day is followed by a period of absenteeism as distressing as it is needless. The chart represents conditions at 6 anthracite collieries and so exhibits the absenteeism of just one-sixtieth part of the whole anthracite region.

It is said that the loss of coal from the man shortage thus caused aggregates 5000 tons a month at the 6 collieries. It would therefore be permissible to figure the loss for the whole anthracite region at 4,000,000 tons a year. Those who have investigated the situation say that the cause of the idleness is the saloon and that the saloon is attracting more men than ever.

On the first day after pay day at the close of last month 240 men were absent from the 6 collieries mentioned and on the day following there were 175 men still absent. Whereas 9300 tons were mined on pay day only 6200 tons were mined on the day following. On one occasion a policeman counted 116 men in the Wilkes-Barre saloons between 8:30 and 11:30 p.m. At one saloon there were 20 men still drinking at 4 a.m.

The conditions shown in the chart exist at mines which are considered leaders in the matter of good management. It is probable that drunkenness is not as rife in these mines as in others, for an attempt has always been made to hire desirable men who were known to work with reasonable steadiness. Just lately, however, managers are hiring all who come without asking questions and there is no attempt to exclude men who are known to be of uncertain habits.

The uncertainty in the daily output naturally ties up many railroad cars. If the operators could know just how many men would work each day, the car supply could be exactly adjusted to needs. As it is, many idle cars have to be carried over whenever men are absent.

If the saloons are to be allowed to ply their trade during the war why not close them between 9 p.m. and 8 a.m.? The mine workers and other workingmen can then get their drink of beer on returning from work, but cannot extend their potations to too late an hour and cannot renew them in the morning before going to their hazardous work. Should this not succeed a more drastic provision could be put into force.

In whatever is done the mine worker should coöperate. The loyal, sober, hard-working patriot predominates in the industry, and he is so strongly opposed to disloyalty, insobriety or slacking that he is sensitive if the charge is wrongly applied to the industry as a whole. Yet he knows well that there are such elements working in the coal mines and with a little urging there is nothing he will not do to root them out.

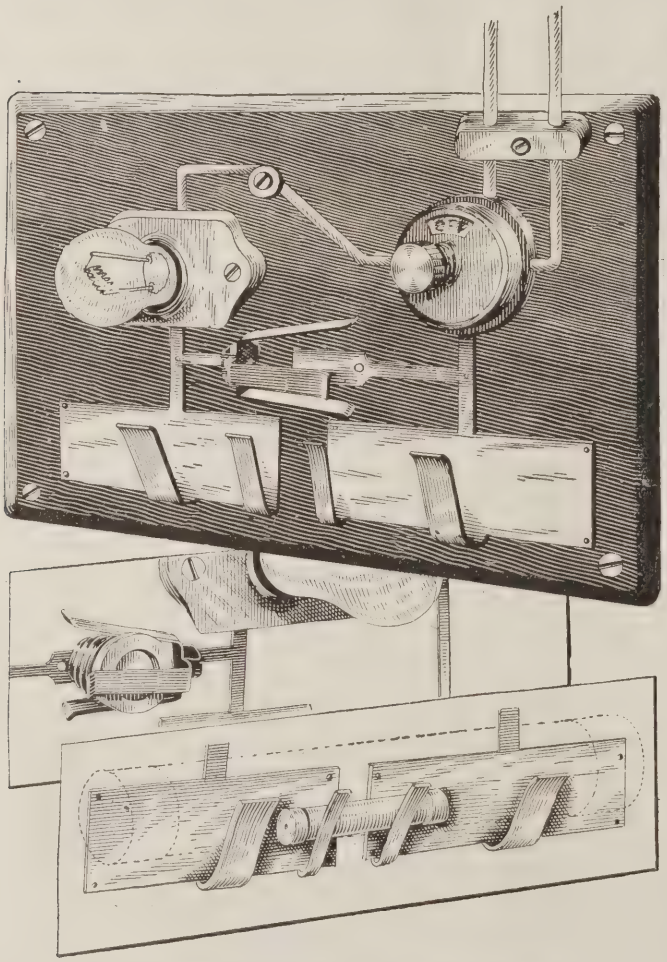
IDEAS AND SUGGESTIONS

A Convenient Fuse Tester

BY L. V. LAUTHER
Guttenberg, N. J

The accompanying illustration shows a device for testing electric fuses. As I had a great many such fuses to test daily I hit upon this scheme to facilitate the work.

The tester, as may be seen, consists of a few properly shaped and formed metal strips and two electrical



THE APPARATUS FOR TESTING FUSES

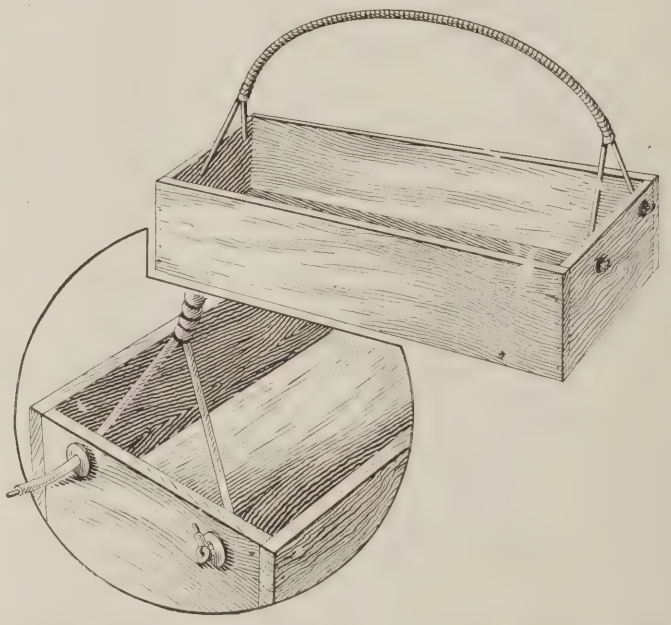
fittings that may be easily procured at almost any mine. The whole apparatus is mounted on a piece of slate that may be sawed from a broken or discarded switchboard. The edges of this piece may be cut away on a bevel if desired.

A single-throw double-pole switch puts current onto the board. If the fuse being tested is in proper shape the light will burn. The illustrations show that a similar arrangement may be employed with equal ease for testing either long or short cartridge fuses as well as those of the socket variety.

Handy Non-Tipping Tool Tray

A common method of making a tool tray or hand tool box is to nail a strap or piece of old belt across the open top of a box. This arrangement is liable to tilt sidewise, allowing the tools to fall out.

The accompanying illustration shows a tool tray of similar character and purpose to the one just described, but so built as to avoid side tipping. The bail, or handle, of this tray is made from a short length of armored two-conductor cable. The armoring is cut away from this cable for a suitable distance at the ends, exposing the two conductors. These are spread apart and each passed through a small hole drilled in



FINISHED TRAY AND DETAILS OF CONSTRUCTION

the end or side of the box. Over the end of the conductor a burr or washer is slipped.

This may either be soldered in the proper position or a knot tied in the conductor resting against the washer. A bail is thus formed that is semi-flexible yet prevents tipping of the box when lifted or held in the hand.

Undercutting or Slotting of Commutators

BY FRANK HUSKINSON
Lafayette, Colo.

It is believed by many that slotting or cutting out the mica between commutator segments is or should be a sure cure for commutator troubles. A few do not believe in undercutting the commutator at all. As a matter of fact, undercutting relieves certain troubles and is to be recommended for all types of mine-loco-

motive armatures. In most cases, also, it is well to undercut the commutators of the motors of mining machines, pumps and stationary motors in general.

Several factors should be taken into account when the undercutting of mica is being considered. The most important of these are the conditions of operation, frequency of inspection and the peripheral speed. Slots that have been undercut are liable to fill up with dust, dirt and oil. This is especially true if the motor is located in a dusty or dirty place. If the machine is of the open type, care should be taken to see that there is no possibility of oil dripping on the commutator; for oil, dust and a few particles of carbon from the brushes and copper from the commutator itself will fill the slots with a conducting composition that will sooner or later cause such trouble as short-circuits between the bars, flash-overs and the like.

A machine that has the commutator undercut should have frequent inspection, as there is a chance of small particles of copper, carbon and other foreign substances lodging between the bars. Such accumulations should be brushed out at frequent intervals.

A low-speed machine with an undercut commutator does not operate with the same degree of safety and satisfaction as a high-speed machine. The machine that operates at a sufficiently high peripheral speed to throw off by centrifugal force any particles of dust or other matter which may enter the slots requires much less attention than the low-speed machine.

The principal reason for slotting a commutator is to relieve it of high micas that have not worn down the same amount as the copper bars. The grade of material that is used in the insulation between the commutator segments is not always uniform. Some of the micas will wear down as fast as the copper bars, but it is a more frequent occurrence to have the copper bars wear down faster than the micas. The result is that the mica insulation between the segments is a trifle higher than the copper segments, and this results in a poor contact between the carbon brushes and the commutator bars. This is in turn intensified by the commutator rotating at a high speed. The high micas tend to impart a vibratory motion to the carbon brushes, thus lessening the contact between them and the commutator. The result is that sparking takes place more or less violently, depending upon the condition of the commutator and the micas.

Too often a case of this kind is aggravated instead of relieved by increasing the tension on the carbon brushes, thus causing a still greater wear on the copper bars and brushes. This also causes increased heating of the commutator. There is only one remedy that will cure this trouble and give permanent satisfaction, and that is to undercut the mica.

With a slotted commutator it is possible to use a soft brush; in fact a softer brush should be used with the undercut commutator than is employed with the commutator that is not undercut.

A slotted commutator permits the use of low-friction, non-abrasive brushes, which increases the life of both commutator and brushes, lowers the heating to a minimum and increases the efficiency of the machine.

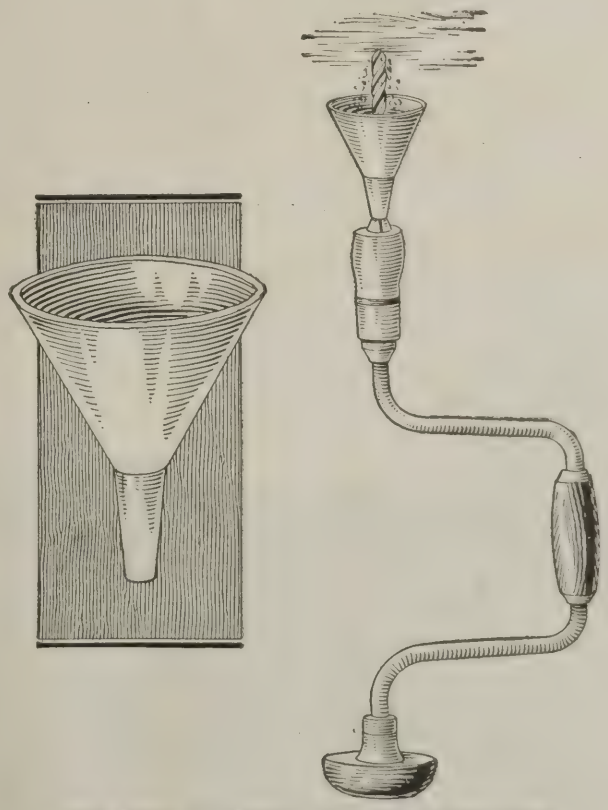
A commutator that has a raw appearance and will not assume the glossy surface it should have normally can be restored to normal and satisfactory condition at once by undercutting the commutator. It will be found that almost any machine, be it motor or generator, will be improved and a higher efficiency will result from having the commutator undercut.

There are several ways and methods of slotting or undercutting the commutator of an armature. A number of devices are on the market that are made to accomplish this result. Some are made to operate while the armature is in a lathe, or other device, and others are used to undercut with the armature in the machine. One means that is in daily use around small plants and shops is a 4- or 6-in. knife-edge file. After a little practice the operator is able to make fairly good progress in undercutting the micas in the commutator with such an instrument. The micas in all cases should be cut out the full width and length of the commutator bar, and the resulting slot carefully cleaned of all burrs and rough edges. It is not necessary that the slotting be very deep, from $\frac{1}{32}$ to $\frac{1}{16}$ in. being generally sufficient.

Grit Guard for Overhead Drillings

By A. Lucas
Chester Park, N. Y.

To protect the eyes of the man drilling and keep the machinery below free from grit when working overhead, I hit upon the guard shown in the accompanying illustration. It is simple and inexpensive. A



THE CHIP CATCHER AND ITS OPERATION

funnel of suitable size is placed over the drill, and all the grit and chips collected in it. After the work is done, this material can be easily removed and the funnel cleaned out.

Become a stockholder in the United States—buy War Savings Stamps.

Business as usual now may mean no business later.

An Electrically Interlocked Car Haul and Car Feeder

By R. P. HINES
Fairmont, W. Va.

SYNOPSIS—*A car feeder within the mine and a car haul leading to the tipple are so connected electrically that the feeder can not be started until the haul is running at normal speed. Both pieces of apparatus may be stopped from various points, and when so stopped cannot be restarted unless the proper switches are reset.*

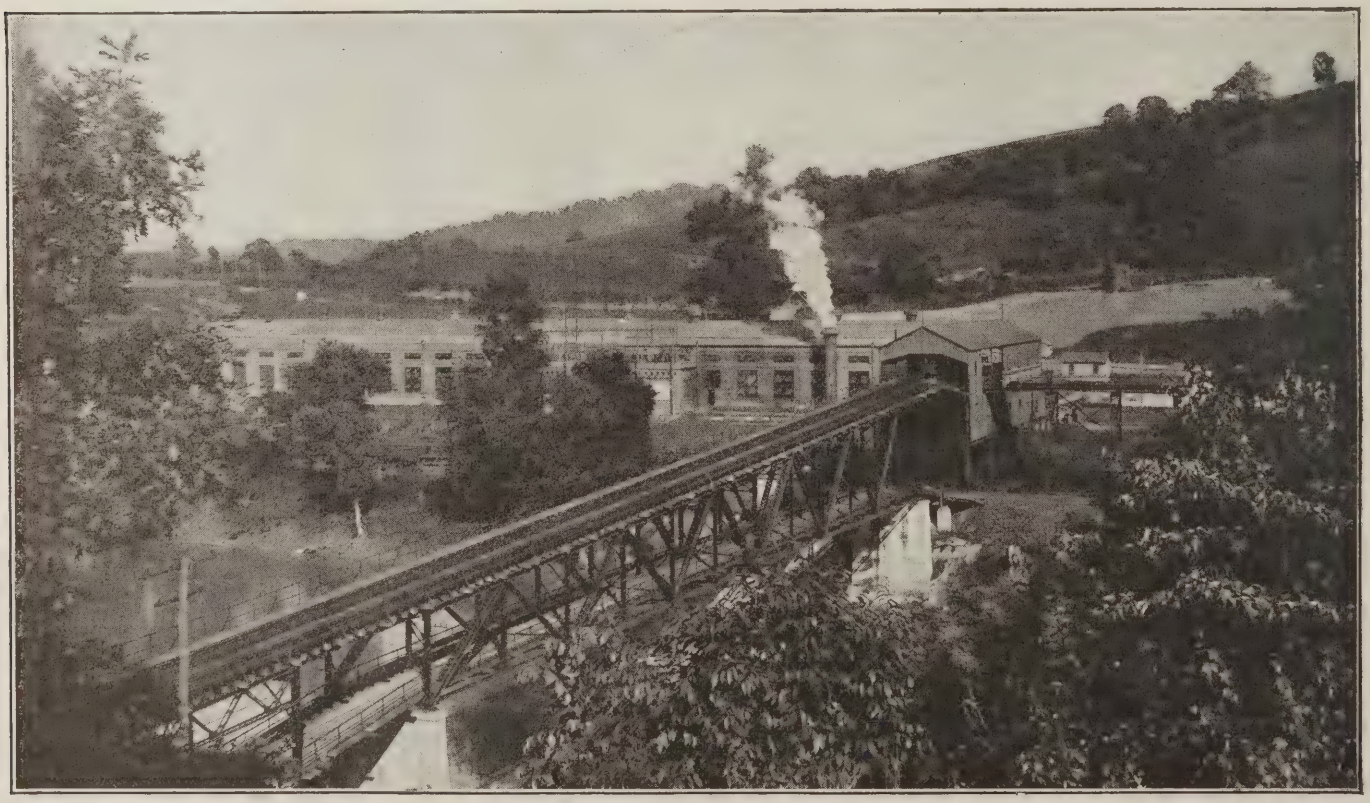
THE two pieces of apparatus which, together with their control, are described in this article are separate and distinct mechanisms. Together, they are used for delivering the loaded coal cars from the bottom of the slope to the dump on the tipple and for returning the empty cars from the tipple to the bottom.

Electric haulage locomotives operating on a 275-volt, direct-current trolley are used to deliver the loaded cars to the bottom and to distribute the empties from this same location. The loaded cars are fed by the car feeder onto the loaded side of the car haul. This pulls them up the slope to the tipple dump and after discharge returns the empties into the mine.

The motor and its starting device for the car feeder are located inside of the mine, approximately 769 ft. from the motor and starting device for the car haul, which are outside, on the tipple. The starters are of the manually operated type and consist of practically standard oil-immersed starting compensators, as it was not deemed advisable in this installation to use the automatic type of starting equipment.

The objects to be attained by the electrical interlock between the two motors and their starting devices were: To render it impossible to start the car feeder, unless the car haul is running and up to speed. To be able to run the car haul without the car feeder being necessarily in operation. To be able to shut down both the car haul and car feeder from any one of several stations; and in the event of the equipment having thus been stopped from any station to make it impossible to again start either or both of the machines, until the switch at the station from which the machinery was stopped has been again placed in its normal operating position. To give an indication to the operator at the car feeder so that in case of a shutdown he can easily determine if it is due to the car feeder; and if so, to make it unlikely that he will attempt to start up until the trouble has been cleared away. In case of a shutdown of the system, due to car-feeder trouble, to make it impossible to start the car haul until the relays on the car-feeder starter are normally reset.

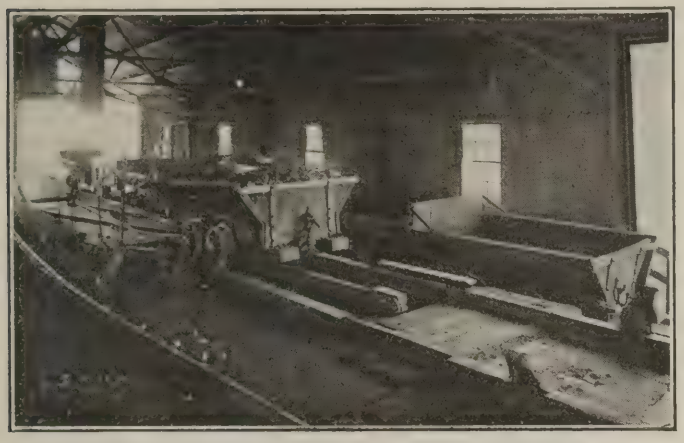
The car haul is of the continuous wire-rope type, dogs being attached to the rope at desired spacing. Guides are provided in which the rollers of the carriages, supporting the rope, run. This rope runs around a master



BRIDGE CARRYING CAR HAUL WITH TIPPLE IN BACKGROUND

wheel on the tipple and a tail pulley at the bottom of the haul, inside the mine. The master wheel on the tipple is driven by a motor through suitable gears and belt connections. The master wheel operates at 2.75 r.p.m. The dogs on the rope, by means of which the cars are attached, are spaced approximately 31 ft. apart. Thus the haul delivers, when operating with each dog carrying a car, 2.75 cars per minute. The cars are provided with a special attachment for engaging the dogs on the rope. The grade up which the haul draws the cars is 25 per cent. for the first 343 ft. at the bottom, and 5.69 per cent. for the balance of 361 ft. to the knuckle, from which the cars run by gravity 65 ft. to the dump.

After a car has been emptied, it is bumped off the dump by the next oncoming car and passes to a kick-back, which delivers it to the empty track of the haul, to be picked up by the rope and returned to the mine. As at present arranged, there are sufficient dogs on the haul to take a maximum of 24 cars on the loaded side and an equal number on the empty side. The descending empty cars aid the motor in pulling up



INTERIOR OF TIPPLE SHOWING CAR DUMP

the loads, so that the minimum load on the motor is with all possible cars on the empty side and no loads coming up. The maximum load is of course with all possible cars coming up on the loaded side and none being returned to the mine on the empty side.

The car-haul motor is a 75-hp., 2200-volt, three-phase, 60-cycle, 900-r.p.m. (synchronous speed), squirrel-cage induction motor, of the regular open type of construction. This motor is connected to the main gears by a Lenix belt drive.

The car feeder inside of the mine operates in much the same manner as the car haul and is designed to handle four cars per minute on a level track onto the car haul. It is gear-driven by a 10-hp., 220-volt, three-phase, 60-cycle, 720-r.p.m. (synchronous speed), squirrel-cage-type open induction motor.

For the control, starting and electrical interlocking arrangement, besides the manually operated motor-starting compensators, there are used two three-pole, oil-immersed, 2200-volt, electrically actuated contactors, two 600-watt, 2200/110-volt potential transformers and two control switches.

The equipment is wired as shown in the accompanying diagram. One of the contactors, called for convenience "the main-line contactor," is connected in the main circuit to the car-haul motor starting com-

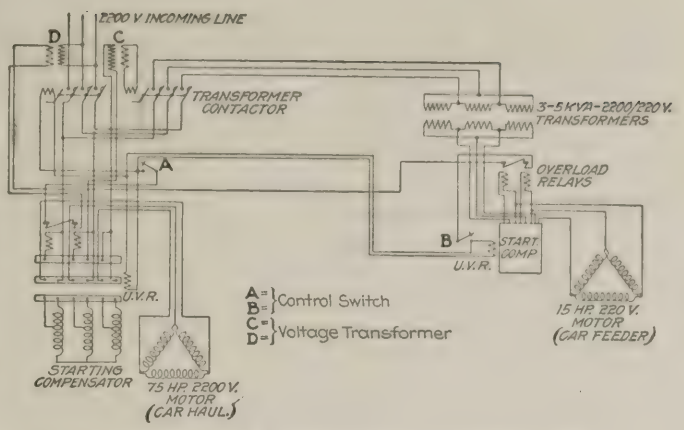


DIAGRAM OF ELECTRICAL CONNECTIONS

pensator. The high-voltage winding of one of the potential transformers is energized from a circuit taken off ahead of the main-line contactor, and from the secondary winding the actuating coil of the main-line contactor and the low-voltage release coils of both starting compensators are energized, there being connected in this control circuit the control switches, like *A* and *B*, for shutting down the system.

The second or transformer contactor has its main contacts connected in the supply circuit to the step-down transformers for the car-feeder motor, located at the pit mouth of the mine, and the actuating coil of this contactor is energized from the low-tension side of a potential transformer whose high-tension winding is connected to the car-haul motor starting compensator so that it is energized only when the starting compensator is thrown to the full running position. This closes the transformer contactor and delivers 2200 volts to the pole-type, step-down transformers for the car-feeder motor, and consequently the proper voltage to the starting compensator for this motor. As is the usual practice the low-voltage release coils of the compensators are wired in series with the contacts of the overload relays on the compensators, which in the compensator for the car-haul motor are self-resetting after opening under overload; but in the compensator for the car-feeder motor these remain open after having been opened by an overload, and have to be manually reset.

Referring to the diagram of connections, the operation of the system is as follows: With the control switches *A*, *B* and *C* closed, the "main-line contactor" will be closed, which will make circuit to the car-haul



VIEW LOOKING ALONG CAR HAUL

motor starting compensator. The car-haul motor is started by means of this compensator, and when this is thrown to the running position the potential transformer *C* will be energized; the secondary of this transformer being connected across the actuating coil of the three-pole "transformer contactor" will instantly close this contactor, supplying 2200 volts to the high-voltage side of the three 15-kw., 2200/220-volt transformers, and thereby a proper low-voltage supply to the 10-hp. car-feeder motor, which can then be started.

As the low-voltage releases of the two starting compensators and the actuating coil of the "main-line contactor" are all energized from the secondary of the potential transformer *D*, it will readily be seen that if any of the control switches such as *A* or *B* are opened, the whole equipment will be shut down. The transformer contactor will also open, as the primary of the potential transformer *C* will be opened when the 75-hp. starting compensator returns to the "off" position.

If one of the control switches such as *A* or *B* is opened, it will be impossible to start this equipment again until the open control switch is reclosed. If any overload relay on either starting compensator opens, the whole equipment will be shut down. This equipment has been in operation for about four years and has proved quite satisfactory in actual service.

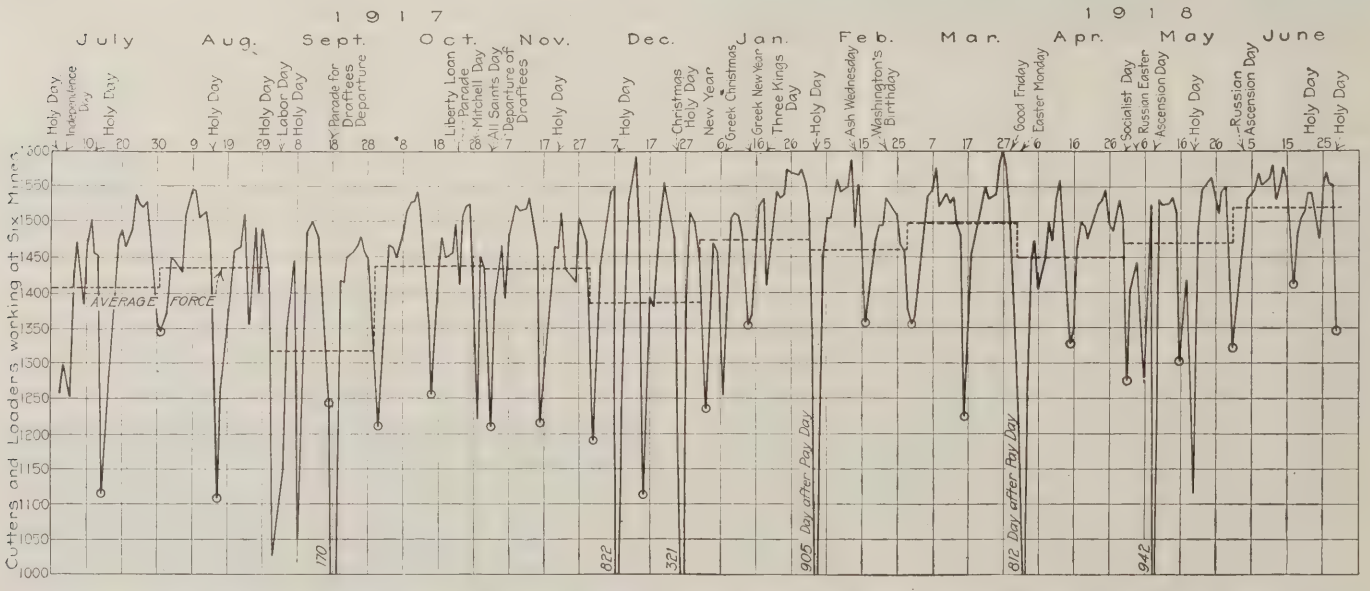
The squirrel-cage type of motor was decided upon because of its ruggedness and serviceability, freedom from moving contacts and ability to operate satisfactorily under adverse conditions of dust, etc., and because it requires practically no attention and is almost "fool-proof." As the tipple is within a few hundred feet of the large central generating station, having approximately 10,000-kv.-a. capacity, and a separate 2200-volt line for its service, the characteristics of the large starting current, etc., of the squirrel cage motor have not proved detrimental.

Tests of momentary starting current with 12 cars on the loaded side, and 6 on the empty side, gave 85.2 amp., the normal full-load current of the motor being 19 amp. With 12 cars on loaded and no cars on the empty side, the running current was 15 amperes.

Intemperate Men Cause Tonnage Loss

THE chart on this page shows the variation in the force of men cutting and loading coal at six mines in the anthracite region. Circles call attention to the number of men reporting on the day after payday. Sometimes, however, the chart cannot record the profundities of low output, and the circle has had to be omitted, a note being substituted.

In the months of July, August and December, 1917, forces of men are always found a few days before the colliery pay. Unquestionably the mines are, even now, not working at full force and the days of carousing which follow pay days and days which commemorate great events in Church history are one cause of the inadequate production. Many people everywhere fail to regard the Fourth of July, Decoration Day, Thanksgiving Day, Lincoln's Birthday and Washington's Birthday as days of solemn commemoration of the nation's holy purpose. And similarly there are very many at the mines who look upon the days which their Church has appointed for certain devout exercises as an opportunity for visiting the saloon and spending the whole day or even more in soul-destroying revelry, contrary to the principles which their Church has always advocated and for which the feasts were instituted.



CURVE SHOWING HOW WORKING FORCE AT SIX ANTHRACITE MINES VARIES OWING TO PAYDAYS AND FESTIVALS

there were three days, each of which followed a pay, on which the force dropped to about 1100 men. This was approximately 500 men short of a normal force, namely 1600 men. Allotting 5 tons to each man, which is considered a fair day's work, there was on each of these days a loss of 2500 tons.

It will be noted that following the pay day of Aug. 31, 1917, the force dropped to 1025 men. The largest

The War and British Coal Supplies

BY MARK MEREDITH
Liverpool, England

SYNOPSIS — *The necessities of war have made it necessary to place the entire coal industry under government regulation. In this work use is constantly made of existing organizations of both miners and operators. Much good has been accomplished and many economies effected through intelligent control of the coal from the mine mouth to the consumer's bin or bunker.*

COAL is a highly necessary munition of war, and the British Board of Trade early recognized its value by controlling it to the fullest possible extent. It was not possible until the early months of this year to collate the information regarding the steps taken by the British government to insure the adequate supply of coal for all purposes, but in an issue of the Board of Trade *Journal* some outline has been given of what has been done.

In the earlier stages of the war a special staff (a section of the Railway Department) had to be set apart for dealing with the question of coal supplies and distribution. Thus there was no sudden change, but a gradual increase in the board's supervision and powers during the early years of the war, until that stage was reached where complete control became, by common consent, essential.

CONGESTION WAS FIRST DIFFICULTY

The first difficulty which arose after the outbreak of war was one of distribution, due to the congestion of the railways. Next came a decrease in production, in consequence chiefly of the enlistment of trained coal miners in the army. The number of miners at work decreased between August, 1914, and June, 1916, by 13.7 per cent., and the loss in efficiency was greater than can be expressed in a numerical percentage. For the departure of trained men, especially those who were young and vigorous, was not compensated for by the influx of other workmen into the coal-mining industry. A third difficulty, which directly led to the taking over of the coal mines, was labor unrest in South Wales.

When the Board of Trade was faced with the problem of distribution, arising out of railway congestion, the Railway Department of the board, in conjunction with the companies (which had been brought under government control as soon as the war began), took such steps as were necessary to expedite supplies to meet local shortages, particularly in the London area.

In the winter of 1914-15, however, it became clear that some more general action was necessary, and pressure was put upon the collieries to secure the continuity of supplies to important consumers. Recognizing that adequate supplies for home consumption was a primary necessity, a coal exports committee was appointed by the board president in May, 1915, to restrict exports, on the recommendation of the retail coal prices committee.

The situation at home was eased by these measures, but the restriction of exports had financial and diplomatic disadvantages, so that it had to be applied cautiously. Since part of the shortage was still local and due to defects in distribution, and in particular in order to insure adequate supplies, it was decided in the second winter of the war to set up distribution committees whose function it was to arrange for the most economical system of distribution.

These district coal and coke supplies committees were appointed in the different colliery districts on the nomination of the local coal owners' associations. A central committee, consisting of representatives of the Board of Trade, the Admiralty, the Home Office, the Ministry of Munitions, the Railway Executive Committee, the coal mining industry, and the coal trade, was also appointed to consider such questions of policy as might arise. This was called the Central Coal and Coke Supplies committee.

NO GENERAL SHORTAGE EXISTED

At first, the committees were upon a voluntary basis, but the inevitable interference with contracts gave rise to legal difficulties and rendered necessary the establishment of the system upon a compulsory basis. The coal output of the kingdom had fallen from 140 million tons for the six months, January to June, 1914, to 128 million tons for the six months, January to June, 1916. The great drop in the output was for the second six months of 1914 (to 123.6 million tons), after which there was a slight but steady advance.

Though there was never during the first two years of the war an actual shortage of coal (taking the country as a whole), the problem of dealing with war and other demands could only be solved by making the best use of the available supply. The industrial demands fell away, while those of the admiralty, of the munition works, and of the allies tended to increase. Half of the French coal fields were, unfortunately, in the possession of the enemy. The first step toward compulsion was taken under the Defense of the Realm Regulations, giving to the government departments concerned power to give directions with a view to securing priority for the delivery of coal and coke. This power was delegated to the joint secretaries of the central coal and coke supplies committee.

Another step toward the assumption of a general control was taken when in July, 1915, the Price of Coal (Limitation) Act was passed. This act resulted from the investigations of a committee, appointed by the president of the Board of Trade on Feb. 25, 1915, to inquire into the retail prices of house coal. The Price of Coal (Limitation) Act prescribed that the price of coal at the pit's mouth must not exceed by more than 4s. ($1) per ton (or such other amount as the Board of Trade might order) the price of the same description of coal sold in similar quantities under similar conditions at the corresponding date during the twelve months ended June 30, 1914.

Voluntary arrangements were made with the London

coal merchants for limiting the retail prices of house coal, and it was suggested to local authorities throughout the country that they might make similar voluntary arrangements with the coal merchants in their districts. The measures, enumerated above, were largely of a voluntary character, and though they met with considerable success, it eventually became clear that a comprehensive scheme for the control of the country's coal supplies was demanded in the national interests.

In February, 1915, the Home Office appointed a coal-mining organization committee, consisting of representatives of coal owners and miners, "to inquire into the conditions prevailing in the coal-mining industry with a view to promoting such organization of work and such coöperation between employers and workmen as, having regard to the large numbers of miners who are enlisting for naval and military service, will secure the necessary production of coal during the war." This committee, which is now merged in the coal controller's department, did much useful work and formed the nucleus of the advisory board of coal owners' and miners' representatives which now assists the controller.

In order, further, to provide for coördination between the committees set up by the Board of Trade and Home Office which were dealing with coal problems, Lord Milner acted for some months before September, 1916, as government supervisor of the supply and distribution of coal. He was chairman of a select committee of four members, of which the other three were the chairman of the coal-mining organization committee, the coal export committee, and the central coal and coke supplies committee. The coal exports committee still remains in being.

Mines Might Be Seized

Labor discontent in South Wales brought matters to a head, and on Nov. 29, 1916, a regulation was made under the Defense of the Realm Act giving to the Board of Trade power to take possession of any coal mines where it appeared to it expedient. The owner of any mine taken over under the regulation is bound to "comply with the directions of the Board of Trade as to the management and use of the mine," but the liability of colliery officials under the Coal Mines Acts are not affected.

Within three months from the taking over of the South Wales coal field all the mines in the kingdom came under control, and the coal mines department had been established by the president of the Board of Trade. On Feb. 22, 1917, an order was issued by the board taking possession of all coal mines as from Mar. 1, and Guy Calthrop, the general manager of the London & North Western Ry., was designated controller of coal mines. An advisory board, consisting of representatives of the coal owners and coal miners, was appointed to assist him. The central coal and coke supplies committee ceased to exist, but the local committees were retained in being, and the scope of their activities has been considerably extended.

The powers given to the coal controller's department are quite comprehensive. The Board of Trade was given authority to take possession of any coal mines and of land for colliery transport purposes, and to exercise powers similar to those of the food controller's with respect to any necessary article of commerce (other than food), and including horses and horse-drawn vehicles. The powers comprise, for example, the regulation of the "production, manufacture, treatment, use, consumption, storage, distribution, supply," etc., of any article, the fixing of maximum or minimum prices, the issue of orders requiring returns as to stocks, authority to requisition stocks, and so on. These wide powers may be exercised either generally or in specific cases. The controller of coal mines has therefore full power to control the production, distribution, prices and consumption of coal, in so far as he may consider necessary.

An agreement between the controller and the mining association, with respect to the compensation to be paid to coal owners in full satisfaction of all claims arising out of control, was signed on July 20, 1917. Under this agreement the owners surrender 95 per cent. of any profits in excess of the "profits standard" (that is, the average profits of the best two out of the three years before the war, or the best four out of six), the controller receiving what is not payable for excess profits duty. The controller, on the other hand, guarantees the pre-war profits standard subject to a reduction where the output is reduced. There is also a limitation of retainable excess profits to one-fifth of the profits standard.

Where the controller closes a mine, the cost of maintaining and reinstating it does not fall on the state, but may (on the application of district associations) be met by a levy on the districts in which it is situated. Provisions are included for fixing substitutes for the profits standard in case of hardship. This agreement received royal assent as the Coal Mines Control Agreement (Confirmation) Act.

The objects that the controller set himself to accomplish were as follows: To control the whole production and distribution of coal in the national interest and to remove the chief cause of labor unrest by making it possible for the men to feel that they were working for the community, and not in order to earn excessive profits for the coal owners.

Existing Organizations Utilized

From the first it has been the controller's desire to make the fullest use of the existing machinery of the coal-owners' and of the miners' organizations. With this object in view, an advisory board was set up with which he would be kept in constant touch, and by whose experience and technical knowledge he could be assisted. The board consists of seven representatives of coal owners and seven officials of the miners' federation.

This advisory board meets about twice each month and has considered such important questions as recruiting, labor disputes, miners' holidays, mobility (the transfer of men from one district to another), short time and absenteeism, the settlement of price lists, and the supply of pitwood. The assistance of the advisory board has been of the greatest value, and has enabled the controller rapidly to explore the problems which constantly arise upon his horizon.

One of the chief objects of control was to maintain the output of coal, and the postponement of development work was recommended by the coal-mining organization committee in its first report as one means of keeping production at the maximum. It is an essential feature

of the system of control that the actual management of the mines should remain as far as possible in the hands of the owners, but considerations of man-power and the shortage of materials render some regulation unavoidable. Both material and labor must be put to the most productive use, and be kept for those classes of coal which were most in demand. New sinkings are rarely permitted. The employment of a staff of district inspectors has been sanctioned by the treasury, and these officers report on the necessity of proposed works, and on the relative urgency of demands for materials.

Experience since the coal mines were taken over justifies the assertion that the miners now realize that they are working for their country, rather than for the private profit of their employers. There has been a marked decrease in industrial unrest, and a greater willingness to regard work in the mines as war-service of the first importance. The chief labor event since the control was established was the demand of the miners' federations for a 25 per cent. increase in wages to meet the increased cost of living.

This demand was presented on Aug. 28, 1917. As the result of subsequent negotiations the miners finally accepted increases of 9s. ($2.25), and 4s.6d. ($1.12) in the case of boys, a week—that is, 1s.6d. (37c.) a day for each day on which a man works or is ready and able to work, and 9d. (18c.) a day for boys under 16 years old. A feature of the arrangement is that the increase of 1s.6d. (or 9d.) a day is paid even when the pit is idle for lack of orders; for example, in the exporting districts—and this is done in order to give some relief to men in the export districts who are suffering from irregular working of the mines, as the result of shipping losses. Such irregularity is no fault of theirs or of the coal owners.

By the foregoing arrangement with the miners, the controller was able to convert a demand for a percentage increase into the concession of a flat rate. An advance on a percentage basis would have chiefly benefited men who were getting regular work, and who were previously earning the highest wages. The settlement has been extended by the Ministry of Munitions to workers in many cognate industries. The "war wage," as it is called, dates back to Sept. 17, 1917. An inevitable consequence has been an increase in the pithead prices of coal of 2s.6d. (62c.) a ton.

Disputes Are Reported

While the policy of the department is to insist upon the use of local machinery of owners' and miners' associations for the settlement of disputes, a close watch at headquarters is kept upon them. All disputes which may involve a stoppage of work are reported at once to the controller. His friendly offices are always at the disposal of the parties, either personally in London, or locally through members of his staff.

The controller of coal mines inherited from the Home Office the functions of that department regarding the recruitment of miners, with the exception of the supervision of the colliery recruiting courts. The central court sits at the coal mines department and one of the staff acts as its secretary. These functions have now been transferred by the war cabinet to the Ministry of National Service, while the controller continues to act in an advisory capacity.

One of the most difficult problems before the controller has arisen from the diminished supply of ships in certain export districts (East Fifeshire, the Lothians, Northumberland, Durham and portions of the South Wales field). It is not possible to keep the pits in these districts regularly working and the men constantly employed, although in most other coalfields, and in many other industries of national importance, there is an acute shortage of labor.

The problem has been to make labor more mobile and to effect the necessary transference. Various measures are being taken to solve the difficulties which have arisen. For example, by arrangement with the railway executive committee, a train service was put on to enable miners who live in the east of Fifeshire (where short-time operations have been serious) to go to the western districts of that county where the pits are working better. Special commissions of inquiry (of which the local miners' leaders are members) investigate the short time worked in some districts, and make suggestions for an improvement.

Mobility Bureaus Are Established

In order to deal with the whole question systematically the controller placed before the miners' federation of Great Britain a proposal for the establishment of mobility bureaus, to be managed by the miners' federation and their district associations. The purpose of the bureau was to transfer coal miners from operations that were not working full time, to other coal, fireclay or ganister mines where their labor was required. The federation has accepted the proposal and district mobility bureaus are being set up. The controller is also collaborating with other departments (such as the Ministries of Munitions and of National Service) in order to transfer surplus mining labor into other occupations, such as timber-felling, iron-stone and iron-ore mining, the shipyards, etc.

The broad results of the measures which have been taken by the Board of Trade may be shown by the figures of coal outputs since the war began. They are given below in millions of tons for six-month periods during the four years 1914, 1915, 1916 and 1917:

	Million Tons		Million Tons
January to June, 1914.....	140.0	January to June, 1916.....	128.3
July to December, 1914....	125.6	July to December, 1916....	128.1
January to June, 1915.....	127.6	January to June, 1917.....	126.4
July to December, 1915....	126.6	July to December, 1917....	121.3

It is remarkable when all the difficulties are considered that have arisen through the long duration of the war and the calls upon the national man-power, that the output of the British coal mines during the last year amounted to 247.7 million tons, or only 8.7 million tons (3.4 per cent.) less than during 1916. It was not until the second half of 1917 that the output fell below that for the second half of 1914.

It will be seen from the foregoing figures of output that there has never been a shortage of coal in the sense that there has been a shortage of petrol (gasoline). All the coal used in Great Britain is there produced; while, with the exception of the comparatively small production from Scottish shale, we import all our petrol supplies.

The coal problem has, throughout, been primarily one of labor and distribution. The government control of the collieries, through the Department of Coal Mines,

has facilitated the apportionment of supplies of fuel to industrial consumers of national importance, particularly in those cases in which it has been necessary to provide supplies of special qualities or grades of coal by diversion from consumers of less importance.

To effect economies in railway transport, a redistribution scheme was worked out with the object of maintaining the consumption of coal as near as possible to the point of production. The necessary powers were provided by the coal-transport order of 1917 (made by the Board of Trade under the Defense of the Realm Regulations on July 4, 1917) and by the direction of the controller of coal mines which were issued under this order. The country was divided into areas, the interchange of coal between producing areas was restricted, and consuming districts were allotted specific sources of supply.

The redistribution scheme came into operation on Sept. 19, and the estimated saving in railway haulage alone—apart from other economies in railway operation—is 700 million ton-miles annually. The controller is now taking up the question of unnecessary transport within the areas. Canal transport for coal is made use of wherever practicable. The department has been able to accumulate technical records of all industrial processes, and its staff is assisted by representatives throughout the country. Firms are visited and reports submitted upon any difficulty which arises out of the allocation of supplies.

The Regulation of Household Consumption

When it was decided in August, 1917, to control household consumption of coal in the London area, steps were taken to register all coal merchants, to set up local organizations for watching the interests of consumers, and to devise a scale of allowances which would be equitable as between the different classes of users. All persons engaged in the distribution of coal were recorded and arrangements made to keep each one under review, so as to insure that he continued effectively to carry on his trade.

A census of men and horses was undertaken in order to protect the facilities for distribution and, if possible, to augment them. The coöperation of the food production department of the Board of Agriculture was secured in regard to horses. A local organization for watching the interests of consumers was set up by the appointment of local coal overseers by the local authorities in each district. With a view to assisting the local coal overseers, a coal merchant, known as the coal merchants' supervisor, was appointed in each district as well. This organization, which involves the coöperation of representatives of both merchants and consumers, enables local troubles to be settled at the source.

In order that an equitable distribution of coal might be secured, allowances were fixed in respect to houses of different sizes, and arrangements made to assess exceptional buildings and premises. Forms for requisition were issued for the purpose early in September, and the machinery has worked smoothly and satisfactorily.

The object of the scheme of allowance was to reduce the extravagant consumption of coal by the wealthy classes, to do away with the use of coal in unnecessary buildings, and thus to insure that a supply should be available for the poorer people. At the same time it was sought to diminish the total demand for coal. A reduction in the amount burned was made urgent by the difficulties of labor and transport.

A special section of this branch of the control system has been set up to review the facilities for selling coal in small quantities. Stocks were provided in difficult areas under the control of the local authorities, and every encouragement was given to the small dealers and retailers to continue in business. The demands of the war have encroached severely upon this unorganized body of distributors, many of whom carried on one-man businesses. It was by no means easy to organize those who still remained and to supplement their effectiveness from other sources.

Local house-coal distribution committees have been appointed in towns with a population of 20,000 or over, and emergency stocks of coal are being accumulated in these municipalities under the direct control of the local authorities. Smaller towns have been invited to combine their urban and rural districts to form committees on similar lines; and, as in the case of the larger towns, the controller's representatives visit the committees in an advisory capacity.

The prices of coal at the pit's mouth were fixed by the Price of Coal (Limitation) Act, passed in July, 1915. Under the régime of the controller of coal mines the regulation of prices was extended to cover both wholesale merchants' charges and retail prices. Powers were conferred by the wholesale-coal-prices order and the retail-coal-prices order made by the Board of Trade on Sept. 5 and 11 respectively. The function of fixing in each locality the maximum retail prices of house coal which would comply with the requirements of the retail-coal-prices order was assigned to local authorities throughout the United Kingdom.

Exports Decreased

The effect of the shortage of shipping resulting from the operations of enemy submarines was felt in the early part of 1917 in the form of a considerable reduction in the quantity of coal exported, and a serious decline in export prices. In order to deal with the proposition of prices, a code of directions as to the sale of coal was issued by the controller of coal mines on June 28, 1917, embodying a schedule of prices for coal sold for export or bunkering. The scheduled prices operate as fixed prices in the case of shipments to France and Italy.

The much-reduced imports of pitwood made difficult the provision of adequate supplies of props, without which coal mining could not go on. At first the controller made use of the personnel of the old pit timber committees throughout the country which had been set up by the Home Office, and which were worked under a joint committee of members of the coal-mining organization committee of the Board of Agriculture with a representative of the Board of Trade. He also appointed eight district pitwood committees throughout the country, the chairman in each case being one of H. M. inspectors of mines, with an officer paid by the controller to act as the chairman and technical assistant.

The first duty of these committees was to perfect

the formation of district pitwood associations, and seven associations have been formed to develop the supply of home-grown timber, which became necessary as the result of the curtailment of the importation of pitwood by the war cabinet. The great majority of the collieries are readily joining these pitwood associations, and colliery owners who show reluctance are being strongly pressed to join.

In July the controller of timber supplies offered to take over from the controller of coal mines the duty of supplying the collieries with pitwood and other necessary timber together with the supervision of the district pitwood committees. This offer was accepted, and the controller of timber supplies is now responsible for the work. The functions of the controller of coal mines respecting pitwood have been confined, since then, mainly to watching the activities of the district pitwood committees, encouraging the formation of pitwood associations, and dealing with applications from colliery companies for permits to purchase soft imported wood.

On Dec. 19 the controller of coal mines (acting after consultation with the controller of timber supplies) issued detailed instructions regarding stocks, prices and contracts for pitwood and other mining timber. Stocks were limited to twelve months' future consumption. This was done because some collieries had stocks much exceeding their requirements for such a period, while others had nothing like that quantity. The maximum prices which collieries were permitted to pay were fixed in accordance with the various classes of timber and the position of the coal fields. Certain existing contracts for pitwood were ordered to be submitted to the controller for direction and advice as to revision.

Results Obtained Justify Control

It may be said that the policy of taking over the coal mines, and of controlling the distribution and prices of coal, has been justified by its results. In 1913 there were 1,110,884 men employed in and about British coal mines, and of this number 316,000 have joined the army. Other labor has been drafted in, so that the employees during 1917 numbered approximately 987,000, a reduction of only 133,000 men. Still, the loss of the young, vigorous and trained miners was severly felt, and it is a matter for satisfaction that the output for coal during the years 1915, 1916 and 1917 should have been so well maintained.

The present output is naturally a good deal less than it was before the war—this was inevitable—but, after taking account of the big reduction in coal for export, it may be said that the amount available for inland consumption, the admiralty, and for ships' bunkers, is almost as large now as it was in 1913. The admiralty's requirements, of course, expanded enormously, and the supplies available for inland consumers (other than direct war industries) have had to be cut down and the strictest economy insisted upon.

Everything possible is being done to secure economy. Electric supply undertakings have been urged to interconnect wherever this can be done at a small expenditure of materials and labor; representations have been made to the Home Office in order to secure lighting restrictions and the early closing of shops; and the need for economy has been brought prominently before the public by appeals to both industrial and domestic consumers. The London district has been definitely rationed. The whole country will undoubtedly be rationed before the close of 1918.

The net result is shown in the following table, which gives the comparative figures of coal production and consumption for the years 1913, 1916 and 1917:

	1913 Million Tons	1916 Million Tons	1917 (Partly Estimated) Million Tons
Coal output	287	256	247 5
Export	77	42	38
Balance available for inland, admiralty and bunkers	210	214	207
Stocks at pithead on hand at close of year	2	2	4 5

It will be seen that the coal available for inland, admiralty and bunkers shows only a slight falling off as compared with the pre-war year 1913, while stocks on hand at the end of the last year show an increase. This increase, is however, largely made up of small coal, which cannot now be exported.

The exports have fallen off largely in 1917, owing to the shortage of shipping, and the decrease in exports at the end of 1917 as compared with the end of 1916 was approximately 3,000,000 tons per annum.

Ohio Production in 1917

The Industrial Commission of Ohio, Department of Investigation and Statistics, Columbus, Ohio, has tabulated the coal production for the year ending Dec. 31, 1917, and has classified the data according to method of production by counties, as follows:

County	Tons — Pick-Mined	Machine-Mined	Stripped	Total
Athens	356,973	5,956,446	200	6,313,619
Belmont	516,709	10,639,917	.....	11,156,626
Carroll	165,228	320,508	1,356	487,092
Columbiana	108,969	507,615	341	616,925
Coshocton	208,174	163,611	....	371,785
Gallia	24,964	3,306	.....	28,270
Guernsey	69,847	3,938,967	15,451	4,024,265
Harrison	58,369	877,205	286,987	1,222,561
Hocking	238,668	1,973,190	.....	2,211,858
Holmes	20,144	.....	...	20,144
Jackson	655,968	358,824	1,457	1,016,249
Jefferson	240,914	4,733,481	767,845	5,742,240
Lawrence	241,333	.....	.....	241,333
Mahoning	33,895	16,642	.....	50,537
Medina	10,088	.....	.....	10,088
Meigs	160,129	1,107,015	.....	1,267,144
Monroe	682	.....	.....	682
Morgan	1,160	324,848	...	326,008
Muskingum	195,990	345,171	100	541,261
Noble	8,822	999,697	.....	918,519
Perry	351,491	1,987,533	103,090	2,445,114
Portage	45,082	47,357	.....	92,439
Scioto	2,608	.....	.....	2,608
Stark	314,231	152,001	4,802	471,034
Summit	29,680	.....	.....	29,680
Trumbull	1,266	.....	.....	1,266
Tuscarawas	586,988	1,157,474	44,338	1,788,800
Vinton	62,872	150,068	.....	212,940
Washington	1,137	.....	.....	1,137
Wayne	13,072	52,690	.....	65,762
Total	4,728,453	35,723,566	1,225,967	41,677,986



MOVIE, BARBER SHOP AND COMMISSARY OF THE SOUTHERN MINING CO., BALKAN, KENTUCKY



GENERAL VIEW OF CARBONADO

Coal Mining in Carbonado, Washington*

By F. G. JARRETT
Superintendent of Mines, Eska Creek, Alaska.

SYNOPSIS — *The mines here described lie in an extremely rough country, and many difficulties not found in level mining are encountered. Longwall is worked in a steeply pitching bed, the coal being sent down a chute to the gangway. The inclination of the bed facilitates ascensional ventilation. A peculiar "gas belt" is also encountered in one mine.*

THE mining town of Carbonado, owned by the Carbon Hill Coal Co., is situated in Pierce County, Washington, on a branch of the Northern Pacific Ry., and is one of the oldest mining towns in the state. Owing to the immense area of coal available and the progressive methods being adopted by the present management, the town will be on the list of big producers when many other mining camps now operating are forgotten.

Many difficulties are encountered here that are of special interest to the mining student. Fortunately, most of these can be overcome with the aid of capital and engineering skill. The Carbon River cuts diagonally across the coal beds, to a depth of approximately 400 ft. along the line of a large fault separating the southern portion of the formation from the folded part on the north. This exposes numerous beds of high-grade bituminous coal.

The strike of the beds on the south side of the river is fairly uniform and nearly north and south; the dip varying from 10 to 80 deg. Due to the depth of the narrow canyon resulting from the action of the river, the company was confronted with a problem in outside transportation. The main difficulty lay in the scarcity of available room for yards, tracks and plants. Finally, the cleaning plant and coke ovens were built about one mile down the river on the first piece of ground available to which the Northern Pacific R.R. connected by means of a spur track. To reach the cleaning plant, the coal is conveyed from the several mine mouths by small steam locomotives hauling from 60 to 80 tons per trip.

This particular mile of track has cost the company considerable money and worry in building and maintenance, because of the loose character of the hillsides, which necessitated the building and driving of tunnels and the placing of cribbing and sheds, to prevent land slides. In this connection boilers, hoisting engines and tracks have more than once been retrieved from the river bottom. On the other hand, these difficulties are somewhat offset by the amount of available coal to be won by drifting in at water level.

Most of the operations have been confined to water-level mining, although a few slopes have been sunk on the different beds. Some of these have been abandoned. On the southwest side of the river a slope has been sunk nearly 2000 ft. on the Wingate bed. Higher up the river, on the same side, a new slope 8 x 16 ft. in the clear has been sunk 1200 ft. on the No. 10 seam, with the intention of tapping five or more beds by means of rock tunnels. The coal from these seams will be hauled by storage-battery locomotives and delivered to bunkers at the slope on each level. A 750-hp. electric hoist has been installed for hoisting purposes, using two 10-ton skips on a 60-lb. double standard-gage track.

For ventilating purposes, the company is using a Sirocco fan, with 200,000 cu.ft. capacity. Both the hoist and fan are installed in chambers hewn out of the solid rock, in order to effectually protect them from slides.

*Paper read at Puget Sound meeting of the American Institute of Mining Engineers.

All the water will be drained to the main pumping station at the lower level, where two centrifugal pumps and one Aldrich quintuplex pump will discharge it to the surface.

The fundamental principle embraced in this mine is the consolidation of several units by centralizing the operations, thereby eliminating or reducing the overhead expenses of hauling, pumping and ventilation. Another feature used in conjunction with this system is the driving of all gangways in rock (foot-wall), connecting the rock chutes to the coal bed above every 20 or 50 ft., as the conditions may require. Some of the advantages to be derived by driving rock gangways are as follows:

First, a saving of coal is secured as well as an increased output by working several levels simultaneously, if desired. Under the old system gangways, on pitching seams, were invariably driven in the coal, making it impracticable to work the lower levels until the upper ones were worked out. If it became necessary to commence on the lower levels before the upper levels were finished, a barrier pillar had to be left in to protect the upper gangway. As will be evident, this usually ended in the loss of the barrier pillar, and, in many instances, the gangway also, due to robbing too close to this roadway, not forgetting poor Jim, or some other good official, who "got it in the neck" through following instructions for more coal.

The miner is exceptionally rare who can not cite cases of lost coal, due to the difficulty in keeping open the gangways. Neglecting the future is a common error in the history of coal mining. This mistake is often attributed to the shareholders in their undue haste to participate in dividends as soon as they are able to dump into the railway car.

A vast difference exists between mining methods in the West and those followed in other countries. When a mine is opened in Europe the owners endeavor to extract all the mineral possible. In the West the custom is to abandon a mine when a little difficulty is encountered or when the profits run low, and open another one, leaving behind, in many cases, considerably more coal than has been extracted. Our motto is: "A new mine every 20 years; a new boss every two years." Rock gangways will put a check on this waste by providing an outlet which, under proper management, should extract every ounce of coal in the lifts, at the same time allowing the management to work two or more levels simultaneously.

The second advantage is that of ascensional ventilation. Upon the completion of the upper working the lower lift is advanced under other methods up to this abandoned gangway, which is usually caved tight. Then comes an increased cost in addition to inefficient ventilation. The chief feature in the ventilation of inclined beds is to so arrange the air current that the circulation will be ascensional, more especially in seams generating marsh gas. The reason is obvious. Marsh gas (CH_4) being lighter than air has a natural tendency to rise. Ascensional ventilation is impossible with the top gangway caved.

Third, with the upper gangways caved, the mine workers always feel the dread of being entrapped in the event of anything happening in the working gangway.

Fourth, timber distribution is much easier. With



AFTER A LANDSLIDE THAT CARRIED BOILER HOUSE AND BOILERS INTO THE CARBON RIVER

the upper gangway open, the foreman can distribute the timber to the workings below much more cheaply and effectively than by hauling it up the pitch, in the event of the upper gangway being closed.

Fifth, the cost of re-timbering is reduced. The common method is to extract the pillars when the breast, or chutes, have reached the upper gangway. Insufficient coal is often left to protect the working gangway. This results in the timbers being crushed and the commencement of a cost which never ends, until, in disgust, the gangway, together with thousands of tons of good coal, is abandoned. Invariably this performance is repeated at the next level.

With rock gangways, this cost and loss of coal, if not entirely eliminated, is reduced to a minimum. The initial cost of driving the gangways in rock is generally higher than in coal, but this is soon offset by the many advantages just mentioned.

Owing to the many beds in Carbonado the mining methods employed vary in accordance with the character of the bed, the overlying and the underlying strata, and the inclination of the seam. Probably the most interesting system employed is the 4-ft. Miller seam worked longwall, on a pitch of approximately 40 deg. Successful longwall mining requires a roof of a yielding nature that will settle uniformly. If this condition exists in a pitching bed, ideal ventilation and complete extraction of the coal are assured.

As compared with flat longwall, the pitching beds possess the advantages of requiring less retimbering, no old workings to keep open, no brushing of roadways, no cogs or packs to build, and ideal ventilation. The disadvantages are the possibility of congestion, considering that the coal must be delivered down the main chute, and the possibility of neglecting to keep the wall at a sufficient angle to prevent the break from closing the entire face.

In former years the company operating at Carbonado had endeavored, unsuccessfully, to work this mine on the chute and breast-and-pillar system. Because of the soft swelling nature of the roof, it was found impossible to keep the workings open. Finally, it was decided to abandon them. Eventually another attempt was made, this time on the longwall system. Success attended these efforts and proved that coal beds, like human beings, had their peculiarities, which required different methods in handling.

As in the other beds, rock tunnels are driven in the foot wall and are really more essential to the success of this method than in chute and pillar workings. The gangway is kept in advance of the wall and connected by rock chutes, every 25 ft., to the counter above. The intervening strata being strong sandrock 12 to 15 ft. thick proves effective in protecting the gangway. Immediately above the counter gangway angle chutes are driven into the open wall above. This lift is usually 500 ft. in length with the line of wall face making an angle of approximately 45 deg. across the pitch. This gives a working face of approximately 700 ft. and an output of between 400 and 500 tons.

The face is worked in steps, of 6 ft. each, and generally spaced 25 to 30 ft. apart. In addition to each miner being protected from the falling coal in the skip or step above, the angle of the face prevents the break from closing the wall during the caving process. Owing to the exceptionally soft nature of the roof, sets are placed every 4 to 5 ft. apart, with three to four laggings covering the set. Each miner puts up on the average two sets per shift.



THREE VIEWS SHOWING THE ROUGH NATURE OF THE COUNTRY

Every week end the main sheet-iron chute is advanced close to the face, and the timber in the waste knocked or shot out, causing the roof to cave. At each skip two iron sheets are laid to conduct the miner's coal to the main chute.

Timber distribution is extremely simple with this class of work, the timber being brought down every night and placed close to each miner's skip. In the event of a shut-down, as the result of a strike or other cause, it is necessary to place cogs at the corner of each skip, also at the bottom of the wall close to the angle chute; the next step is to remove the sheet iron and cave the roof in the waste close up to the cogs. The wall then will remain open with little attention.

One other bed is perhaps worthy of mention. This

is the Wingate seam, which has been the subject of much discussion among mining men. This measure averages approximately 5 ft. 6 in. in thickness on a pitch, varying on the lower levels from 10 to 35 deg., and is worked on the breast-and-pillar system. The first three levels have been partly worked out and the present operations are on the fourth and fifth levels. On account of the slight grade, water is used to wash the coal down the sheet-iron chutes to the gangway.

Since this coal is of a friable nature, with a tendency to create considerable dust of a dangerous character, the water system serves two purposes—that of keeping down the dust and at the same time causing a great saving in tracks and ropes which otherwise would have to be employed to convey the coal from the working face to the gangway. From a dam in the upper levels water is conveyed by a 6-in. pipe to the working gangway. Connections are made here and the water conducted by 1½-in. pipes up to the face of each breast or pillar, where a tap is placed and a piece of hose is attached, enabling the miner to turn the stream of water in all directions. Water sprays are also placed at each crosscut nearest to the face on the intake side, facing the air current to effectually saturate the dust-laden atmosphere, thereby reducing the danger of a dust explosion to the minimum.

In the past this mine experienced considerable trouble with what the miners call "bumps," killing a few men and injuring many others. In addition to the injuries to the men, the mine in and around the vicinity of the bumps, sometimes for a considerable distance, was badly wrecked. Without the slightest warning, timber, coal and sheet iron flew in all directions, killing or maiming the miners close by. Cogs placed on opposite sides of 20-ft. breasts were discovered locked together in the center as if there had been a head-on collision; 20-ft. breasts were filled tight with coal from the opposite ribs; pillars were scattered; crosscuts closed—everywhere a mass of wreckage which often defied the fireboss in his efforts to locate himself.

These bumps, while violent, are not so extensive; that is to say, they do not cover such a large area as



A VIEW IN ONE OF THE PITCHING COAL BEDS



FOLDS AND FAULTS IN THE NORTHERN PORTION OF THE PROPERTY

do the bumps in the Crowsnest Pass. The primary causes of these bumps are undoubtedly common to both localities for, if we had no cover, we would have no bumps. The action of the bumps in the two regions, however, are entirely different.

Mining experience has been dearly bought, but, owing to changes in the methods of working at Carbonado, it is gratifying to believe the danger referred to above is eliminated, since there has been no recurrence of these disasters for several months.

Among the other troubles in connection with the working of this mine is the gas belt. Occluded gases, under heavy pressure, have been encountered in the upper levels, necessitating the stopping of the levels when the gas belt is reached. It is claimed by the older workmen that a hard formation of coal on the outside of this gas belt is encountered. Immediately this hard section is pierced the coal changes in character and blowouts of gases occur, filling the gangway for a distance of 2000 to 3000 feet.

When we stop to consider that occluded gases exist under pressure that is proportionate to the weight of the overlying strata, we can easily imagine the dangers attending the operations when approaching such a locality as that described. The removal of the coal leaves this pressure unsupported, allowing the pent-up gases to burst forth in large volume. These occluded gases, chiefly marsh gas (CH_4), are the result of coal formation and always have a tendency to escape. When, however, the strata adjacent to the coal bed are impervious to these gases we have a gaseous seam.

Approaching this gas belt, the first indication of close proximity is noticeable in the coal. Shiny streaks, with a black-lead luster, two to three inches wide appear in the bed, next the hard coal, sometimes several feet in thickness, is encountered; after penetrating this for a few feet, distant rumblings are heard, accompanied by the splitting and cracking of the coal, due, undoubtedly, to the pressure behind. To the experienced miner this is an indication of danger ahead. Shortly afterward the noise becomes more pronounced, having a decided pounding effect, similar to the report of quick-firing guns. Immediately behind this hard barrier soft coal of an oily nature, having an odor somewhat similar to kerosene and which may be easily ignited by applying a lighted match, is encountered.

Up to date the company has not devised any practicable means of overcoming this difficulty. In other words, a few schemes, such as boring, etc., have been tried, without success. Neither has it been possible to accurately estimate the extent of this gas belt.

Nothing unusual or difficult has been found in the other mines, all of which, with the exception of the Douty seams, will be embraced in the consolidation scheme. It may also be of interest to mention the other progressive schemes outlined by this company.

Among the many other drawbacks encountered in coal-mining operations, the company realizes fully the importance of the labor problem. Due, possibly, to new industries springing up and other causes, the company has experienced difficulty in securing sufficient trained men to keep up the necessary work. It has waked up to the fact that in order to encourage settlers it is necessary to pay more attention to their home comforts. With this end in view, it is demolishing the old shacks, replacing them by modern plastered houses, with electric lights, hot and cold water, baths and toilets, fences, cement sidewalks, etc. In addition to this, it has erected the largest and most up-to-date wash-house in the state, built of hollow tile brick. Included in this building are the foreman's wash-house, rescue and first-aid rooms, with separate reading rooms for both miners and officials. The surroundings will be laid out in lawns and ornamental shrubs.

These, among many other improvements proposed, will eventually repay the company by encouraging a good class of married people to make this place their home. In this connection, mention should also be made of the broadminded plan to build a block of officials' homes, knowing from experience that "all is lost," as it were, without good officials. This, to my mind, is one of the most practical moves yet made. It is hard to realize anything more embarrassing and humiliating than for a foreman to find himself housed in a shack next door to, we will say, an ignorant foreigner of anarchistic or I. W. W. persuasion. Those who have been in official positions in and around mining camps, especially those who have children, will readily perceive the soundness of the company's efforts in the endeavor to encourage a good class of officials.

In conclusion, credit should also be given to the state inspectors and others for their endeavors to educate the coal-mining officials by compelling them to pass examinations. This will undoubtedly bring its reward by planting seeds which will eventually germinate into a more ambitious and intelligent class of mine officials.

THERE IS MORE to the transportation problem than moving freight from its origin to its destination with dispatch. The shipper and the receiver both play important parts. When coal operators are shipping trainloads of coal to the seaboard with no ships in sight to receive them, when manufacturers are receiving coal which they cannot store, when jobbers and speculators use cars for warehouses, they are contributing to the confusion and helping to increase the car shortage. One of the remedies for the coal shortage is well known to all those connected with the coal industry. That is, coal must be stored in the summer in excess of requirement for excess consumption in winter. This coal must be stored at the point of consumption.

Power of Coals and Gas

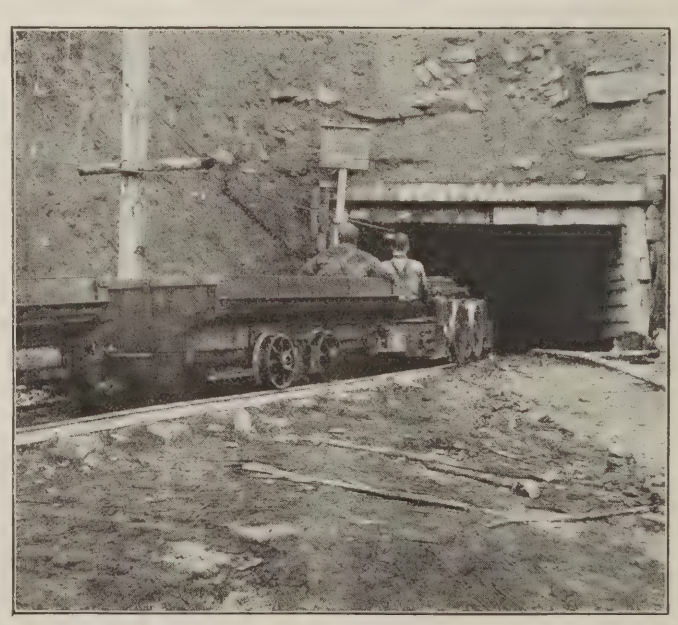
BY W. D. OWENS
West Pittston, Penn.

Good bituminous coal produces about 14,450 B.t.u. on combustion, while one pound of this same coal will generate 12¼ cu.ft. of combustible gas, weighing 0.045 lb. per cubic foot. One thousand cubic feet of this gas, weighing 45 lb., will develop about 1,000,000 B.t.u. of heat, but 45 lb. of coal in combustion with oxygen will only produce 14,450 x 45 = 650,250 B.t.u. Bearing this fact in mind, it would seem more economical to relieve all bituminous coal of its volatile gases and use the product for combustion. The saving from this method would seem to amount to about 54 per cent. over the best results obtained from the present practice.

The Government testing plant at St. Louis has opened the eyes of the scientific world to the merits of consuming gas instead of coal to develop power. One of the tests showed that it required 5.27 lb. of Illinois (Springfield) coal to develop one horsepower-hour, while only 1.79 lb. of the same coal converted into gas produced a horsepower-hour. Of an Indiana coal it required 4.53 lb. to produce one horsepower-hour by the steaming method, but 1.61 lb. of the same coal converted into gas developed the same power.

This discovery led to the testing of the power of lignite, which is the poorest quality of the various grades of coal. It was found that it required 10 lb. of lignite by the steaming method to produce one horsepower-hour, while but 2.82 lb. of this coal was necessary to develop one horsepower-hour by converting the same into gas. This shows a better result from lignite by 100% than is obtainable from either Illinois or Indiana coal through the steaming method.

The Geological Survey states that we have about 480 square miles underlaid with anthracite coal in Pennsylvania. This, to be sure, is a great bed of fuel, but when compared with the square miles of lignite now known to exist in the United States (omitting all bituminous coal) it is but a trifle. The same authority states that there are 246,000 square miles of these low-grade coals.



TRIP OF EMPTIES RETURNING TO MINE OF BLUE DIAMOND COAL CO., KENTUCKY

Methods of Operation

By J. F. K. BROWN
Montreal, Canada

SYNOPSIS — *The chief factor influencing the methods to be adopted in working any particular coal field or bed are the thickness of the coal, the roof conditions, prevailing custom, restrictions, embodied in the lease or deed, and the kind and quality of the labor available. Concerning some of these little can be definitely learned until a certain amount of extraction has been made.*

THE question of the proper method of mine operation is one which always gives rise to much argument and discussion. The reason of this is mainly narrow experience, failure to state all details and conditions, and generally a fatuous conservatism. The worst practical effect of such divergence of opinion is often witnessed in the development of coal fields which have not been long enough known to create or evolve methods peculiarly their own and most suitable to their particular conditions. In such cases it is often possible to find mining methods brought from one experience, one field, sometimes one mine, applied to conditions to which more mature judgment would ascribe another remedy. The policy pursued appears to be: As it was in the older country and the older district, so it must be in the new.

On the other hand, the propagation of definite and well established systems when accompanied with deliberate judgment has much to recommend it. In many cases this may save much costly experiment under unknown conditions. The North of England mining districts are probably the best examples of world-wide perpetuation of special systems, and their men the most migratory of miners. Thus it happens that in various fields scattered over the coal-producing continents the methods and even the local mining terms of the Lancashire and Yorkshire miners are in use today.

From the point of view of the investigator of a new coal area, the factors that point to and influence the method of mining which may be adopted are mainly: (a) Thickness of coal; (b) condition of the roof; (c) custom; (d) special reasons connected with the leasehold; (e) labor.

About the only point upon which there is something approaching unanimity in regard to methods of operation is that thick coals should not be mined on any other system than some method of pillar-and-chamber extraction. Thin coals, on the other hand, may be worked by either the longwall, pillar-and-chamber and entry systems.

Sound engineering backs the argument in favor of the one way of mining thick coals, since the roof of a thick coal would be liable to cause trouble so great that it could not be controlled, if left completely without support as in longwall, or if the supports are not large and properly proportioned to the thickness of the bed. The longwall method does not provide these conditions, and in the thick coals insufficient material is made in the course of mining with which any attempt could be made to pack the waste spaces left behind after the coal has been removed.

With the advent of cutting machinery and loading and conveying devices, all of which tend to increase the daily output, the limit of height beyond which longwall is not feasible, as opposed to pillar systems, has increased. Machine methods have increased the rapidity of face advance to such an extent that fresh roof is exposed practically every night. This eliminates the most frequent cause of coal-mining troubles—namely, deterioration or weathering of the roof stone in position, whereby it fails to carry the weight and do the work it did when first exposed.

As a general rule, however, when a coal bed is 4 ft. and over in thickness preference should be given in the first instance to pillar systems, provided, as already stated, no other conditions predominatingly influence the situation.

With coals below this height—and there are now few coal fields that are not already facing this problem—there is the choice of extraction methods already outlined. It is in discussing how coals of approximately this height and lower should be recovered that the greatest diversity of opinion develops. It is fortunate, however, that few if any specific considerations of the thickness of the coal with the exception of extremely thick beds really exercise a determining influence on methods of operation.

Conditions of the Roof

The importance of the roof conditions should be readily appreciated. It is important in preliminary investigation to know as much as it is possible to know about the roof in addition to the more usual and more readily acquired data on the thickness of the bed or its analysis. In many coal-mine examinations these facts are noted largely as matters of habit, there being always a tendency to pay small attention to them since the coal is after all the reason for the work being done and the object of the inquiry. But it is vitally important to remember that the best coal in any field may be worthless as a commercial proposition if it has to be worked under a bad roof.

Unfortunately it is not easy to collect data about the roof from preliminary examinations. Gathering information about the coal is a much simpler matter. Neither the roof stone nor the coal may outcrop anywhere on the ground, and furthermore an outcrop of roof rock is not always a reliable indication of what the material will be like underground, where it lies in its natural state and has not been subjected to weathering. In some cases outcrop exposure may cause improvement, in others deterioration. Boreholes do not answer the question satisfactorily, the size of the core brought up being far too small for any judgment to be formed concerning the probable action of the roof under any method of mining afterward adopted. Again, too, it is not just the rock immediately above the coal that

can rightly be termed the roof—it is the relationship between the immediately overlying rock and the succeeding strata for an indefinite distance upward that is the real factor in answering the problem of roof behavior.

The most satisfactory method of ascertaining with some measure of accuracy just what a roof may do under future working conditions is to make an actual trial extraction. Whether special or ordinary methods are followed in taking out this trial tonnage is largely immaterial because the trial period cannot commonly be extended over a long enough time to develop into a system. The mining of the small tonnage is usually enough to provide a good idea of what may be expected in the near future. Failing this, judgment is best based on the results of the boring—that is, the drill records which show the approximate thickness and relative position of the various strata over the coal. This knowledge, augmented by experience gained in the same or other fields, will lead to a fairly accurate summing up of the underground conditions as they may be expected to exist when operation has been proceeded with for a considerable distance from the outcrop and after weight begins to tell.

Cost of operation is the limiting factor anywhere, and is the only standard of measurement by which the roof conditions can be properly estimated and adjudged. It is a difficult task, however, and one not always possible, to clearly define the relative influence on costs of which each part of the mine operations is the cause. Thus it is possible to say that the cost of timbering amounts to so much per ton, but it is not so simple to say that this roof cost so much per ton.

Three Classes of Roof

For purposes of rough comparison roofs may be considered as of three classes—good, bad and medium. Bad roofs are such that no method of mining can be operated under them. Grading into the medium and finally into the good groups the advantages that one system of coal mining possesses over another become more understandable and appreciated. Thus it becomes reasonable to assume that the worse the roof the more coal will it be necessary to leave behind for support and the more surely must the operating concern make up its mind to loose in the end.

As better roof conditions are approached such large supports are no longer required, and it is easier to adopt systems that do not call for such a heavy sacrifice of valuable fuel. Finally a stage is reached in which it is possible to extract the coal in one operation and where the problem becomes one of finding proper artificial support.

Modifying these conditions are a number of minor factors, many of which are bound up with and belong to the geological periods when the coal was laid down. Of these stratification and cleavage of the roof are most important. Cleavage of any rock member of any system is developed in three directions, two vertical at right angles and the third horizontal and at right angles to the other two. This does not always apply with extreme accuracy in each case. There may be certain divisions which lie to or away from the vertical plane, but it is near enough to be taken as a general rule. Since the method of deposition and the after pressure and heat cannot always have been the same and equal in each disturbance of strata, it follows that cleavage has become more developed in one direction than in another.

Generally with sedimentary stratification the horizontal parting exhibits the greatest cleavage. This is most pronounced in rocks of fine grained texture such as some classes of shales. The two vertical partings do not so readily show cleavage and in many cases these are not apparent until after operation commences. The important consideration is that there may be between these vertical lines sufficient, if invisible difference, so that the seam is finally found to be capable of being developed and worked in one direction only. This is a feature of underground operation that can only be discovered through experience and experiment.

Complicating this, especially in regard to the horizontal cleavage, is the phenomenon of false bedding, whereby the lines of possible fracture are not parallel to the plane of the coal, but taper down to or up from the run of the coal. This creates lips, steps or edges in the roof, which naturally thicken in one direction. Here again the question of which way operation should proceed may have an important bearing on the method to be adopted, since workings passing parallel to the line of these cracks may experience frequent roof trouble while those operating at right angles thereto may be quite free from such drawbacks.

Passage of Water Along Roof

Equally important, although not so well observed or understood, is the passage of water through or along the roof. The information provided by or deduced from borehole records may not indicate these conditions in the least, because in the core the rock is brought up unweathered and from positions where naturally it has been out of contact with the air. The dangerous feature is the double effect of water and the atmosphere, and that condition only comes about when the extraction of the coal has proceeded for some time.

The double effect of water and air may go so far as to be the cause of virtually a creep in the roof although the phenomenon has not been described as such. This softness of the roof induced by such a combination often proceeds at a more rapid rate than the extraction of the coal, and thus will follow up and render unworkable a section hitherto considered quite minable. Only close study and attention to every detail will be of aid in obtaining knowledge that may be of service before mining commences.

It is of course an admitted mistake to order equipment before mining conditions have become known. Nevertheless this is often done, and underground plant is even more frequently than any other variety purchased before all the simple and primary facts about the the underground conditions of the seam have been ascertained. A considerable capital outlay is involved in underground equipment and its accessories, and to buy these before the information upon which performance can be estimated shows bad judgment.

This fault is not always that of the engineer—much more frequently it is that of a board of directors or a president whose knowledge of coal-mining conditions is of the slightest and who is so anxious to post good reports to the shareholders that he urges the imme-

diate and speedy purchase of equipment before the engineer, if there be any under such circumstances, reports upon what is really required.

Underground atmospheric conditions and the presence of gas have no great effect on the method of operation. In modern practice it is quite possible to properly ventilate almost any system of mining. However, in development these conditions have to be taken into consideration since obviously it is necessary if gas is encountered to have the ventilation designed on a more lavish scale than would be required if gas had not been present.

Custom is possibly the strongest factor in causing the selection of one system of mining over another, and quite often without any consideration of suitability. This is perhaps natural and is a trait that has to be guarded against. An engineer will almost certainly gravitate toward the system to which he has been accustomed. There is, of course, an advantage in this since men accustomed to one system of mining are better able to handle its development quickly and speedily, and undertake its more economical operation later on than those whose experience has been limited to other methods. The disadvantage is that this leaning in one direction may cause the investigator of an unknown coal bed in an undeveloped region to place entire reliance upon what he has seen in the past. He may thereby wrongly prejudice conditions. In an area which is surrounded by operating mines and which has been in operation itself for many years this danger disappears. It is economy to follow custom in this case.

Leasehold Affects Method of Operation

There are a number of conditions connected with the leasehold which may have some effect on methods of operation. For reasons given in the lease or deed of sale a certain method of operation may be prescribed either over the whole or part of the area. In some cases this is not an unreasonable stipulation, as where there are certain important bridges or buildings to be protected; but in other cases such stipulations merely hamper proper development of the field. The shape of the leasehold may also have an effect on mining methods, as may also the grade or pitch of the bed. If the pitch be heavy special methods will require to be introduced. The class of coal may likewise assert some influence and floor conditions may have to be taken into account.

Labor, strange to say, frequently exerts a potent influence on methods of mining because of the effect of custom. In general labor is highly conservative and it is always easier to obtain labor for that class of mining to which it has been long accustomed than for new methods. Thus in longwall districts labor prefers longwall mining, while in pillar districts it approves of that method and would practically refuse to man a longwall mine. Where untrained labor is available this question is not so acute. But the same trouble again arises with ignorant labor, as for example some of the black races, who balk at working under certain conditions because of some unimportant detail. Thus the noise from the working of a longwall roof was enough to ban that system in some coal-mining fields where black labor had to be used.

In general there are but few principles to be outlined as being deciding factors in the question of what method of mining should be adopted. Each case must almost certainly be judged and based on conditions that are present in each field and area and in the surrounding related conditions in the district in general. There is fortunately a vast and excellent collection of description available of methods of mining operated under an almost infinite variety of conditions and those who are in doubt upon this subject cannot do better than search the existing mining literature for details of any system which has been brought into use as a result of underground features which appear to be comparable to those under which mining is contemplated.

Some Advantages of Heat Treatment

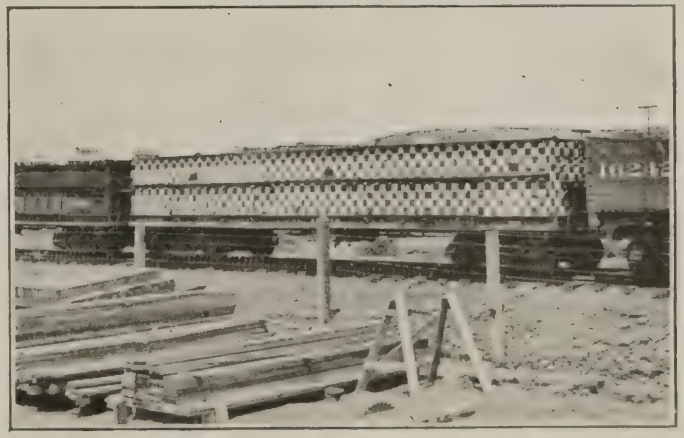
By E. A. Pearson
Kingston, Penn.

One consideration regarding equipment that is not given much thought by the average mine official is the kind of axle steel best fitted for mine-car running gears. As a general rule, this kind of material is bought from a price standpoint. No thought is given to the analysis, tensile strength or hardness of the steel. Also, few seem to realize the great advantage of using a heat-treated axle. This latter may cost a few cents a pound more than the ordinary soft steel, but it will pay for itself many times over in a short time.

By heat-treating an axle of say 0.40 to 0.50 per cent. carbon content, a tensile strength of about 125,000 lb. per square inch is secured with a hardness of about 40 on the scleroscope scale. The same analysis steel, cold rolled, gives a tensile strength of about 80,000 lb. per square inch. The advantage in using as hard a steel as possible is self-evident when the extremely hard usage of mine-car service is considered.

By using heat-treated axles, bent and broken axles may be eliminated. This item itself saves considerable blacksmith and car-labor expense. Then, again, where a heat-treated steel is used it is found that wheel hubs are not enlarged to such an extent as when a soft axle is employed. Also, the axles themselves do not wear down as much as is usually the case.

I know of one large anthracite mining operation that has been using heat-treated steel for axles for the last seven or eight years. When this company was using ordinary soft steel it sold from one to two carloads of scrap axles every year, but since using heat-treated axles it has not scrapped one car load. These axles have also shown a decided saving in shop labor.



STEEL GONDOLAS USED AS ARMORED CARS IN MEXICO
THE CHECKERBOARD EFFECT HIDES THE PORTHOLES

Scraper Mining of Thin Bed Anthracite

By E. P. HUMPHREY
Upper Lehigh, Penn.

SYNOPSIS—*Beds of anthracite less than 3 ft. in thickness and pitching less than 20 deg. are difficult to mine. The method here described—namely, loading the coal by means of a V-shaped scraper driven by power—has met with reasonable success during the past two years.*

THE mining of the small beds of anthracite has given rise to many interesting articles and discussions in *Coal Age*. It was therefore deemed worth while to tell how the Upper Lehigh Coal Co. is mining its flat small seams.

The beds being worked with scrapers vary from 16 to 48 in. in thickness and pitch from flat to about 20 deg. When pitching above 20 deg. the problem is a simple one and no scrapers are used; but when 20 deg. or less, difficulty is experienced at once in getting men to work these places, for they do not want to shovel coal several times, use a buggy, or push the coal down a chute—all of which becomes more difficult as the thickness decreases. In fact, in a 36-in. bed any of these methods become quite laborious.

The coal, excepting at the crop, is quite hard and tough. Various conditions of top and bottom have to be overcome. The top may be conglomerate, a soft slate, a soapstone or a "bony" clod. This is sometimes 16 in. thick and either comes down with the coal, forming half-and-half pieces with it, or stays up and must be taken down for safety. It can not be propped as the timbers in many cases would be in the path of the scraper. In places the coal may also be "burned" to the bottom, or a soft bottom that sometimes comes up with the coal makes it hard going for the scraper.

Everything is done to increase the production of each engine. Jackhamers, with cruciform bits, drilling about 2¼-in. holes 6 ft. deep, are used with a mounting consisting of a light metal runway with four adjustable legs. On this mounting the Jackhamer is supported. This makes the work much easier for the driller and overcomes entirely the breaking of drills due to either dropping the machine or not advancing it in a straight line on account of the operator slipping. When one considers that the driller must sometimes lie on his stomach on a pitching floor with no foothold while doing his work, it is no wonder that the pulsations of the machine push him away from the face. Besides overcoming this difficulty and making the drilling less laborious, the support practically replaces one man. By the old method the driller had to have a helper to hold the drill while starting a hole.

As a general rule the air drills are used where the coal is hard and the bed thin, say from 16 to 36 in. Sixteen inches is the lowest that this producer has mined up to this time, and as the scraper is 14 in. high it did not have enough clearance in such places to make allowances for the unevenness of the top and bottom, thus giving trouble by catching. Where the coal is 36 in. or more thick, and softer, especially near the crop, good results have been secured with the hand auger. From data kept for a comparison on this work the consumption of powder was less while the output was the same, for no other reason than that possibly with the auger there was not so much hole to fill with powder. Besides, the auger's record was helped by the softness and greater thickness of the coal. In less than 36 in. of coal the auger is out of the question.

While experimenting to find the best equipment to use for drilling this low coal a twist drill similar to a 1½-in. auger was rigged up, using an old air-driven wood-drilling machine. This worked better than expected. There

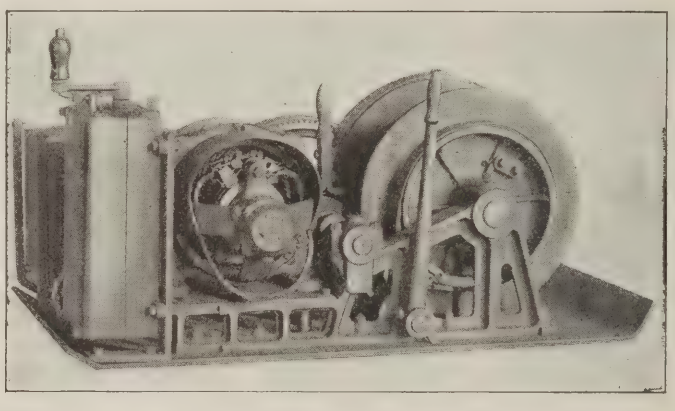


FIG. 1. SMALL HOIST USED TO DRAG THE SCRAPER

was no dust, no pulsation, practically the same weight as the Jackhamer, with no loss in the drilling speed.

An objection to an air machine is the necessity in a long breast of running up the air pipe. An electric motor-driven drill, similar in power to the one used in the experiment and built to do this work, was sought, but no manufacturers with whom correspondence was had carried anything they would care to recommend for the current available—namely, 440 volts, three-phase, 60 cycle—and for the service required. With an electric drilling machine it would be an easy matter to run a flexible armored cable up the rib of the breast.

In the beginning it was the practice to run the power lines along the gangways under an inverted wooden trough nailed to plugs driven in holes in the top rock. Three separate No. 6 weatherproof covered wires were supported by porcelain cleats. This troughing was expensive to place and maintain, was not foolproof in wet places, and the trough could not conveniently be used again. A three-wire lead-covered heavily galvanized armored cable is now used, and this gives perfect satisfaction. Of course, this cable is more expensive initially than the three separate conductors, but the cost shows that after it is used twice the expense is even. This is due to the ease with which it may be strung. Holes can be bored into the coal on the high side of the gangway, plugs driven in, and the cable hung up on hooks. It is absolutely foolproof, and when painted with a heavy oil is practically indestructible. At various convenient places junction boxes are established with switches and fuses.

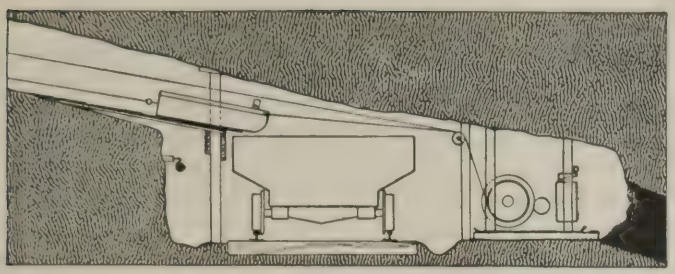


FIG. 2. ARRANGEMENT OF HOIST, CAR AND SCRAPER

The type of scraper engine used, of which eight are employed, is a double-drum machine equipped with a 5-hp. motor. These machines are made by the Pneumelectric Machine Co. and some of them have been in daily operation for nearly two years without a repair. The drums have a capacity of 900 ft. of $\frac{3}{8}$-in. or 500 ft. of $\frac{1}{2}$-in. wire rope. The lighter rope is the one normally used for both pulling and tail ropes. Experiments were made with a $\frac{1}{4}$-in. rope for the latter purpose. Overall dimensions of the engine are 44 in. wide, 38 in. long and 26 in. high. The machine weighs 1650 lb. It has been found that the power consumption averages about 100 kw.-hr. per month per engine.

The scraper is made of No. 10 sheet steel, as shown in the illustration. It is open on top about 48 in. wide in the front, and when filled holds about 8 cu.ft. of coal. In some places, where the bottom is regular, the back and side plates are riveted together, making a solid construction with a minimum leakage. Where the bottom is irregular it was found that a hinged connection between the back and the side plates gave greater freedom and allowed the scraper thus constructed to follow the bottom and not lose as much coal as a rigid one would. A chain bridle is used in the front for attaching to the pulling rope, and a ring is bolted to the back plate for the tail rope.

The scraper has no bottom, so the operation of pulling it over the top of the car empties it. An important feature for its successful operation is to have the bottom edges of the back and side plates bent inward. This keeps the scraper under the edges of the coal and stops the tendency of the device to ride over the top of the pile. The front crossbar, which keeps the scraper open, is arched or elevated to allow the lumps to enter without raising it, also to prevent pulling the big lumps back up the breast.



FIG. 3. THE SCRAPER IN A ROOM

Another detail which in itself is a simple one, yet of great convenience, is the use of a low lift shovel, one in which the end of the handle is about 10 in. from the bottom rock when the back of the shovel is flat on the floor. This keeps the men's hands from rubbing on the roof when shoveling.

The manipulation of this scraper is as follows: The place to be mined is first opened up about 20 to 30 ft. from the gangway and 15 to 18 ft. wide, with a place on the other side of the gangway on the center line of the breast for the engine. This is an opening generally about 5 ft. deep, 4 ft. high and 6 ft. long. The hole is made chiefly in the coal, with a little of the top shot down for headroom. The opening work in the breast is done before the preceding place is finished, so that the output is not decreased. This also removes the blasting sufficiently far from the engine, when it is in place, so that a few planks will protect it.



FIG. 4. METHOD OF DRILLING EMPLOYED

To move the engine a truck is placed in front of it, and, with a few skids and pipe rollers, the machine can pull itself up onto the truck. This is done by hooking one of the ropes on the old platform across the gangway. The base of the engine is made of one piece of plate with the front and rear ends turned up, and it is especially adapted for sliding around, so that if the distance is short it can be pulled along the gangway on its own base, the power being supplied to the motor by the flexible cable.

Referring to the drawing (Fig. 2), the general layout is shown. The gangways are driven 9 ft. wide and 4 ft. high on the low side. A low-type car, 41 in. in overall height with 92 cu.ft. capacity, equipped with Hyatt roller bearings, is used for the low bed. The pulleys on the crossbar in front and above the engine keep the ropes from rubbing on the cars. At the face of the breast an adjustable prop similar to a screw jack, with pointed ends upon which the top snatch block is fastened, is placed. This adjustable feature is a good thing. It allows the prop to be moved across the face, which is necessary for thorough cleaning, with the least expenditure of time and effort.

The method of mining has varied widely. If the top will permit, the breasts, when 30 ft. above the gangway, are driven 50 ft. wide. In other instances they are as narrow as 24 ft. They vary in length from 100 to 360 ft. It has been found that 200 ft.

is the limit for efficient operation on account of the time required for the scraper in moving up and down the breast. The scraper travels about 145 ft. per minute, which is the maximum speed that can be used and still maintain a nearly full load on account of the irregularities in the bottom.

Some of the places are worked with only a day crew of four men—a miner and a laborer in the breast, the engineer and one laborer on the car leveling and picking out refuse. In some cases there is no man on the car, the engineer doing the changing and leveling of the cars. The usual practice for this crew of four is to load out the coal in the morning from the previous afternoon's firing and blast their next day's coal just before leaving in the afternoon. Sometimes they fire in the morning if the coal is all loaded.

Other places use successfully, in addition to the day shift, a night shift of two men—a miner and a laborer—whose duty it is to fill the breast with coal and shovel it away from the face so that the next morning the miner can drill and the laborer load out the coal. The man on the car can often be done away with and used as a scraperman in the breast, while the miner and laborer are drilling. This is done in the places where small or 45-cu.ft. cars are used, the engineman doing the placing. Usually a trip of from four to six cars is brought in and run down one at a time to the platform and loaded.

Four Cars Per Hour Have Been Loaded

The best loading record at this time is 32 small cars per shift of eight hours. The crew consisted of the night shift of two men bringing down the coal and the day shift of four men who loaded it and fired a few shots to make more coal. The coal averaged 36 in. high and the length of the haul for the scraper was 175 ft. About 50 minutes were taken from the possible loading period for the changing of the trips. The crews are all made up of "company men" on account of difficulty in getting the places worked on a contract basis.

In performing the first mining it pays to leave large pillars at least 25 ft. thick for the robbing, unless it is possible to take this all out the first time. When robbing, the engine has to be placed again, this time in a new position on the center line of the pillar, and the pillar skipped till all the coal is removed. Of course, some of the coal is lost by being shot out too far into the open breast, but this does not amount to much if the clod and other refuse are always gobbed against the outside rib when doing the first mining. This gob not only keeps the coal from scattering into the dangerous inside section, but aids in breaking off the cave when the pillar is removed. When robbing it is well to place a few light props to indicate any settling. When pillars are big enough they may successfully be robbed by driving a hole up through the center and bringing the top back through it.

The proposition of driving more than one place side by side with the one engine and using a system of snatch blocks has not proved to be successful. It means a bigger output per engine and is not impractical, so that attempts are still being made toward that end.

The section of the gangway shows the relative positions of the loading platform, the car and the engine. For the platform two light props are placed about 12 ft. apart, on which are spiked two planks at the proper height for the car. From these about five 2-in. planks about 10 ft. long are run up the breast, upon which iron sheets are placed lapping each other and parallel to the gangway. These are all nailed to the planks except the one nearest the gangway, which is arranged so that it can be pulled out to cover the gap between the car and the platform and prevent spilling. It can also be pushed back when not in use.

To aid the man in leveling the cars a common garden hoe is used, a shovel being of little value on account of the low top. To secure the engine and keep it from pulling out on the gangway four light props are wedged between the top rock and the engine bedplate. The engine is first run in on two ties, to aid in setting it up fairly level so that the motor may get oil properly.

The manner of supporting the power cable is shown, except that between the breasts the plugs are in the coal and not in the rock. The reason for carrying the cable on the high side of the gangway is to keep it from being damaged or shot down when the breasts from the lower level break through. At a platform the cable is passed under it. The lead to the engine is run over the top of the gangway.

For the past two years these methods, with slight modifications, depending upon conditions, have been used in small beds. Before adopting the present electrical equipment an air engine was used. This engine was in every respect similar to the present electric machine, except that it was driven by compressed air. The electric engines, however, proved more efficient and were consequently adopted. For the problem of mining thin beds, pitching within the limits of 0 to 20 deg. and varying in thickness, from 18 in. to 4 ft., this method of loading with a scraper is one solution.

Legal Department

Right to Use Surface—Separation of ownership of underlying coal from ownership of the surface by a grant or reservation of such coal implies grant to the owner thereof of the right to use so much of the surface as may be reasonably necessary in mining and removing the coal. **(Iowa Supreme Court, Hammarstedt vs. Bakeley, 166 Northwestern Reporter, 729.)**

Employer's Responsibility Under Mining Acts—In the case of Whittaker vs. Valley Camp Coal Co., 103 Atlantic Reporter, 594, in which plaintiff sued on account of injuries sustained in a mine by coming in contact with a post standing near a track while performing his duties as brakeman, the Pennsylvania Supreme Court lately quoted the following statements of law bearing upon a mine owner's liability for injury to an employee, according to whether the cause of injury may be attributed to negligence of the owner or of a statutory mine foreman: "Where the act imposes upon the mine owner a specific duty as to the arrangement and management of the mines, the mine owner cannot protect himself from liability by showing that the structure in question was put up by direction of the mine foreman, at least wherever the fact of its existence became known to the owner, but that it would be his duty to remove it; * * * on the other hand, where the act does not call for any particular arrangement or structure, the arrangement or structures ordered by the mine foreman for the purpose of supporting the roof are obligatory and he is therefore not responsible for injuries caused thereby."



Must Find a Market for Screenings

Relief must be granted in the matter of handling screenings in the territory from Indiana westward. This is becoming increasingly evident, according to advices reaching Washington. If serious loss of production is to be prevented, a market must be found for a large tonnage of screenings in the near future. The most practicable way of solving the problem, it is suggested, is to raise some of the so-called conservation orders and allow brick and tile factories, the makers of sanitary ware and such materials to operate at full time provided they will agree to use screenings. It is also suggested that many manufacturers would be glad to store screenings in considerable quantity, which would do much toward ameliorating a situation which is interfering decidedly with the production of lump coal.

President Wilson Issues Proclamation to Coal Mining Industry

Despite the handicaps which the coal-mining industry is laboring against, President Wilson believes that "sufficient coal can be mined in spite of the handicap if every one connected with the industry, from the highest official to the youngest boy, will give his best work each day for the full number of work hours." The President regards the coal situation as sufficiently serious to justify the issuance of a formal proclamation to all those engaged in coal mining. The proclamation in full follows:

The existing scarcity of coal is creating a grave danger—in fact the most serious which confronts us—and calls for prompt and vigorous action on the part of both operators and miners. Without an adequate supply our war program will be retarded; the effectiveness of our fighting forces in France will be lessened; the lives of our soldiers will be unnecessarily endangered and their hardships increased, and there will be much suffering in many homes throughout the country during the coming winter.

I am well aware that your ranks have been seriously depleted by the draft, by voluntary enlistment, and by the demands of other essential industries. This handicap can be overcome, however, and sufficient coal can be mined in spite of it, if every one connected with the industry, from the highest official to the youngest boy, will give his best work each day for the full number of work hours. The operators must be zealous as never before to bring about the highest efficiency of management, to establish the best possible working conditions, and to accord fair treatment to everybody, so that the opportunity to work at his best may be accorded every workman. The miners should report for work every day, unless prevented by unavoidable causes, and should not only stay in the mines the full time, but also see to it that they get more coal than ever before. The other workers in and about the mines should work as regularly and faithfully so that the work of the miner may not be retarded in any way. This will be especially necessary from this time forward, for your numbers may be further lessened by the draft, which will induct into the Army your fair share of those not essential to industry. Those who are drafted but who are essential will be given deferred classification and it is their patriotic duty to accept it. And it is the patriotic duty of their friends and neighbors to hold them in high regard for doing so. The only worker who deserves the condemnation of his community is the one who fails to give his best in this crisis; not the one who accepts deferred classification and works regularly and diligently to increase the coal output. A great task is to be performed. The operators and their staffs alone can not do it, nor can the mine workers alone do it; but both parties, working hand in hand with a grim determination to rid the country of its greatest obstacle to winning the war, can do it. It is with full confidence that I call upon you to assume the burden of producing an ample supply of coal. You will, I am sure, accept this burden and will successfully carry it through and in so doing you will be performing a service just as worthy as service in the trenches, and will win the applause and gratitude of the whole nation.

Railroad Mines Not to Get Preference in Car Supply

Mines owned by railroad companies are to receive no preference in car supply, according to a ruling made by A. H. Smith, regional director for the East, when an actual case came before him for decision.

Mines to Receive Essential Equipment

Through the newly created equipment section of the Fuel Administration, an arrangement has been made with the War Industries Board which is tantamount to a blanket priority order covering essential equipment for coal mines. The automatic priority does not apply to equipment for new construction or expansion. When materials are needed under those circumstances, the regular priority certificates must be used.

Inspection Leads to Large Coal Saving

A saving of coal equivalent to 350,000 tons annually already has been effected by the Fuel Administration in its conservation campaign among the steam power plants, it is stated officially. This saving has been effected through the inspection of 300 plants. It is the intention to inspect each of the 250,000 steam plants of the country. The saving is declared to be the result of applying more efficient firing and operating methods. It has been brought about without curtailment of output.

Statistical Section of Fuel Administration Doing Important Work

What is regarded as one of the most effectively organized divisions of the Fuel Administration is the statistical section. Since an enormous volume of data must be collected and tabulated, this section is conducted as systematically as a large manufacturing enterprise. All of the latest mechanical devices for punching and sorting and otherwise handling cards have been installed. The section is in charge of C. E. Lesher, who is handling this work in conjunction with his regular division of the Geological Survey, which compiles coal statistics.

Demands for Coal Continue to Increase

Demand for coal for essential uses continues to exceed estimates. This is particularly true with regard to coal from the low-volatile fields of Maryland, West Virginia and Pennsylvania and the high-volatile fields of Kentucky, West Virginia and Pennsylvania. At the beginning of the coal year the Navy's requirements were placed at 3,500,000 tons. It now is estimated that the Navy's requirements will be on a basis of 8,000,000 tons before the end of 1919. Last month the Navy's demand had risen to a 6,000,000-ton basis. On Apr. 1 it was considered that 10,000,000 tons was a liberal annual allowance for the Shipping Board. The results which have been secured in the shipbuilding program, nowever, are such that the estimate now is 13,000,000 tons.

One of the more phenomenal increases in the estimates is that for bunker coal. At the beginning of the coal year, 13,500,000 tons was assigned for this purpose, with the thought that it was liberal. The figure has now risen to 21,000,000 tons. The advanced calculation as to fuel which would be needed by new industries went decidedly awry. Adding to this the coal needed by plants that have been enlarged and the additional fuel required to keep a large percentage of industries operating on a 24-hour basis, it can be seen how the actual requirements are far in excess of the forecast.

Because the enormous consumption of the East must be met from such a limited area, the difficulties of the situation are becoming increasingly great. The mines in that limited territory are now more than 14,000,000 tons behind their schedule, due largely to difficulties of transportation.

To Demonstrate Rescue Work at Fairs

That a more general understanding may be had of rescue work at coal mine accidents, the Bureau of Mines will conduct demonstrations this year at a number of state fairs. Demonstrations of rescue work will be made possible in a glass inclosure which will be filled with smoke for that purpose. The inclosure will be elevated so that the demonstration will be visible to a large number of spectators. The fairs at which the demonstration will be given are as follows: Missouri state fair, Sedalia; Illinois Centennial state fair, Springfield; Iowa state fair and exposition, Des Moines; Kansas free fair, Topeka; Wyoming state fair, Douglas; Kansas state fair, Hutchinson; Oklahoma free state fair Muskogee; New York state fair, Syracuse.

Coal Exports During May

Exports of coal during May, 1918, as reported to the Department of Commerce, with the figures for the corresponding month of 1917, as finally revised, are as follows:

Exports	June, 1917 Tons	June, 1918 Tons
Anthracite	604,777	378,753
Bituminous	2,291,613	2,205,711
Exported to:		
Italy	58,516	.....
Canada	1,801,776	1,803,407
Panama	38,348	50,871
Mexico	12,328	13,508
Cuba	115,091	110,959
Other West Indies	33,031	25,944
Argentina	17,054	43,035
Brazil	96,040	93,782
Uruguay	2,151	48,105
Other countries	117,278	16,100
Coke	152,948	141,194

Brief Washington Notes

Using the returns from the first of the lightless nights, the Fuel Administration estimates that more than 1,000,000 tons of coal will be saved yearly. The saving in the Borough of Manhattan alone is figured at 40,000 tons a year.

Communities having conveniently at hand a supply of wood may be cut off from any supply of coal if the state fuel administrator sees fit. The attention of the state administrators has been called to the fact that the order appointing them to office contains their authority for prohibiting the sale, shipment and distribution of coal to domestic consumers.

Clay products, lime, cement and glass industries are to be inspected in the near future and rated as to efficiency in fuel consumption. An opportunity to effect savings will be made before the inspection. The furnace industries have the reputation of being profligate in the use of fuel. It is believed that several million tons can be saved by enforcing conservation.

The Secretary of War has sent the following letter to the Fuel Administrator:

I was greatly impressed when I learned recently about 150 retired miners in Mercer County, Penn., recognizing the nation's urgent need of increased fuel, had volunteered to go back to the mines and serve their country there.

This is the spirit which free and liberal government always engenders and which insures the triumphs of our arms and aims. I should like, through you, to send a personal greeting to these heroes of the pick.

Help Find This Man

Coal Age is in receipt of a request from a soldier at Camp Merritt, N. J., to help locate his father, who was a coal miner in Tennessee and left his family four years ago. His name is James A. Nelson; aged about 40; weight 180 lb.; dark complexion; with blue eyes, smooth face; height 5 ft. 11 in. He left three sons, all of them in the service at present, two being in France and one at Camp Merritt. The mother died last April. If anyone reading this notice knows where this man can be found, see that he communicates with his son, Joseph A. Nelson, of the Headquarters Company, War Risk Insurance Department, Camp Merritt, New Jersey.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The labor situation seems somewhat discouraging, partly because it has fallen into an era of recrimination instead of coöperation. There are charges and countercharges, and the industry no longer says one and the same thing. Some have spoken for temperance so forcibly that others have been prompted to deny that the miners are as a whole drunken, which of course no one has been foolish enough to affirm. Some have pointed to the revelry of those who profane the church festivals by improper observance, and in so doing have aroused the antagonism of those to whom the festivals are occasions of religious—and not riotous—celebration. Others have condemned the irregular work of the mine workers with such persistence that the mine workers have countered, charging inefficiency against the operators.

Now clearly this is no time for scolding or recrimination as against any class as a whole. Every remark should be carefully guarded with the intent to prevent too general a reference. The patriotic, temperate and conscientious men should not be offended by broad generalizations directed against a whole class, part of which, it is true, deserves criticism, but part of which is doing its utmost to serve the nation.

There are causes for the harshest of criticism. Some should be directed against certain operators and some against certain miners. The greater part of the criticism must be against the latter, partly because many are foreign and not therefore ready to support us in the war, but partly also because the needs of the hour have not been made plain to them.

But do what we will, some will be made angry. The more angry some are made the better it will be. Criticism which hits all miners alike, however, only lightens the burden for the worthless part of our personnel, which should be loaded, not with a part, but with the entire onus. Classing mine workers in a common category without any respect of persons results in antagonizing the elements by which alone our battle may best be fought.

It is the mine workers who can decree temperance, who can restrict religious observance to the daylight mass, who can require the 8-hour day, who can put their condemnation on all who go to festivals and horse fairs and on all who take their guns from the wall and hunt groundhogs and rabbits when they should be mining coal. As the mine workers "put over" the Liberty Loan, so they can "put over" the steady working day—the 48-hour week. They can and will if right leaders are chosen. But if we are going to have a quarrel as to the relative patriotism, temperance, patience, endurance and even the piety of the two elements of operation—employers and employed—then we are starting the war a-wrong and need to go unsnarling all the material with which we have to work.

There evidently has been an outpouring of energy and right-minded purpose in the coal industry, for though we have lost men the tonnage is nevertheless higher than ever. Some are keeping up the fight, though there are doubtless far more slackers than there should be. Let us be careful of vexing the patriotic men by firing volleys of abuse at the minority of slackers among them.

The man who has nothing but blame in the armory of his corrective effort is quite liable to find that it will not serve his purpose. Judicious praise in liberal measure should welcome every patriotic effort. For instance, for one man who quits a corporation to secure a refund on his Liberty Loan there are dozens who quietly pay up as the payments become due and some who pay even before they are due. It is just as easy to win out by encouraging these men as by condemning the others, and a little failure in diplomacy may anger the honest men while not rectifying the faults of the delinquents.

> *THE miners should report for work every day unless prevented by unavoidable causes, and should not only stay in the mines the full time, but also see to it that they get more coal than ever before. The other workers in and about the mines should work as regularly and faithfully, so that the work of the miner may not be retarded in any way. This will be especially necessary from this time forward, for your numbers may be further lessened by the draft, which will induct into the army your fair share of those not essential to industry.*
>
> *Those who are drafted but who are essential will be given deferred classification, and it is their patriotic duty to accept it. And it is the patriotic duty of their friends and neighbors to hold them in high regard for doing so.*
>
> *The only worker who deserves the condemnation of his community is the one who fails to give his best in this crisis; not the one who accepts deferred classification and works regularly and diligently to increase the coal output.—President Wilson, Aug.* 11, 1918.

All this is written for the operator and his principal assistants. If by any means this review passes to the mine worker it should assume another tone. The mine worker is letting things drift. It is his duty to back the union in its fight for clean coal and contract keeping. It is the duty of every miner to advocate a new attitude toward the whole question of coal production. In the anthracite region the funeral strikes, the little fusses fostered to break the scale, the meetings to create entirely new wage rates should be insistently suppressed. The duty of the mine worker is not fulfilled if he does his personal duty and yet sympathizes covertly with those who are trying to break scales and create new conditions with the Hun in Germany and the friend of the Hun in America as principal assistants. A positive program of nationalism and production is part of the duty of every mine worker. He should not be content with his own vote in the union, he should convince his coworkers. Anything less is half-hearted patriotism.

The demands of the 52 local unions of the northern district of the anthracite region, which includes Scranton and Wilkes-Barre, unreasonable as they are, are not as much to be condemned as the untruthful aspersions with which they are accompanied. It is unbelievable that any men would be found willing to assert that the "coal operators or their subordinates are restricting the output at nearly all the mines." With wages higher than at any time, with some men laying off four days at a time, how can they say also that conditions are unbearable?

Perhaps they are right when they say that now is the time to make an investigation. Perhaps now better than at any time we can find men who will not be afraid to speak plainly about matters and reveal to the world the spirit of covenant breaking which is becoming too common among the workers in the industry. The few malcontents sway the many. Most of the English-speaking miners are punctilious about their honor and the union leaders intend to keep a promise when they make it; but unfortunately there is a turbulent minority always dissatisfied, always

rebellious, which upsets agreements or tries to upset them as soon as those covenants are committed to writing.

The large shortage in car supply is again upsetting production propaganda. Again we have to say "Mine whenever the chance is given." An "if" and an "and" are again introduced into the plea for steady work and this spoils its whole effectiveness. The miner again becomes a casual hand, with all the faults which are inevitable in a casual worker. Of course this does not affect the anthracite region. There are always enough cars there, but it does spoil much good work in the bituminous regions.

Stocking of coal should start again and last till the railroads are relieved of the transit of grain. The earlier grain is moved the sooner the movement will be over, and when it is over the mine worker will have his chance. In giving out cars the possession of a stock pile should be given consideration. The mines which provide these valuable regulators of business should by all means be rewarded. If all mines stock coal, all will be on the same footing; but what a wonderful resource of coal would be provided. An embargo on other merchandise of only a few days would enable the mines to flood the country with coal, whereas that could not be done if the country were dependent on the efforts of the miners.

The note of the President to the mine workers is reproduced in full in the news section. This is an extremely welcome accession to the long list of those who are aiding in the production campaign.

Wage Competition Replaces Price War

President Frank Farrington of district 12 of the United Mine Workers of America (Illinois) is opposed to the practice of paying premiums to miners because this action stirs the men at other mines to demand more money and because the union, in agreement with the United States Fuel Administration, has bound itself to work at the present scale during the war unless the war lasts beyond Mar. 31, 1920. Farrington has protested against premiums in communications he has made not only to the local unions of his own organization, but also in those addressed to the three operators' associations in the state and in letters written to the United States Fuel Administration. He has also taken the matter up with Governor Lowden and with the state council of defense. He urges all miners to work full time and work hard and make no demand for more wages. He is also prepared to go to the limit to have the federal fuel administration close the mines where operators continue to pay premiums. Whereas Illinois formerly had a price war, the operators, having a fixed price, are now engaging in a wage competition which threatens a reduction of their profits to the vanishing point. Frank Farrington knows that profitless operation is demoralizing to the industry and causes unsafe, unhygienic and unfair mining conditions. For this reason he does not approve such unbridled competition for labor, and he opposes it furthermore because it tends to cause the mine workers to break a scale of wages to which they have set their hand.

Want An Increase of 25 per Cent.

On Aug. 5 the delegates from 52 local unions established in every mining section of the northern anthracite field from Forest City to Shickshinny, drafted resolutions demanding higher wages and a government investigation of the anthracite mines. A committee of 12 was appointed to work on a new scale of wages and other benefits. Demands were drawn up which will be presented to the operators by this committee. It is stipulated in the agreement that whatever increase is granted be dated from Aug. 1.

The miners maintain that they are entitled to an increase in wages and to a betterment of conditions because of the unprecedented rise in the cost of living. They say they are making more sacrifices than ever in order to increase the output of coal. The operators know, they say, that the miners would remain at work under any conditions to avoid a crisis next winter, and for this reason they are taking an unfair advantage of them.

The miners unanimously decided to send copies of the resolutions to the president of the district, to the international president, to the War Board, and to United States Fuel Administrator Garfield. It was also decided by the miners that they demand an answer within a month. It is intimated in the Wyoming Valley that unpleasant measures may be taken by the miners if their demands are ignored. The delegates vented no little of their discontent on their district leaders against whom considerable bitterness was exhibited, the complaint being that they had failed to sanction the meeting.

The resolutions, which were unanimously passed, are as follows:

"Whereas, the Anthracite Coal Operators through their publicity bureau and the press of the country, advertised extensively the existence of a shortage of labor and the necessity for an increase in the production of coal, and stated that, if relief were not forthcoming there would be a coal famine next winter, and

"Whereas, it appears that there has been no one willing or able to take up the mine workers' side of this great question and give it publicity, and

"Whereas, it is intimated in these articles in the press that mine workers would be responsible if a shortage of coal occurred, and

"Whereas, we believe that if a careful investigation were made in the proper manner it could be easily proven that the coal operators or their subordinates were restricting the output at nearly all the mines, and

"Whereas, conditions are imposed upon the miner daily such as reduce his earnings and make it harder for him to make a living for himself and family so that the conditions are becoming almost unbearable, and

"Whereas, the operators, knowing our patriotism and love for the cause of our great country at war and believing that we will remain at work under any conditions to avoid a national coal crisis, are taking unfair advantage of us, and imposing conditions on us, which are as bad as we had prior to 1900,

"Therefore, be it resolved, that we court a government investigation of the anthracite mines and urge that the investigation be made through the mines grievance committee, the members of which are the only persons closely connected with the mines and so equipped to know by experience the true conditions of the men in and around the mines, or else by calling together a convention at which representatives of the men in the anthracite region would be present."

The demands which the men make are as follows:

1. That the present war bonus be doubled for outside and inside day work. 2. That time and half time be paid for all overtime worked, and double time for Sundays and holidays. 3. That contract miners be granted an increase of 25 per cent above the rate of pay provided in the Washington agreement. 4. That a minimum rate of $5.50 per day shall be paid to the contract miner and $4.25 per day to miners' laborers.

Pro-German Agent Is Arrested

With the arrest of Joseph Paesteinsch, at Fleming, Ky., it is claimed that a Hun movement to tamper with the mine labor of eastern Kentucky was unearthed. It is said that this man and his associates as agents of the German Government had been endeavoring to start trouble among the miners in an effort to reduce production. As the schemes were discovered early it is not believed that any further trouble will be experienced.

C. J. Norwood, dean of the University of Kentucky, at Lexington, in discussing this matter said: "Scarcity of labor and not Hun agents will cut coal production in Kentucky this year. A large percentage of the Kentucky miners are native born, with only a sprinkling of Germans, Austrians and Italians. Most of these are naturalized, and apparently loyal. Enemy agents so far are having no effect, and the German propaganda has been wasted. Kentucky is fortunate in having a smaller percentage of foreign-born miners than the other states."

EDITORIALS

Record Would Put Blame Where Due

"CONFESSION of a fault," says the proverb, "is half amends." The record of workingmen's time proposed by the Central Pennsylvania Coal Producers' Association and reproduced as a general article last week, if filled with a due recognition of the redemptory value of a frank confession, will be a most valuable stimulant toward larger production. It shows what delays are due to bad places, lack of railroad cars, floods and fires, lack of purchased power, breakdowns, no rails in place, no timber in place, no mine cars, place not cut, lack of air and presence of water and then gives place to one inexcusable item against the mine worker—intoxication—and adds holidays and sickness, which may or may not be excusable. However, two holidays are conceded—Independence Day and Christmas. There is room for two other items. "Breakdown of street car or railroad service" might fill one of the spaces provided and "returning home early" another.

The operator's difficulties, of course, make it impossible to obtain a 100 per cent. record, such as the mine workers may, at any time, obtain and should obtain, if they are in good health and railroad-car service is satisfactory. The operator has to depend on labor supply, and the shortage of labor is hampering him. That is the sole reason for introducing these forms. In nearly every case, it will also be the reason for the failure of the operator to make a perfect score. Labor may be, and often is, to blame for the failure of the operator and the committee which will keep the record will be tempted, if not justified, in writing down "intoxication" as the cause of delay whenever a man goes home because his place is not cut when the reason it is not cut is that the man appointed to do it was intoxicated and would not cut it. There are many other similar temptations to transfer the burden of failure from the operator to the worker, for many of the delays are due indirectly to labor's failure laying labor idle. Such causes are breakdowns, undelivered timbers, mine cars not placed, air ill-distributed and water not removed.

Moreover the temptation will be increased if the man thus delayed goes home at once and makes an hour or two of excusable delay the reason for a day of inexcusable idleness. As has been said, presence at one's work for eight hours can be supplied at any time when a man is well. The mine worker really should give that attendance though it may try him severely if he finds that those who "fly off the handle" and threaten to go home or who are in the habit of leaving work before the whistle blows are given undue preference. His patriotism will also be severely tried if he discovers that when working to remove the cause of delay—pumping the water or ditching it away—he is not credited with pay for his labor.

But in any event as the record is largely a personal record the mine worker should not be credited with another's fault if he really cannot possibly make a complete record. The operator may have to stand the blame even though it is largely not his, but the fault of some human link in the chain which elects to break incontinently. The record will in any event stimulate the operator to greater efforts and analyze his failures in regularity of operation as the cost sheet has analyzed the economy with which his plant is conducted.

It will not be surprising if the record when honestly filled is a little depressing and annoying to the operator unless the committee decides to fill it out by reporting unfavorably the absences of all men who leave their places while the mine is still working or who fail to report on working days, for the shortage of labor and the lack of material and supplies makes a "bull's eye" record almost a phenomenon. Conscience unfortunately will have much to do with this report and conscience is a variable quantity.

One might have wished that "air and water"—lack of air and presence of water—had not been copulated. Lack of air is much more condemnatory than presence of water and it is well to separate these two causes, for the correction of them is quite different. Intoxication and holidays should not be combined, nor floods with fires.

If Coal Had Been Stored at the Mines

IT IS A PITY that in the early months of the year when cars were scarce more coal was not stored at the mines. Had it been done the mines could have flooded the railroads with coal when cars were plentiful.

In the first weeks of this present year less cars were furnished than last year, and yet even last year's cars in January were less numerous than the year before. Early in February the car supply of 1918 became better than in 1917, but up to the Fourth of July in most places coal could have been stocked with advantage. Unfortunately the railroads had failed so completely to meet the situation that few thought well to make preparation for the time when the railroads would be able to supply more cars than were needed to accommodate the daily output.

Should the military draft and other influences continually lessen the ability of the operators to produce coal, and should the activity of the railroads be unhampered, and both propositions seem conceivable, it is quite likely that there will, at times, be plenty of opportunity to load stocked coal. In fact it should be the customary plan during the war to stock coal whenever the mine would otherwise be idle wherever the topography makes such a practice feasible. The steady production resulting would make the practice profitable. In this way both mines and railroads would work at full blast every day, and the mines would be able to furnish assistance to the farmer even in the early summer when car supply is at its best.

Gave Their "Fourth" to the Red Cross

UNDER this head we present a poster this week commending the patriotic work of the men of the Jewell Ridge Coal Corporation, with offices in Tazewell, Va. The mines are at Jewell, Tazewell County, and the coal mine is in one of the Pocahontas measures, No. 8 to be exact. The high quality and smokeless character of the coals of the Pocahontas series fits them well for bunker purposes, and the men who mine these coals have a right to feel that they are more than usually privileged in their opportunity to back up the sailors on the ocean front.

Only a few of the men are shown in the upper picture, which does not include some of those who posed for the photographer. The group had lined itself up in front of the Y. M. C. A. building. The second illustration shows the small schoolhouse and the children merrily at play. George W. St. Clair, the secretary of the company informs us that "we have been fortunate enough to have college graduates for teachers each year." Doubtless this matter came by design and was not wholly fortuitous. The lowest illustration shows the village of Jewell, situated 500 ft. vertically above the drift mouth.

One may be pardoned for listing the names of those who have given Jewell Ridge a preëminence for civic virtue to which no mere size would entitle it. Thomas M. Righter, of Mt. Carmel, Penn., was president, but he died on July 12. George W. St. Clair has been already named in this notice. J. B. Collins, a trained industrial secretary, manages the Y. M. C. A.; J. J. Delp is superintendent and R. J. Blakenship is mine boss. These men are entitled to full credit for creating a generous and devoted spirit in the personnel of the mines.

It is only fair to add that the miners of Jewell were by no means the first to give a day to the American Red Cross. Whole districts have done this. The exceptional character of their sacrifice was the surrender of the Fourth of July to the need of their country. By celebrating that day as they did they gave twice to the cause. They gave the navy coal it could not otherwise get, and it gave the Red Cross a big boost in the financing of its gigantic program.

The One-Industry Nation

GRADUALLY the entire industry of the country is taking one trend, is being focused upon one point —that of winning the war. Steadily we have seen the steel output turned to national needs, and the products of the factories, the mines, the farms, etc., are inevitably moving in the same direction. The progress that has been made toward this end has been rapid since our entrance into the world conflict—more rapid and complete than has been that of some of our allies who have been in the war since its beginning.

We print on page 303 a résumé in abstract from the *Journal* of the British Board of Trade. This shows among other things that at the time the article was published in the *Journal* only the London district of Britain was "on coal rations." Although the coal industry was under complete governmental control, it had not as yet been found necessary to ration any portion of the country outside of the London area.

In the United States, on the other hand, the entire country is "on allowance," and it is believed that all Britain will soon be rationed also.

In the conduct of the war this country has followed closely the example of England, and will doubtless continue to do so. This country has not even yet thoroughly realized that we are at war. In England that realization is a grim and stern reality.

Britain is today prosecuting but one business—that of war-making. It is stated that all other interests are, if not forgotten, at least side-tracked and neglected. Political issues arise which in normal times would create a furore from one end of the land to the other. Today they are settled after a half-hour's debate in Parliament, and if noted at all by the average Britisher they are considered as being merely interesting side shows to the great tragedy being enacted across the channel. The one and only business that occupies the attention of the British is the conduct of the war.

The citizen of Great Britain today has less personal liberty than was enjoyed in the early days of King John before the populace of the realm demanded and received the Magna Charta—yet nobody cares, no one complains. Lloyd George exercises greater power than any monarch who ever sat upon the throne of all Britain, yet no one raises a voice of protest. As one man the English people are working with unshakable determination, full speed, full steam ahead to defeat the Hun.

And as the blue stars upon the service flags displayed from the windows of millions of American homes begin, slowly at first and then more and more rapidly, to one by one change their color to that of gold, America will gain the spirit that now pervades England and France. The time is not far off when we also as well as our allies will have but one business, but one aim, but one purpose. The sooner that time arrives the sooner will that purpose be fulfilled.

The Hand of All for the Help of All

THE war is teaching us that our ideas, our plans and our ambitions must be at least nation-wide, if not wider. The methods and mechanisms we devise are not ours, but our country's. To hold them for ourselves alone is not modesty, but meanness. The things our brain has conjured up to produce more efficiency and greater safety, good will in the industry and health for the worker, should be communicated to others for their imitation. We who want to read and absorb such ideas should be as ready to distribute what we have as we are to accept those which others have conceived.

Thus we all owe a duty not only to the industry but through the industry to the nation. On Sept. 12 *Coal Age* will have a Safety, Welfare and Convention Number in honor of the National Safety Council, which has done so much to save lives by arranging for a free exchange of ideas on safety and by stimulating safety practices in all forms of industry by cartoons and posters.

Coal Age invites its readers to send articles on safety and welfare for that issue. Its many readers cover the whole field of mining safety and mining welfare. Their devoted efforts in that work have resulted in developments of value and interest. Let us serve as the medium for their further distribution and broadcasting. All articles used are paid for at a fair rate of remuneration.



These Men gave their "Fourth" to the Red Cross





1. Some of the Jewell Ridge patriots.
2. And the coming generation at play.
3. Road their boys took for "Over There".

The Jewell Ridge Coal Corporation, of Jewell Ridge, Va., planned to hold a big Fourth of July celebration with a band playing and flags flying. But the miners thought it would be a waste of time and of money, and the United States wants both badly just now.

So they declared they would mine coal and thus help the boys on the battleships and transports. They gave all they made to the Red Cross and the company did the same. These men of the Virginian mountains, by their example, teach us all a splendid lesson.

COAL AGE

DISCUSSION BY READERS

Ventilating a Gassy Slope Mine

Letter No. 1—I have read the inquiry of "Mine Foreman," *Coal Age*, July 25, p. 191, asking for the best method of ventilating a mine opened by a slope pitching 6 per cent., when the seam is generating large quantities of gas. I heartily agree with the editorial suggestion made in the reply to this question, where it is stated that three main slopes should be driven on the full dip of the seam, the center one to be used as the main intake and haulage road, while the two side slopes serve for the main return air-courses on their respective sides of the mine.

Let me add, also, what the editor probably had in mind judging from his statement at the close, that each lift of cross-entries should be ventilated by a separate split of air to insure the best results. This should be done as early in the development of each split as possible, since it will render the entire circulation ascensional, as far as that is practicable.

In my opinion, this mine should be ventilated by a large centrifugal fan of ample size and capacity. Also, the return airways should be of good size and unobstructed. I fully endorse the suggestion, that the ventilation of the mine should be on the exhaust plan. Also, a duplicate fan should be installed for use in case of emergency, and each of these fans should be large enough to meet the requirements of the entire mine. This is important in order to avoid shutting down the mine in case of accident to the ventilator.

Air-Tight Stoppings of the First Importance

Another important feature in respect to maintaining adequate ventilation is that of building air-tight stoppings throughout the mine, especially the stoppings separating the main slope from the air-courses on either side. It must be remembered that the main intake current always seeks the line of least resistance, which occurs at every leaky stopping. The result is that, where leaky stoppings exist, a large volume of air may enter and leave the mine, while the circulation at the working face is deficient.

At the first point where the air current must be split, it will be necessary to ascertain whether the natural division of the air will meet the requirements, or whether it will be necessary to build a regulator, which every practical man knows must be placed in the short split, since it is this one that will take more than its share of air unless some means is used to prevent. Sometimes when both splits are of the same length, one will take more air than the other because it runs to the rise, causing a natural air column to form in the entry.

Where the natural division of the air meets the requirements, it is evident that such a condition will prove of great advantage, since a regulator always absorbs a certain proportion of the power. We learn that a regulator placed in an airway has the same effect as increasing the length of the airway which, of course, would mean an increase of power on the air. In the development of a large mine, these points, which appear small in themselves, will frequently cause a considerable increase in the power required for the proper ventilation of the mine.

Plymouth, Penn. JOSEPH R. THOMAS.

Blasting a Ditch in a Mine

Letter No. 1—Kindly permit me to offer a suggestion in respect to the inquiry of George Smith, relating to blasting a ditch at the side of a slope road where 10 x 10-in. timber frames are set on 4 x 10-in. mudsills. It is stated that the ditch must be blasted in a hard bottom underlying the mudsills.

It is difficult to understand why the timber frames were set on mudsills, in this case, the bottom being hard. Usual mining practice is to employ mudsills only when the bottom is so soft that the legs would sink into the floor. However, accepting the proposition as it has been stated, I would suggest the following method of procedure:

Stand temporary posts under the collars of three or four sets, about 18 in. from the track, so as to allow the passage of the cars. Then take out the legs of these sets and the mudsills beneath them, which will give an opportunity to drill and blast the ditch at that point.

The holes for blasting should be drilled only to the depth required for drainage, and allowance made for a ditch 18 or 20 in. wide at the top. Care should be taken to drill the holes close together so that but a small amount of powder will be sufficient to break the rock. By this means, little or no damage will be done to the timbers.

Having completed the work under these four sets, the legs should be replaced and the temporary posts taken out. If the work has been properly planned, the mudsills can now be laid on the side of the ditch close to the rib. In the same manner another section of three or four sets can be treated and the ditch extended. I might say that where the ditch is shallow it may be practicable to use a point, made of octagon drill steel sharpened like a pick point. With this tool, it will often be possible to split up the rock, using wedges to assist the work. If this can be done it will not be necessary to use explosives, although the process will be much slower and increase the expense.

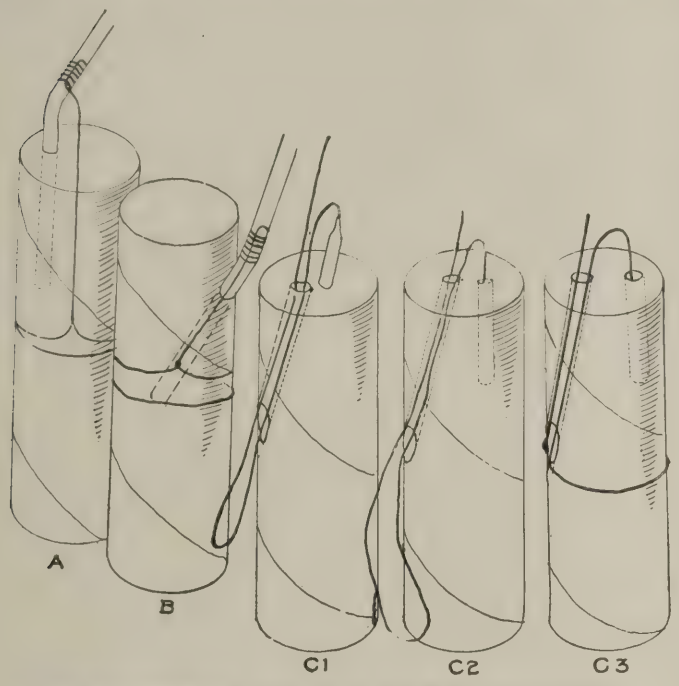
Let me say that, in my opinion, the ditch is much to be preferred to the siphon or pipe line suggested in the reply to this inquiry. It is true that the ditch would have to be cleaned, from time to time, but it would give better service and prove more permanent as a means of draining the slope, which is of the utmost importance when this is the main haulage road of the mine.

Cassidy, B. C., Canada. J. W. P.

Priming a Cartridge

Letter No. 1—I examined carefully the methods described by William Crocker, *Coal Age*, Aug. 1, p. 203, and H. J. Broughton, page 214 of the same issue, in regard to priming a cartridge. While I can agree with much that has been said by these two contributors, I would like to present the methods I have employed for this purpose, in my own work, during 25 years of practice in the blasting of rock tunnels and slopes and sinking shafts. These methods have always proved successful.

The accompanying sketch shows three arrangements, *A*, *B*, *C*, that I have employed at different times, in



SECURING THE CAP IN A PRIMER CARTRIDGE

blasting with the ordinary tape fuse, having a detonating cap crimped on the end, or when using electric detonators. The first two methods can be used in either case, but the last method is designed for electric fuse only. They are described as follows:

In the first method shown at *A*, a hole is punched in the center of the top of the cartridge, by means of a small wooden stick slightly tapered and rounded at the end. The electric detonator or the ordinary tape fuse with a blasting cap crimped on the end is inserted in this hole. As shown in the figure, the cap is made secure in the cartridge by a string tied to the fuse an inch or two above where it enters the cartridge, the other end of the string being made fast around the cartridge a short distance below the top. This prevents the strain of the fuse coming on the cap and dragging it out of the cartridge.

In the second method, as shown at *B*, the hole is punched in one side of the cartridge, running diagonally toward its center. The electric detonator or the ordinary tape fuse with cap is inserted in this hole and made secure with a string, in the same manner as described in the first method. In either of these methods, when the ordinary tape fuse is used, care must be taken that not more than ¼ in. of the fuse enters the cap, in which case there would be danger of the burning fuse igniting the dynamite, before the cap is detonated, which might prevent the detonation of the cartridge or lessen its force.

The third method, which applies to electric exploders only, is illustrated by three sketches, showing three stages of the operation. In the first stage shown at *C1*, a hole is punched near the center of the top of the cartridge and extends diagonally downward through one side. The lead wires of the fuse are now doubled back on themselves, about 18 in. from the cap. The double wire is inserted through the top of the cartridge and passed out through the side, forming a loop.

In the second stage, another hole is punched in the top of the cartridge about ½ in. from the first hole and the cap inserted into this hole, as shown at *C2*, in the figure. The third and last stage completes the operation by passing the loop formed in the wires around the cartridge and drawing them tight. In this manner the strain of the wires is prevented from coming on the cap and dislodging it from the cartridge.

Charging and Tamping the Hole

The charge and primer are now carefully inserted in the borehole and tamped with damp clay or other loose material gathered from the road, taking care to use only material that will not burn. "Bug dust" or the cuttings of machines must never be used for tamping. In any event, it is well to use a small plug of wet clay and press this gently down on the top of the primer. Then tamp gently for 8 or 10 in., using more force as the tamping proceeds to the mouth of the hole.

In closing, permit me to say that, in all my experience of 25 years, I have never heard of leaving an air space between the charge and its tamping, as suggested by Mr. Broughton and explained on page 216. In order to secure the best results in blasting, the charge should be packed in the hole so closely that no air spaces remain, which lessen the effectiveness of the expanding gaseous products. This would act in the same manner as clearance in a compressor cylinder acts to destroy the efficiency of the compressor. The firmer the tamping, the greater will be the execution of the explosive. Care must be taken not to disturb the detonator fixed in the primer when starting to tamp the hole.

Wilkes-Barre, Penn. J. P. G.

Safety in Shotfiring in Mines

Letter No. 7—To my mind, the most important feature, in connection with securing a maximum safety in the firing of shots in coal mining, is the use of electricity for that purpose. Employers of labor are recognizing, now more than ever, that it pays to protect the lives and health of their employees. It is almost impossible to step into any industrial plant of any size, without being confronted with the sign "Safety First."

In respect to safety, the method of firing shots by electricity possesses the greatest advantage over other methods. It has occurred to me that a brief description of the methods we have employed in our mines in blasting the coal would be of interest. It is well known that the coal seams of Franklin County, in this state, produce a good deal of gas. On this account, the use of black powder gave place to permissible powders long ago.

A customary charge is four sticks of the powder, although occasionally a miner will charge five sticks in a single hole. A sharp stick is used to make a hole in one of the cartridges, and a percussion cap is inserted to explode the charge. Most of the miners are using cotton-tape fuse to explode this cap, and I am only aware of one company in the county where the shots in their mines are fired by electricity.

The coal is all cut by machines, the fine cuttings and dust being loaded into a car and hauled out of the mine. According to agreement, the coal cut in each place is properly snubbed before a shot is fired in the place. The width of the room is 26 ft. Three shots are fired in each room, one center and two rib shots. The center shot is always fired first, which gives the rib shots a better chance to work.

Electric Firing in Illinois Mines

Where electric fuses are used in firing, the lead wires are 8 ft. long, which permits the ends of the wires to hang out of the hole far enough to attach the firing cable. The work of preparing and charging the shots is performed by the miners but all shots are fired by competent shotfirers after the men have left the mine.

When firing the shots, the shotfirer leaves his battery in a crosscut on the entry and drags the cable after him to the face where the shots are to be fired. The cable is of the twin type prepared especially for the purpose. The shotfirer scrapes the ends of the wires bright and, likewise, the ends of the lead wires, attaching them, in turn, to the wires of the firing cable. Having done this, he returns and connects the other ends of the cable wires with the poles of the battery.

Use and Care of Portable Hand Batteries

In the mine where I was employed there were six shotfirers, who did all the shooting for 375 or 400 loaders. The battery used was of small size, about a 6-in. cube, weighing 8 lb. The armature of this battery is operated by a spring, which must be wound up, and is held by a catch until released by pushing a button when the shot is to be fired. The battery is strong enough to explode four shots at one time if required, but care is needed to keep it in good condition. It must not be left in the mine where it would be injured by dampness and cause much trouble by frequently failing to explode the shots.

From time to time, the batteries used in blasting must be overhauled and a little oil applied to the bearings; loose connections should be tightened and the brushes cleaned and sandpapered. With proper care a battery will give good service for a long time. Some of the batteries, at the mines of the Old Ben Coal Corporation, have been in use five years, others for three years, and their use has never caused an accident. When it is considered that the No. 8 and No. 9 mines of this company, at West Frankfort, are hoisting between 8000 and 9000 tons of coal a day, some idea will be formed of the number of shots that are fired in these mines.

Briefly enumerated, the advantages of the electric firing system are: (1) The shotfirer is always in a safe place when the shot goes off. (2) There is no risk from a short fuse. (3) A possible fire started by the explosion of a shot is always detected by the shotfirer, before he leaves the place, which is not the case when the firing is done by fuse. I recall two instances when, as shotfirer, I discovered that the shots had ignited a gas feeder, which would have caused a disastrous fire if the burning gas had not been detected in time and extinguished.

SHOTFIRER.

West Frankfort, Ill.

Squibs vs. Electric Fuse

Letter No. 1—In response to the invitation to discuss the relative safety of single- and double-tape fuse, squibs, electric fuse, and electric detonators, for blasting coal, given in the reply to the inquiry by "Miner," *Coal Age*, July 20, p. 145, let me say that electric fuses and detonators are much the safest to be used, in my opinion.

My experience, derived largely in the old country, convinces me that there is greater safety in the use of any electric appliance, in place of the best quality of tape fuse, for the firing of shots in coal mining. If permitted, I will recite one or two instances to illustrate this point. In the first instance, 2 ft. of double-tape fuse continued to burn for 45 min. before setting off the charge, and in the second instance 2 hours.

Danger of Firing Shots with Tape Fuse

We were driving an incline in a 2-ft. seam of coal and lifting, on the average, 5 ft. of bottom. The explosive used was gelatin dynamite. We had encountered a large boulder of unusual hardness. With considerable effort, however, the leading miner succeeded in making a small pocket on the top of the boulder, in which he placed 150 g. (5¼ oz.) of gelatin dynamite primed with a detonating cap attached to the end of a 2-ft. length of double-tape fuse. The charge was covered with a handful of fireclay and the fuse ignited, after which we retired for lunch.

A half hour later the charge had not exploded. At that time, the foreman happened to come around and started down the incline. Believing that the fuse had gone out and fearing to warn the foreman of his possible danger, we allowed him to proceed. He had but just returned, a few minutes later, when the shot went off, much to our surprise and that of the foreman, who ordered us to report to the office that night. The foreman was so overcome by the thought of his narrow escape, that he could scarcely speak.

Another instance occurred when working on the night shift and packing a room with refuse slate and rock. A large rock had to be blasted, and a charge of 700 g. (1½ lb.) was used for that purpose. To ignite the charge the usual 2-ft. length of fuse was used. We listened in vain for the shot to go off.

Having in mind the mistakes of others in returning to a blast before it exploded, we waited a long time and then decided to put up some timbers in an adjoining place and not return to the shot. The result was that two hours later we heard the shot go off. Many accidents have come to my knowledge, caused by men returning to investigate a misfire, and practically all of these occurred in the use of a good quality of double-tape fuse.

Speaking of squibs, there are two general kinds used in the old country. First, there was what my friend

has called the "red spitter." It was the usual form of rocket squib, having a sulphur match for its ignition. This squib threw a shower of sparks into the air when the match reached the powder, and was dangerous to use in the presence of gas. What we called the "gas squib" had a match so impregnated that no flame was produced. This form was considered safe for use in gas.

In the use of tape fuse, I recall that a special igniter was employed, which consisted of a paper cartridge placed on the end of the fuse and capped with copper. Inside the cartridge was a small friction cap that produced the spark and ignited the sulphur with which it was in contact. The friction cap was exploded by a small key at the end of the cartridge. The sulphur fumes produced showed that ignition had taken place, but no sparks appeared outside the hole. The device did not prevent misfires, but as these cartridges were only carried by the shotfirers they were responsible for their use.

Let me repeat, in closing, that the safest of all means of firing shots is by the use of electricity. By means of the electric fuse, a charge of black powder can be ignited at its center, which greatly increases the execution, the charge being far more effective than when it is ignited at the top of the powder as when squibs are used. Even the best quality of triple-tape fuse will spit fire and ignite the top of the powder when the fuse has been extended to the center of the charge. Also, electric detonators do not need to be crimped, as is necessary when placing a detonating cap on the end of a fuse.

GASTON LIBIEZ.

Cedar Point, Ill.

[There appears to be some confusion in the terms applied to the different types of electric exploders. What is generally termed an "electric detonator," as has already been explained, consists of a copper cap containing a charge of high explosive, which is ignited either by an electric spark or by the heating of a platinum-wire bridge connecting the terminals of two copper wires that pass into and are secured in the cap.

The low-tension exploder uses the wire bridge to ignite the fulminate that explodes the charge, while in the high-tension exploder the fulminate is ignited by the spark passing between the wire terminals. The term "electric squib" is sometimes wrongly applied to the electric fuse, in which a paper cap is used filled with an explosive capable of igniting the charge, but causing no detonation.—Editor.]

The Miner and His Pleasure

Letter No. 1—Trusting I may be granted the privilege of explaining a statement made in my letter on "The Mining Situation," *Coal Age*, June 29, p. 1208, regarding miners owning and using automobiles, I desire to say that, in speaking of the large number of automobiles driven by miners and their frequent visits to other mining camps and towns, it was not my intention to question the right of a miner to own and operate an auto. That thought did not enter my mind.

I have been a miner, myself, long enough to know that he needs all the pleasure he can get. If he can find his pleasure in a car and has the money to buy one, no one has a better right to own and use an auto than the man who toils beneath the ground. Far be it from me to take from the miner any of the few enjoyments he has in life.

My reference to the autoing of miners was intended to emphasize the great need of increasing the production of coal at this time. My contention was then and is now that the miner should not allow pleasure to interfere with his regular work in the mine. In the present crisis, loyalty demands that pleasure must give place to work, and this does not apply to the miner alone, but to every man connected with the coal industry whether he be mine official or miner.

No one will deny that the need of an increased production of coal is pressing. It must be apparent to every observer that much time is lost by mine workers absenting themselves from the mine instead of sticking close to their work. To overcome this evil, I suggested the employment of a truant officer to hunt up men who are out of their places and ascertain the reasons for their absence. It was the best suggestion I had to make and it was my hope that others would follow with a better one. The plan is not original with me, as I have seen it tried where it worked successfully.

Result of Not Enforcing Penalty Ruling

When the ruling was first made of imposing a penalty of $1 for each day a miner was out of his place, the money to be paid to the Red Cross, we understood that it would be enforced and notices were posted to that effect. The result was that little time was lost by the miners that month. When it developed, however, as it did later, that the fines were not collected, miners again laid off and did not work regularly every day the mine was running.

Before closing, let me refer to the exception taken by Fred Hicks, in his letter, July 20, p. 144, to my statement that 90 per cent. of our men are foreign born and many of them could not read, so that all they know is what they hear. Mr. Hicks claims that 95 per cent. of the men working in the anthracite region can both read and write. I regret that such is not the case in our own locality, and am certain that my former statement is well within the mark.

It is not the fault of a foreigner that he cannot understand the English language and is unable to read or write the same, it is rather his misfortune. I have the utmost sympathy and respect for this class of workers in our mines, as many will testify who have worked for me.

However, as I remarked before, it is hard to make these men understand the seriousness of the present situation. Perhaps we are more to blame than they, for this failure on their part. There has been, however, a great change in this respect. Efforts are now being made to educate our foreign workers, and the mine boss or superintendent who does not use these men right and give them all the assistance they need is not wanted by the best companies. One of the most urgent duties of the mine foreman, today, is the education of his men, especially the foreign born, to understand what is wanted of them and to instill the principles of loyalty and true citizenship in the mind of every worker.

THOMAS HOGARTH.

Coal Run Mines, McIntyre, Penn.

INQUIRIES OF GENERAL INTEREST

Loss in Storage of Anthracite

Can you give any data, or say where to find them, regarding the loss in the storage of anthracite? Is there any diminution in weight when the coal has been dumped in a pile and allowed to remain, say a year before being used? I refer only to the natural and unavoidable shrinkage due to dusting, loss in handling several times and weathering. This information is of particular interest at present and will be greatly appreciated.

New York City. H. M. D.

The chief loss in the storage of anthracite in open piles is the loss by breakage, resulting in the degredation of the several sizes and the consequent depreciation in market value of the aggregate. As is well known, what are called the "prepared sizes" of anthracite; namely, broken, egg, stove and chestnut, command a higher price in the market than the smaller sizes of steam coal, which include pea, buckwheat, rice and barley.

Because of the breakage due to handling, the aggregate weight of the prepared sizes is decreased and that of the smaller sizes increased, in storage. The loss of weight, due to weathering, is practically inappreciable, in a limited period of storage of anthracite, as has been shown in the clean-up of large storage piles of this coal.

In an interesting and valuable paper prepared by R. V. Norris, consulting engineer, Wilkes-Barre, Penn., and read before the Wilkes-Barre meeting of the American Institute of Mining Engineers, June, 1911, it is shown that the depreciation in market value of anthracite stored in piles, aggregates, for all sizes, 5.36c. per ton. In his paper Mr. Norris gives the following table based on 1,000,000 tons of assumed quantities of egg, stove, nut and pea, stored on the Dodge system of large open piles:

Size	Original Quantity, Tons	Price per Ton	Original Value	Quantity Shipped, Tons	Price per Ton	Final Value
Egg	350,000	$5.00	$1,750,000	300,300	$5.00	$1,501,500.00
Stove	200,000	5.00	1,000,000	219,450	5.00	1,097,250.00
Nut	200,000	5.00	1,000,000	210,480	5.00	1,052,400.00
Pea	250,000	3.25	812,500	253,240	3.25	823,030.00
Buckwheat	.....	.....	.....	7,775	2.50	19,437.50
Rice, Barley	.....	.....	.....	8,755	1.75	15,321.25
Totals	1,000,000	.....	$4,562,500	1,000,000	.....	$4,508,938.75

Loss, $53,561.25, or 5.36c. per ton.

In the same paper, Mr. Norris shows that the loss by breakage of the coal when stored in bins or pockets, is far greater than when stored in open piles. In an estimate based on 1,000,000 tons of assumed quantities of broken, egg, stove, nut and pea, he shows that the depreciation in market value was found to reach 54.5c. per ton. The following table, presented by Mr. Norris, was prepared from several tests, although not representing average conditions, owing to the pockets not being filled in any instance, thus causing a greater drop and somewhat increasing the average breakage above what would occur when the pockets are completely filled:

Size	Original Quantity, Tons	Price per Ton	Original Value	Quantity Shipped, Tons	Price per Ton	Final Value
Broken	130,000	$4.75	$617,000	96,040	$4.75	$456,190.00
Egg	225,000	5.00	1,125,000	191,770	5.00	958,850.00
Stove	195,000	5.00	975,000	192,410	5.00	962,050.00
Nut	200,000	5.00	1,000,000	215,040	5.00	1,075,200.00
Pea	250,000	3.25	812,500	248,630	3.25	808,047.50
Buckwheat	.....	.....	.....	35,515	2.50	88,787.50
Rice, Barley	.....	.....	.....	20,595	1.75	36,041.25
Totals	1,000,000	.....	$4,530,000	1,000,000	.....	$3,985,166.25

Loss: $544,833.75, or 54.5c. per ton.

Mr. Norris draws attention to the fact that the cost of handing each way, including labor, repairs to equipment and supplies, but making no allowance for taxes, interest on investment and depreciation, will vary greatly owing to periods of inactivity when fixed charges continue in force. The tabulation, however, is suggestive and valuable.

Natural Mine Ventilation

The following question asked in a recent examination has puzzled me and others. Can it be answered in two ways? A mine has two openings, one 150 ft. higher than the other, at the surface. The outside temperature being 60 deg. F. and the inside temperature 40 deg. F., in what direction will the current flow and why?

Shamokin, Penn. ASSISTANT FOREMAN.

The correspondent does not state whether the seam is flat or has an inclination and, in replying, it must be assumed that the temperature throughout the mine and the shafts is 40 deg. F. On this assumption, the air in the upper part of the deeper shaft would be cooler than the outside air. The upper 150 ft. of air column in the deep shaft would then outweigh the corresponding 150 ft. of atmospheric column above the shallow shaft, while the remaining shaft and atmospheric columns balance each other. The result is that a downcast current is formed in the deeper shaft and an upcast in the shallow shaft.

However, in practice, the pressure due to these air columns cannot be estimated on such assumed temperatures, since the temperature of the air entering the deeper downcast shaft will be greatly modified by reason of its higher temperature in the atmosphere before entering the shaft.

While the average temperature of the upcast air, in the shallow shaft, can be assumed as 40 deg. F., the average temperature of the downcast air in the deeper shaft will be somewhat higher, depending on the depth of the shaft. This will have the effect to reduce the effective air column producing the circulation. The problem is further modified by the fact that the second opening may be a drift, instead of a shallow shaft. This would reduce to a minimum the counteracting effect of the increase of temperature in the downcast air caused by the warm air entering that shaft.

EXAMINATION QUESTIONS

Mine Foremen's Examination, Shamokin, Penn., Apr. 23, 1918

(Selected Questions)

Ques.—What precautionary measures would you take with the abandoned portion of a mine in operation?

Ans.—The Anthracite Mine Law of Pennsylvania requires that all abandoned parts of a mine in operation shall be, as far as practicable, kept free from accumulations of dangerous gases and water, or the inspector of the district notified when it is found impracticable to do this. General practice has been to ventilate all abandoned portions with a sufficient air current to prevent the accumulation of gas, or to seal off such abandoned places by building air-tight stoppings. When abandoning any portion of a mine permanently, all track material and other equipment should be removed and timber withdrawn, for use in other places.

Ques.—In case of a squeeze occurring in a mine under your charge, at what stage of its progress would you consider yourself justified in stopping operations and withdrawing the workmen?

Ans.—When there is plain evidence that a squeeze has started in a certain section of the mine, safety would require that the men working at the face in that section should be withdrawn promptly and not permitted to return to their working places until the mine is again quiet. During the progress of a squeeze there is danger of loose pieces of slate or rock falling at the face. Sections of the roof that would otherwise be safe may suddenly be loosened and fall, during the progress of a squeeze. At such times, little warning is given by the falling roof. Only competent men should be employed to do what they can to arrest the progress of a squeeze by drawing timber in certain standing areas that have been abandoned and working back pillars in other sections of the mine that are as yet unaffected by the squeeze. Every reasonable effort should be made to start a heavy roof fall, in adjoining sections, so as to relieve the pressure on the pillars in those sections of the mine affected by the squeeze.

Ques.—When the water gage is 1.85 of an inch, what pressure per square foot does it indicate?

Ans.—Each inch of water gage corresponds to a pressure of 5.2 lb. per sq.ft. in the airway at the point where the gage reading is taken. A water gage of 1.85 in., therefore, corresponds to a pressure of $1.85 \times 5.2 = 9.62$ lb. per sq.ft.

Ques.—In driving a gangway in the Mammoth vein, the coal being of a bursting nature, timbers are set 5 ft. apart; what precaution would you take in making room for the next set of timber?

Ans.—Besides setting the usual temporary posts for the protection of timbermen when putting the next timber-frame in place, means should be taken to support the side pressure on the ribs and prevent the bursting out of the coal, until the required lagging can be placed behind the timbers. For this purpose forepoling or a system of temporary lagging should be employed. Where the roof is frail it should also be supported by forepoling.

Ques.—What method of ventilation reduces the danger of explosion, also friction?

Ans.—Splitting the air current as often and as quickly as the development of the entries will warrant affords a better control of the ventilation in each section of the mine, reduces the velocity of the air at the working face, provides fresh air in each section and conducts the gases generated therein directly into the return current, thereby reducing the liability to an explosion. The reduced velocity, also, greatly lessens the friction.

Ques.—The anemometer makes 275 r.p.m., in an airway that measures 7 ft. 4 in. at the top, 11 ft. 11 in. at the bottom, and is 7 ft. 6 in. high; what quantity of air is passing?

Ans.—The average width of this airway is the half-sum of the top and bottom widths, which is 9 ft. 7½ in., or 9.625 ft. The sectional area of the airway is, therefore, $9.625 \times 7.5 =$ say 72 sq.ft. Taking the speed of the anemometer indicated by the dial, as the average velocity of the air current, the quantity of air passing in this airway is $72 \times 275 = 19{,}800$ cu.ft. per min.

Ques.—Which should be the largest, the inlet or the outlet airway, in a mine, and why?

Ans.—Considering the ventilation only, the return airway of the mine should have a larger sectional area than the intake, for several reasons: (1) There is always more or less gas generated in a mine, which increases the volume of the return air current. (2) Almost without exception, the temperature of the return current is higher than that of the intake, which expands the volume of the return air, making it larger than that of the intake current. (3) Since air flows from a point of higher pressure to a point of lower pressure, it follows that the return current is subject to a less pressure than that of the intake. This reduction of pressure on the return airway acts to increase the volume on the return current, which is true whether the fan is blowing or exhausting.

It may be important to consider other practical questions relating to the working of the mine, in deciding the relative size of the intake and return airways. For example, in a gaseous mine where the haulage is generally performed on the intake airway and men are compelled to travel on this road in passing in and out of the mine, safety requires that a good clearance should be provided at the side of the track to enable the men to pass the cars with safety. This consideration may require a larger sectional area on the intake than is necessary in the return airway. Also, the movement of the cars, and especially that of the loaded trip passing out of the mine, offers considerable obstruction to the air current, and this consideration, again, may require a larger sectional area for the intake airway.

COAL AND COKE NEWS

What Happened in July

[The bracketed figures in the text refer to pages in the present volume, reference to which will give fuller information regarding the matters discussed in the item to which the bracketed figures are attached.]

July 1—New prices are set for coal delivered in Cook County, Ill. (Chicago)—John S. Wentz, one of the principal stockholders in the Wentz Coal and Iron Co., Wentz Corporation, Upper Lehigh Coal Co., Maryd Coal Co., Midvalley Coal Co., and J. S. Wentz Coal Co. dies at Philadelphia [84]—Strike ends at Tuxhorn mine, Springfield, Ill., where negroes and foreigners had clashed [71].

July 2—Henry F. Shoemaker, a leading coal operator in Ohio dies in New York City—The Fuel Administration adds 25 inspectors to its staff to watch the preparation of bunker coal [22].

July 3—Viscount Rhondda, formerly David A. Thomas, British Food Controller dies. Lord Rhondda, as D. A. Thomas, was closely bound up with the development of the South Wales coal fields and it was expected at one time that he would become a large owner of West Virginia coal lands and collieries [66]—Fuel Administration prohibits the distribution of gas coal from docks on Lake Michigan or Lake Superior without permission, except to persons engaged in the manufacture of gas or in the operation of byproduct plants—The Fuel Administration issues a regulation reducing the coal supply of the breweries to 50 per cent. of that used in the past three calendar years [67]—Eugene C. Eppley appointed head of hotel section of the Conservation Bureau of the United States Fuel Administration [67].

July 4—Jewell Ridge Coal Corporation and mine workers donate to American Red Cross all the coal mined on this day [70]—Supply of cars to the Huntingdon and Broad Top R.R. is reduced 50 per cent.

July 5—Fuel Administration defines "modified mine run"—mine run from which large sizes are removed—and provides prices for same ranging from 40 to 90 per cent. of the difference in price between run of mine and screened coal above the price of the former [67]—Telegrams sent to 750 retailers threatening to cut off coal supply if reports were not furnished weekly [68, 178]—Inquiry by Board into the operation of high-cost mines in Central Pennsylvania.

July 6—Anthracite Tridistrict Board asks for a higher wage scale to meet increased cost of living [79]—Agreement to compensate the owners of undermined and wrecked buildings is made in Wilkes-Barre, Penn., binding certain coal companies and not binding the city. It provides compensation to owners of properties on the assessed valuation of the property up to $5000, and provides a $100,000 compensation fund. Owners of properties undermined are to be notified, to be compensated in full for moving expenses and to be remunerated in full for rental of new premises—Department of Labor refuses to permit the importation of Mexican labor to mines in New Mexico [70]—New classification for Ohio is issued dividing state into eight producing districts and providing rates for each division [67]—Fuel Administration orders that the amount of coal furnished to domestic users shall not exceed quantity necessary to heat every room up to 68 deg. Fahr. using scientific and conservational methods [68].

July 7—The War Labor Policies Board announces the establishment of Community Labor Boards to mobilize labor [70, 71].

July 8—Bill reported to Senate forbidding the manufacture of beer, wine and other intoxicating malt or vinous liquors for beverage purposes after Nov. 1 and all sale of such liquors or of distilled spirits after Dec. 31 except for export—Department of Labor limits work of United States Employment Service to manufacturers of war material employing over 100 workers and declares itself willing to permit the engaging of men where service is not directly or indirectly solicited [71]—Members of the Anthracite Conciliation Board directs that in case of the funeral of the victim of a mine accident the company owning the mine shall pay an additional $150 to the compensation provided by the compensation law provided that no men lay idle on that day except the members of the immediate family and six other men, the abstention of whom will not cripple the colliery. The six men will be chosen by the mine foreman and grievance committee. Their wages will be paid by the company [181, 227]—Order is issued by Fuel Administration fixing prices of crushed and screened coke and breeze from byproduct and beehive ovens, on beehive coke in Utah and on gas coke [68]—United States Fuel Administration sets prices for charcoal [68]—Furnace Run tipple and retarding conveyor of the Allegheny River Mining Co., near Kittanning, Penn., is burned down [148]—Battery of 80 Koppers byproduct ovens is charged for the first time by Bethlehem Steel Co., Steelton, Penn. [193].

July 10—Thirteen men burned in an explosion of gas at the Lackawanna colliery of the Delaware and Hudson Co. [148]—Preferential supply of coal cars to mines producing railroad fuel is discontinued—U. S. Fuel Administration announces that brewers can only count on receiving enough coal to complete the manufacture of beer from materials now in process of manufacture [134].

July 11—A. H. Smith, Regional Director of Railroads, issues order to speed railroad coal cars declaring that production had declined since June 15 owing to decreased car supply [133].

July 12—The National Coal Association with a membership producing annually 400,000 tons of bituminous coal declares in favor of immediate prohibition [136]—James B. Neale, Director of Production, U. S. Fuel Administration, addresses coal operators at Fairmont, W. Va., urging that operators and directors of companies spend their time at the mines speeding up production [229]—Organization meeting of Northern West Virginia Coal Operators Association held at Fairmont in which operators in an area embracing 12½ counties participated [147]—Thomas R. Brown, administrative engineer for Fuel Administration announces that a saving of coal equal to 81,000 tons annually has been effected in Pittsburgh plants by efficiency methods. A national saving of 25,000,000 to 30,000,000 tons is forecast in the 250,000 industrial plants of the country. One firm had a plant with only 59 per cent. efficiency.

July 13—Fuel Administration prescribes that country clubs may without a permit use wood or peat if railroad services are not utilized, but must obtain permits for the use of any other fuel [133]—Production of bituminous coal in the week just ended reaches 13,243,000 tons, the largest weekly production thus far attained in this or any year [180, 185, 196]—Harleigh-Brookwood coal breaker near Hazelton, Penn., is burned down [193].

July 16—Greenwood Colliery of Delaware & Hudson Co. is closed by a strike for higher pay to miners. (Strike ends on July 20) [180]—G. B. Markle Coal Co. puts its new breaker at Oakdale in operation [193]—Fanhouse of Lehigh & Wilkes Barre Coal Co. at Tresckow destroyed by fire [193].

July 17—John W. Moore, of Columbus, Ohio, has his distributor's license revoked, and the Elk Coal Co. doing business illegally under his license is required to refund commissions collected by it upon transactions carried on under the license issued to J. W. Moore [178]—Explosion of powder magazine of Black Brothers' Coal Co., Blackfield, Penn., kills one man and injures a dozen others [194].

July 18—Fuel Administration prohibits all persons owning or operating a dock on Lake Michigan or Lake Superior from selling, shipping, delivering, or distributing smokeless coal received at any such dock from the New River, Pocahontas, Tug River and other low-volatile smokeless coal fields for any other purpose than making illuminating gas, byproduct coke or coal briquettes or for special purposes as may be designated by the Fuel Administration under special permits—Fuel Administration expresses disapproval of carnivals and like gaieties in coal-mining regions [160, 276]—Coal cut off 70 coal dealers who were remiss in filing weekly reports [68, 178].

July 19—War Labor Policies Board announces that the Department of Labor will enforce a ruling that no contractor shall directly or indirectly employ children under 14 years in the performance of a contract for the Government nor shall he permit any child between 14 and 16 years to work more than 8 hours in any one day, more than 6 days in any one week or before 6 a.m. or after 7 p.m.—Fuel Administration provides that in Michigan, Ohio, Indiana and Illinois, where the allotment of anthracite for the current year has been materially curtailed, domestic anthracite sizes should be distributed first to those communities within the state which would experience the greatest inconvenience, difficulty and suffering by a failure of the supply expected [79]—Fuel Administration formulates orders for a reduction in outdoor lighting. This order is commonly referred to as the "Lightless Nights" order [178].

July 20—New order made by Fuel Administration revising former orders relative to required quality and grades of coal for bunkering steamships at Atlantic and Gulf ports [225].

July 21—German submarine sinks three coal barges and sets fire to the tug pulling them. This action took place near Cape Cod on returning from a trip with coal to Gloucester, Mass.

July 22—District draft appeal board at Scranton declares that mine clerks and stenographers are not essential workers [239, 227].

July 23—President Wilson by proclamation announces that on July 31 the Government will take over the telephones and telegraphs—President declares by proclamation that he will assume control of the Cape Cod canal July 25, and directs the Railroad Administration to operate it. It is the intention to safeguard the transit of coal to New England by the use of the canal which will be deepened to a depth of 25 ft.—D. W. Cooke, vice president, Erie R.R., appointed fuel administrator for New York State to replace Albert H. Wiggin, resigned—Fuel Administration appoints a Bureau of Labor, comprising John P. White and Rembrandt Peale, to administer coal mining labor disputes subject to the Administration and in accordance with a series of specified principles of practice [228]—Major Stuart, of Huntington, W. Va., in charge of recruiting in West Virginia, told not to take mine workers [229]—Strikes at 14 mines in Michigan for an increase of 10c. per ton in the rate for coal mining [277].

July 24—Fuel Administration announces that 150 coal miners at Mercer, Penn., have returned to work after several years of retirement [227]—Coal for lake transportation to be given preference over all coal except railroad coal, byproduct coal and coal for illuminating gas [226]—New "Lightless Nights" order of July 19 becomes operative [178].

July 25—Fuel Administration puts maximum price of domestic coke f.o.b. cars where produced at $1 less than maximum Government price for selected foundry coke f.o.b. cars at the same point [226]—Conference between representatives of Fuel Administration and the smokeless coal operators of West Virginia to adjust standard of prices [226]—Prices are set for coal at all Nova Scotia operations by C. A. Magrath, Fuel Controller of Canada.

July 26—Frank J. Hayes, president United Mine Workers of America, completes a tour of the anthracite region made for the purpose of speeding production—Fuel Administration appoints Roy A. Rainey, of New York, and David D. Bush, of Chicago, to the Production Bureau in charge of priorities in mine supplies to work in conjunction with War Industries Board [226].

July 29—Order in Council in Canada gives railroads the right to file increases in tariff rates of 20 per cent. in transatlantic traffic on Aug. 1, to come into effect Aug. 12, and to remain in force to close of war—Scranton surface Protective Association declares mine-cave agreement unacceptable—John R. Powell, pioneer "squib" manufacturer dies at Plymouth, Penn. [290].

July 30—New prices are made for wagon coal at mine and delivered in Pittsburgh, Penn. [274, 275].

Harrisburg, Penn.

Coal production in the Central Pennsylvania field for the week ending July 20 totalled 1,282,000 tons, 89,390 tons less than the estimated full-time tonnage for the mines reporting. The loss attributed to car shortage was 20,821 tons, and the loss due to labor shortage was 51,980 tons. The week's production was 78,000 tons less than the week before.

R. W. Gardner was appointed production manager of the United States Fuel Administration of the Pittsburgh district on Aug. 6, to fill the place made vacant by the resignation of O. A. Blackburn. Mr. Gardner says that steps will be taken whereby the production will be increased by 15 to 20 per cent. This will mean an added tonnage of 30 or 40 tons each day. He said: "We are planning to have a committee of six at each mine. Three of these men will be chosen by the operators and a like number by the miners. Each committee will report every week to the production manager. Thus we will be able to discover the shortcomings of either the men or their employees."

The coal operators have agreed to pay the salaries in the production manager's office. The Government will furnish the funds for the office rent and furniture.

Inspection of boiler on steam dredge taking coal from navigable streams of Pennsylvania is outside of the scope of the authority of the Department of Labor because such dredges have the status of other steam vessels navigating the streams of the State, holds Deputy Attorney General Emerson Collins.

Uniontown, Penn.

Step by step, the Connellsville coke region is being geared up to war-time efficiency. The last few weeks has seen several orders of a rather drastic nature promulgated by the Fuel Administration and compliance with those regulations has resulted in a steady although not extensive increase in production despite the prevalence of hot weather, which is ordinarily a factor to contend with on the coke yards. There was a discouraging slump in both the coal and coke output for the week of July 20, but for the week ending July 27 production again showed a marked increase, the coal output being 171,293 tons or a gain of 10,153 tons over the previous week and a gain of 29,169 tons over the corresponding week in June, while the coke output was given as 348,180 tons. These figures were issued from the local Fuel Administration office.

Meantime the elaborate and rather complicated labor supervising system is being rounded into shape and its effects are already felt. There is a noticeable tightening up of labor throughout the region, the personal letters directed by the Fuel Administration to labor slackers usually being sufficient to bring them into line. To add further to the effectiveness of that system there is now being considered the appointment of a production manager at every plant, whose business it will be to see that the men stay on the job.

There was little grumbling among the workers because coal company employees were not included in the recent 10 per cent. wage advance given certain munitions employees of the United States Steel Corporation. The men are now making more money than they ever made before in their lives and seem contented as far as wages go. A notable instance of big pay envelopes was at the Adelaide plant of the H. C. Frick Coke Co., where Joseph Malachick drew $158.34 last week for two weeks' work. His pay for the last four weeks was $300.96.

The maximum price fixed for screened coke by the U. S. Fuel Administration is considered favorable by the operators engaged in salvaging coke breeze from ash dumps, an industry which has reached some proportion in the Connellsville region. As applied to this region the order means that cleanly screened coke from ash dumps which can be used as domestic fuel can be sold at a maximum of $6 whether it is shipped for domestic use or not. If it is sized coke over ¾ in. it will bring a maximum of $7.30, and under ¾ in. a maximum of $5. The $6 price applies to all sizes mixed together if the coke is large enough for domestic use.

Charleston, W. Va.

Climatic conditions and a light car supply are believed to have had a marked effect on coal production in West Virginia this week. The supply in many districts seemed to be much lighter than usual, and this scarcity seemed to be more or less uniform throughout the state. Seeking for a cause for such a condition it was learned that districts in other states having fallen behind in their supply last month, an effort was now being made to help them catch up. The intense heat of last week has been such in all the coal fields that it was almost beyond human endurance, and consequently there was a marked decline in the number of men reporting for work.

Last week, laboring under high pressure to meet Government requirements, the mines of the Fairmont district produced coal in such quantities that it threatened a serious congestion at many division points on the Baltimore and Ohio Ry. During the current week, however, the supply has been exceedingly light. Monday the car supply in the Fairmont district was exceedingly small, being 1376 cars—something like 400 under requirements. On Tuesday cars were even more scarce, there being only 1051 in the region. Team back operators in the Fairmont region were hard hit by the issuance of an order prohibiting the shipment of coal loaded in box cars to New England points. As an order already in effect prohibits westbound shipments of the same nature, the snow-bird mines have only a limited field to which to ship. An effort is being made to have the new order changed or canceled, as production will be to some extent affected unless it is rescinded or altered.

Production in the Kanawha District underwent a slight decrease last week as compared with the last week in the month, the production for the week being 216,528 tons, a decrease of about 3500 as compared with the previous week, this decrease being due to labor shortage and to mine disabilities largely, though this week the car supply is only running about 80 per cent. of requirements. The present slight shortage is not regarded as being permanent.

Coal production in the Guyan field was brisk during July, more than a million tons being loaded. It is felt, however, that had the railroad service been a little better and had men remained steadily at work there would have been a production of at least 1,500,000 tons.

Production is being slowly increased in the Pocahontas and Tug River fields, but the operations in those regions have been hard put to get a sufficient number of men to man the mines there. However, since a recent production campaign waged in that district miners are applying themselves more assiduously to mining; and though the draft has made inroads on the industry, greater regularity in reporting for work has to some extent helped keep up and in fact increase production.

Fairmont, W. Va.

Final steps were taken here last Saturday to complete the organization of the Northern West Virginia Coal Operators' Association, begun at a large meeting held here about the middle of July.

In calling the meeting to order, R. B. Isner, chairman of the organization committee, designated C. H. Jenkins, of Fairmont, as temporary chairman and F. J. Patton as temporary secretary. As soon as the report of the organization committee had been submitted and the plan of organization ratified the board of directors chosen at the meeting unanimously elected C. H. Jenkins, formerly president of the Central West Virginia Association, as president of the new organization. R. B. Jane was elected vice president and C. J. Ryan treasurer.

As the appointment of A. B. Fleming, Jr., as director of production for Northern West Virginia had just been announced, Mr. Fleming was called upon. He told of his conference with J. B. Neale, director of production at Washington, and outlined what was hoped for in the way of production.

Temporary directors for the various subdistricts, elected at the July meeting, were made permanent directors as follows: Fairmont subdistrict—A. B. Fleming, Jr., A. C. Beeson, J. A. Clarke, Jr., Geo. E. Peddicord and C. H. Jenkins. Clarksburg subdistrict—A. L. White, D. Howard, J. M. Orr, C. J. Ryan and V. E. Goecke. Elkins subdistrict—E. D. Baker, A. C. Wadell, W. J. Williams, A. R. Miller and R. B. Isner. Morgantown subdistrict—S. D. Brady, B. M. Chaplin. Directors at large—J. M. Wolfe, of Fairmont; J. A. Jenkins, of Clarksburg, and E. Drennen, of Elkins.

Representing as it does a merger of four preëxisting associations, the new association is now said to be the largest association in the United States. The Central West Virginia was the third largest prior to the consolidation.

Herrin, Ill.

The tonnage of coal in the Williamson and Franklin field, as well as in the Harrisburg field, at mines depending upon the Central Illinois Public Service Co. for its supply of electricity, continues to show a loss of production on account of the inability of the service company to maintain current.

In the month of July the following record has been tabulated at Herrin, showing the number of times in the different days that the juice was off: July 2, off 2 times; July 3, off 5 times; July 5, off 5 times; July 10, off 3 times; July 11, off 5 times; July 15, off 4 times; July 16, off 4 times; July 17, off 6 times; July 18, off 1 time; July 22, off 5 times; July 23, off 11 times; July 24, off 1 time.

Not only are the operators vexed, but there is a growing dissatisfaction among the miners, machine men and others who work with electricity; and this may be one of the reasons why many men are leaving this field and going to mines not depending upon this current and to mines in other fields where their own current is produced locally.

Nanaimo, B. C.

The Jingle Pot mine, owned and operated by the Nanaimo and Vancouver Coal Co., which has been closed up on account of a fire in the workings for the last ten months, has been reopened again and will be in full operation in the course of two weeks, when the necessary repairs have been completed.

The Western Fuel Co.'s new shafts, at the Wakeisah farm, are being rushed down at top speed. W. H. Moore, the manager, expects to have from 200 to 300 tons of coal coming from those shafts by the end of the present year. The Harewood mine, recently opened up by the same company, is getting out a record tonnage, amounting to nearly 11,000 tons daily. Albert Rowbotton has been appointed tipple foreman at this mine in place of Mr. Davis.

The Grant mine, which is situated at Nanoose Bay and owned by a local company, is producing about 150 tons of coal a day. As this is a new mine, development work is being rushed as rapidly as possible. It is only a matter of a little more time when a handsome tonnage will be obtained from this colliery.

It is currently reported in the district that the Canadian Pacific Railway Co. has leased 960 acres of coal lands in Cedar district, where borings will be commenced in the near future for coal.

PENNSYLVANIA

Anthracite

Park View—Some people, upon arising on Aug. 3, found their war gardens had been swallowed up in mine caves. The heavy rains are thought to have caused a settling of the ground.

Freeland—The employees of the J. S. Wentz Coal Co., of Hazel Brook, will hereafter be allowed street carfare one way each day they report for work and the company will add 15c. for carfare per day to each man's earnings.

Bituminous

Horatio—After being idle for more than 22 years, the Old Berwind-White Coal Mining Co. mine is again on the job producing coal. The mine was known as "Horatio" No. 2, and is being operated now by the Anita Coal Co. shipping first-class coal in paying quantities. When the mine was abandoned coal was selling at so close a margin that no operator could afford to spend much time or money to overcome faults, rolls, etc. In addition the mine was a wet one and required considerable expense in pumping out the surplus water.

WEST VIRGINIA

Roderfield—New equipment is being added to the plant of the Fall River Pocahontas Collieries plant at this place, in addition to the construction of a number of houses for miners.

Huntington—A second substation is being installed by the Algoma Coal and Coke Company at its Algoma plant. New houses for the accommodation of miners are also being built.

Big Sandy—A number of improvements have been made to the plant of the Hampton Roads Colliery Company's Big Sandy plant, consisting of 30 stucco houses for miners, a club house and bath house. A new system of sewerage has also been installed.

Clarksburg—C. S. Elliott, of Clarksburg, has sold the valuable coal tract owned by himself and his brothers to Pittsburgh capitalists for $750,000. The field purchased is located near Fayette City, Penn., and it is understood development work will be begun at once.

Welch—Coal from the Cyrus and Kimball mines of the Kimball-Pocahontas Coal Co. will be run over the same tipple. This company is building more houses to accommodate additional miners. A new 15,000-gal. water tank is also under construction. The superintendent is Mike Barron.

Bluefield—The progress being made by the Solvay Collieries Co., of which W. P. Goodman is superintendent, at its Hemphill plant is such that the company will be able to begin shipping coal by Oct. 1. The capacity of the new plant will be 2000 tons a day. Thirty stucco houses are now under construction.

Keystone—New equipment is being added to the plant of the Eureka Coal and Coke Co., of which T. W. Chambers is superintendent at Eckman. The company is also building a number of new miners' houses. The Keystone Coal and Coke Co. is erecting an up-to-date steel tipple at its plant here, under the direction of W. W. Wood, superintendent. Forty new houses are also under construction.

Gary—Additional equipment is being installed at the Elbert No. 7 mine of the United States Coal and Coke Co., where 45 new miners' houses are also being built under the direction of W. P. Kearns, superintendent. A new steel tipple has been completed at the Elbert No. 8 mine of the same company, of which J. L. Sullivan is superintendent. A number of new miners' houses will be built at this plant. It is estimated that by the time all the improvements are completed the company will be able to ship 1500 tons of coal a day.

INDIANA

Brazil—Coal miners in the Brazil territory are pleased with the action of officials of the Pennsylvania R. R. in agreeing to place in service a miners' train between Harmony and Glen Ayr to carry miners to and from their work. The train was taken off the road two years ago.

ILLINOIS

Decatur—Decatur is two and one-half to three months ahead of ordinary summer seasons in putting in its coal supply. In other words, the situation for Aug. 10 is about the same that it would ordinarily be about Oct. 10. Some of the Decatur coal dealers have contrasted their daily business this year with their usual September and October business, stating that before the war July was a month which was dull beyond all extremes.

Nokomis—The Keller Coal Co. has resumed hoisting coal in its No. 10 mine after a shutdown of over two months. The closing of the mine was due to a fire which broke out in the underground workings of the mine early in May and raged fiercely for over a week and for a time threatened the destruction of the entire mine. The mine has a hoisting capacity of over 6000 tons per day and for a long time held the state record. Over 1200 men will be employed in this mine in the future.

Carlinville—The Standard Oil Co. has had to stop work on the sinking of mine No. 2 northeast of Carlinville on account of quicksand and water which were encountered when about 100 ft. down. The abandonment of the mine is said to be only temporary, as the company expects to continue the shaft as soon as it can secure the necessary material to make the working conditions safe. In the meantime the company has commenced work on the sinking of mine No. 3 on the same tract. It was not the intention of the company to sink mine No. 3 until mine No. 2 had been completed. Work on Mine No. 4 is progressing nicely, and it will be ready for operation by Oct. 1.

UTAH

Peerless—The Peerless Coal Co., whose mine is located here, is now shipping coal. The mine is equipped with modern machinery and is expected to produce 1000 tons of coal a day. The seam being worked is over 12 ft. thick. Other seams of coal on the property will be worked eventually.

Foreign News

Victoria, B. C.—Coal mine casualties in British Columbia for April, May and June of this year were only four as compared with 39 for the same three months in 1917, according to the quarterly statement of mine fatalities issued by the Provincial Department of Mines. For the first six months of the year the deaths were six for 1918 as compared with forty for 1917. Of these six all were killed underground, three by falling roof and rock, two by mine cars and one by falling timber.

Personals

James D. Simpson is now mining manager of the Berwind-White Coal Mining Co., with headquarters at Windber, Somerset County, Pennsylvania.

L. R. Bayer, formerly with the Bureau of Standards, has joined the organization of E. & T. Fairbanks & Co., scale manufacturers, St. Johnsbury, Vt.

Alan C. Dodson, of Bethlehem, Penn., has been appointed a member of a new committee recently formed by the Fuel Administration to aid in an intensive campaign to provide for an increased production of coal.

Robert Howard has resigned his position of state coal mine inspector of Utah to accept the superintendency of the Peerless Coal Co., which has a mine at Peerless, Utah, with general offices at Salt Lake City.

John E. Williams has resigned as state fuel administrator of Illinois. He is succeeded by Raymond E. Durham, who has been serving as fuel administrator of Cook County (Chicago). Mr. Durham is vice-president of the Chicago Savings Bank and Trust Co. and is a well known and influential business man of Chicago.

John Crawford, of Helper, Utah, has been appointed by the Industrial Commission of Utah to the position of state coal mine inspector. His appointment took effect Aug. 1. Mr. Crawford has been working in and around the mines of the State of Utah for the past 20 years and has held various positions from mine foreman to superintendent during that time.

Charles O'Neill, of Altoona, Penn., has been appointed manager of the Central Pennsylvania coal district by the Fuel Administration. Mr. O'Neill will have supervision over Westmoreland, Cambria, Armstrong, Huntingdon, Somerset, Elk, Tioga, Clinton, Jefferson, Indiana, Clearfield, Cameron, Bedford, Lycoming, Blair and Centre Counties. Mr. O'Neill is secretary of the Central Pennsylvania Coal Producers' Association.

Obituary

Julius E. Bierach, sales manager at Louisville, Ky., for the St. Bernard Coal Mining Co., has passed away. Mr. Bierach started with the company 30 years ago as a weigher, later he became a salesman, and finally sales manager. At the time of his death he was 54 years of age. Death was due to a complication of diseases, following an illness of a year, a considerable portion of which was spent at St. Anthony's hospital.

Frank M. D. Watkins, assistant general sales agent of the Shawmut Coal and Coke Co., died at his home in Binghamton, N. Y., July 21, following an operation. He was 40 years old and leaves a family. He had been with the company nearly ten years and was nominally attached to the office of the general sales agent in this city. A man of the finest character and high social attainments, he was also a leader in business and will be much missed everywhere he was known.

Recent Coal and Coke Patents

Furnace Door Attachment. L. D. West, Denver, Colo., 1,267,298. May 21, 1918. Filed June 29, 1917. Serial No. 177,822.

Coal Carrier for Retorts. G. W. Traer, Chicago, Ill., 1,267,479. May 29, 1918. Filed Mar. 10, 1917. Serial No. 153,911.

Fuel Saver and Smoke Consumer. L. D. West, Denver, Colo., 1,267,295. May 21, 1918. Filed June 12, 1917. Serial No. 174,319.

Furnace Grate. A. W. Bennis, Little Hulton, Bolton, England, 1,267,172. May 21, 1918. Filed Mar. 29, 1915. Serial No. 17,858.

Coal Pit for Locomotive Tender. E. G. Bartlett, Boston, Mass., 1,267,170. May 21, 1918. Filed Sept. 26, 1917. Serial No. 193,357.

Mining Apparatus. C. J. E. Waxbom, assignor to Jeffrey Manufacturing Co., Columbus, Ohio, 1,267,943. May 28, 1918. Filed Oct. 11, 1912. Serial No. 725,322.

Trade Catalogs

Nonpareil Insulating Brick for Furnaces and Ovens. Armstrong Cork and Insulation Co., Pittsburgh, Penn. Booklet, Pp. 4; 3½ x 6 in.; illustrated. Shows the necessity of properly insulating steam lines against loss of heat, and gives data to prove that Nonpareil insulating brick saves 60 to 75 per cent. of the heat ordinarily lost by conduction and radiation.

Catalog No. 33, May, 1918. Steel City Electric Co., Pittsburgh, Penn. Pp. 108; 6 x 9 in.; illustrated. First edition of a complete catalog covering this concern's standard materials. For convenience in ordering by telegraph a code is furnished. The catalog is indexed and cross-indexed, and should prove of service to the buyers and users of Steel City Electric Co. materials.

Motor-Operated Brakes for Alternating-Current Service. Cutler-Hammer Manufacturing Co., Milwaukee, Wis. Pp. 4; 8½ x 11 in.; illustrated. Points out the application and desirable operating features of these brakes. Two installation views are included—one showing the brake applied to a large mine hoist motor, and the other to a motor-driven elevator machine. Dimensions, engineering data and the formula for determining the retarding torque required for any brake installation are also given.

New Incorporations

Kane, Penn.—The Big Level Coal Co. Capital, $25,000. To mine for coal in the Kane district. Albion Bengston is the principal incorporator.

Adah, Penn.—The Lynch Creek Coal Co. Capital, $25,000. To develop coal properties in the Adah district. R. C. Schultz is the principal incorporator.

Fairchance, Penn.—The Zebley Coal Co. Capital, $12,000. To operate coal properties in the Fairchance district. Harry Zebley is the principal incorporator.

Van Ormer, Penn.—The Beacon Coal Co. Capital $50,000. To develop coal lands in the vicinity of Van Ormer. A. N. Arthur, Evansburg, is the principal incorporator.

Coeburn, Va.—The Twin City Coal Co. Capital, $90,000. To engage in the development of coal properties near Coeburn. J. P. Lay is president and C. O. Ramsey is secretary.

Charleston, W. Va.—The Liberty Coal Mining Co. Capital, $10,000. To develop coal properties in the Charleston fields. Incorporators: J. A. Thomas, B. M. Smith and J. V. Sullivan.

Tulsa, Okla.—The Gunther City Coal Mining Co. Capital, $150,000. To engage in coal mining operations in the Gunther City section. Incorporators: E. A. Vernon and A. C. Gunther.

Fort Worth, Tex.—The Bowie Coal Mines Co. Capital, $100,000. To operate coal properties in the vicinity of Bowie. Incorporators: A. H. Woodfin and J. Murrin, Fort Worth; and W. R. Potter, Bowie.

Industrial News

Hazard, Ky.—The Midland Mining Co. has recently filed notice of an increase in its capital from $100,000 to $150,000, to provide for expansion.

Knoxville, Tenn.—The Cross Mountain Coal Co. has filed notice of an increase in its capital from $400,000 to $500,000, to provide for business extensions.

Scranton, Penn.—The Scranton Coal Co. is planning for the opening of new veins at its properties in New County. The coal will be handled at the Pine Brook colliery.

Patton, Penn.—Fire, July 18, destroyed the coal tipple of the Pennsylvania Coal and Coke Co., with estimated loss of about $30,000. It is understood that the plant will be rebuilt.

Goodwater, Ala.—The Central Railroad of Georgia, Savannah, Ga., is considering plans for the construction of a new local concrete coal chute to have a capacity of approximately 300 tons.

Indianapolis, Ind.—Retail coal dealers will have preference over manufacturing plants which are not included in the priority list prepared by the War Industries Board at Washington.

Chattanooga, Tenn.—The White Oak Coal Co., which recently filed notice of a change

in its corporate name to the Christian Coal Co., has increased its capital from $10,000 to $50,000, to provide for expansion.

Beaver Brook, Penn.—The C. M. Dodson Coal Co. is planning for the installation of a quantity of new equipment at the coal breaker at its Beaver Brook colliery to increase the present capacity of the plant.

Harrisburg, Penn.—The Buckeye Coal Co. has secured permission from the State Department of Health for the construction of a new town in Greene County, including a water-supply system, sewage-disposal plant, sewerage system, and other work.

Birmingham, Ala.—The Eagle Coal Co., recently organized, is planning for the development of about 100 acres of property at Adger. The company will install a plant to provide a daily output of about 200 tons. J. C. Maben, Jr., is president.

Hazleton, Penn.—Anthracite production in the Lehigh field was reduced by approximately 40,000 tons due to the idleness of the mines caused by a fire at the substation of the Harwood Electric Co., which supplies power for operation, on July 30.

Pineville, Ky.—The Greasy Gap Coal Co., recently incorporated with a capital of $25,000, is planning for immediate work on the development of about 480 acres of coal properties in the Wheeler district. I. Glickman is president and manager and M. Euster is vice president.

Elkhurst, W. Va.—The Elkhurst Coal Mining Co., the Thompson Block Coal Co., the Big Block Coal Co., and the Foy Splint Co., operating in the Elkhurst district, are planning for the electrification of their properties, power to be furnished by the Hartland Power Company.

Corinth, W. Va.—The Freeport Coal Co., which recently filed notice of an increase in its capital from $25,000 to $100,000, is now developing about 325 acres of coal properties in the Corinth district, with daily output of 100 tons. The company is planning for increased operations.

Joliet, Ill.—The Elgin, Joliet & Eastern R. R. has awarded contracts to the Ogle Construction Co., 28 East Jackson Boulevard, Chicago, for the construction of new coaling stations, about 20 x 20 ft., at South Chicago, Ill., and Gary, Ind. The structures will cost about $25,000 each.

Baltimore, Md.—In connection with extensions in its terminal facilities at its Bayview Junction, Md., yards, the Baltimore & Ohio R. R. has awarded a contract to the Empire Engineering Co., Curtis Bay Junction, for extensions in its coal-handling equipment, to provide for increased capacity.

Fairmont, W. Va.—Development will be undertaken in South Fairmont by the South Fairmont Coal Co., which has been formed with a capital stock of $150,000, those principally interested in the company being John W. Poling, McLough, W. H. Spedden, Carl D. Springer and E. C. Frame, all of Fairmont.

Jefferson City, Mo.—A report from the Bureau of Mines and Mine Inspection shows that in the past 18 months there were 82 fatal and 58 nonfatal mine accidents in Missouri. The mine tax law produced $27,318 since the law became effective, while the total cost of mine inspection during the 18 months was $14,102.

New York, N. Y.—Statistics just made public, show that during the month of June, there were exported from the Port of New York 6761 tons of anthracite with a valuation of $43,991 and 6807 tons of bituminous, valued at $50,751. Of the anthracite 5278 tons were sent to Canada and of the bituminous 4428 tons went to Brazil.

Henderson, Ky.—The Uniontown Coal Co., recently incorporated with a capital of $100,000, has perfected its organization, and is planning for immediate work on the development of approximately 1500 acres of coal lands in the Henderson district, to have a capacity of 500 tons daily. Clarence O. Potter, of Nashville, Tenn., is president.

Dunkirk, N. Y.—In connection with extensive improvements at the Brooks plant of the American Locomotive Co., plans have been prepared for the construction of a large new coal trestle to provide for an increase in the coaling facilities. The entire work, which includes the erection of new shop buildings, boiler plant, etc., is estimated to cost $150,000.

Zeigler, Ill.—For the first time in its 15 years of existence the town of Zeigler, founded by Joseph Leiter after his spectacular plunge in wheat some years ago, has now secured a church. The Southern Illinois Baptists have started the erection of a building. This is the first church the town has had. It is one of the largest strictly coal-mining towns in southern Illinois.

Huntington, Ill.—C. B. Williams, fuel administrator of Huntington County, has gone into the coal fields of southern Indiana where he will buy a reserve of coal for next winter. Nine dealers in Huntington have pledged themselves to store five carloads each for such a purpose. City officials, at a meeting held with Mr. Williams, told him that the city was not in a position to maintain a municipal coal yard.

Bristol, Va.—The Floyd Elkhorn Consolidated Collieries, recently incorporated, will acquire the properties of the Floyd Elkhorn Coal Corporation and the Drift Coal Co. in this vicinity. The new organization plans to increase the output at the works, and will install considerable new equipment, including mining machinery, mine cars, etc. A new electric power plant is also planned. The work is estimated to cost $150,000.

St. Louis, Mo.—The city of St. Louis has renewed its contract for the city institutions with the St. Clair Coal and Mining Co. and will pay $2.30 f.o.b. mines per net ton for all lump and egg, and $2.05 for 2-in. screenings. The contract covers between 200,000 and 300,000 tons of coal and is for one year. This is Standard coal, with a freight rate to St. Louis of 95c. This price is about 10c. under the price paid last year.

Duquoin, Ill.—At the recent meeting of the state and Federal mine officials in connection with the rescue station work the course of instructions in helmet work was changed from twelve to eight lessons with 10 hours for oxygen work. The course in first aid was changed to eight lessons. After passing the examination for the Bureau of Mines, the student will be examined for a state certificate by the managers of the different rescue stations.

Cincinnati, Ohio—More than half a million bushels of Kanawha River coal was brought to Cincinnati recently by a fleet of towboats and barges on the crest of an artificial wave in the Ohio River, which was started at Government Dam No. 20. Seven towboats, with 82 barges, loaded lightly because of the low water which prevailed in spite of the artificial rise, came into the harbor. Each barge carried an average of 325 tons, making approximately 25,000 tons total.

Indianapolis, Ind.—Western Kentucky coal will not be moved into Indiana and Illinois. The fuel administrator held that such coal is no longer needed in Indiana and Illinois because of the large production of coal in these states. This coal will be moved, however, to the Cincinnati switching district. Horace H. Herr, of the Indiana state fuel administration, says that the order will affect only the west tier of Indiana counties and that eastern Kentucky coal can still come to Indiana.

Toledo, Ohio—Activity at the Toledo docks of the various coal-carrying railroads continued, according to the figures of loadings given out covering the week ending Aug. 3. The Hocking Valley docks during the week loaded 164,602 tons as compared with 172,906 tons the previous week. The total for the season is 2,000,000 tons. During the same week the Toledo & Ohio Central docks loaded 73,000 tons as compared with 57,740 tons the previous week, making a total of 940,000 tons for the season.

Indianapolis, Ind.—Fifty tons of coal have been piled on the pavilion at the north side of the Federal Building and approximately 400 tons more will be added. The coal will be stored for heating purposes next winter. About 1200 tons of coal are required to heat the Federal Building each year, and when it was found that there was not sufficient room for storage in the basement the custodian of the building ordered the outside pavilion used. The coal will be piled on all sides of the fountain in the center of the pavilion.

Nelsonville, Ohio—The Buckeye Coal and Railway Co. has secured between 200 and 300 new workers at its mines in the Hocking Valley field, because of the closing down of the large number of brick manufacturing plants in the Hocking Valley. The company readily saw the value of the additional labor and secured the operation of special trains to bring the men from their homes to the mines, where they were most needed. This move has greatly increased the output of the company, which owns or controls 59 operations in the Hocking Valley.

Indianapolis, Ind. — Indianapolis Coal dealers will not be permitted to charge their customers more than 50c. a ton for wheeling coal from the street to the basement of a house. The administrator's ruling provides that the dealer and purchaser shall arrange for the price to be paid for the delivery of coal in bags. The Retail Coal Merchants' Credit Association announced a charge of 75c. would be established for wheeling coal from curb to basement or coal shed, $1 for delivering coal in bags to the first floor of a house and $1.25 for delivery of coal in bags in the basement. Fuel Administrator Matin Rehfuss then made an order reducing the wheeling of all coal to 50c. a ton from street to coal depository.

Louisville, Ky.—Recently an order was issued by the Fuel Administration placing Jeffersonville and New Albany, Ind., across the river from Louisville, out of the zone for western Kentucky coal supplies. However, the matter was taken up with the higher officials, and on Aug. 5, Fielding L. Wilson, Clark County administrator at Jeffersonville, received notice from Evans Woolen, state administrator, to the effect that western Kentucky coal would be permitted to enter the two cities, which for years have depended on western kentucky coal. The dealers had booked heavy orders on the strength of earlier rulings under which Kentucky coal could enter the cities. A few years ago both Jeffersonville and New Albany used Pittsburgh River coal almost exclusively.

Indianapolis, Ind.—A campaign to bring about a saving of approximately 20 per cent. of the fuel used in industrial plants of Indiana will be started at once under the direction of Frank C. Wagner, administrative engineer for the state fuel administration. L. R. Clapp, of Washington, D. C., representing the Federal Fuel Administration, has been in Indianapolis recently to confer with Mr. Wagner concerning preliminary plans for the campaign. Questionnaires will be sent to all owners of factories and industrial plants in the state asking for complete information as to conditions of boilers and furnaces, and suggestions will be made by Mr. Wagner as to changes in equipment and methods which will tend to reduce the supply of coal required to operate the plants.

Columbus, Ohio.—To instill patriotism into Ohio coal miners a series of war meetings is being conducted in mining districts which are expected to result in an increased production and a better spirit of coöperation with the nation's program. One of these was held last week at Byesville, attended by several hundred miners. Besides rousing a more defined win-the-war feeling in the workmen, each miner solemnly pledged himself to increase his individual production three tons daily. Among the speakers were General Schneider of the United States Shipping Board, President John Moore, of the Ohio Mine Workers' Union, and Sergeant Charles Blank, a British soldier, who suffered several wounds in battle. His story and plea to the men that they do their best to win the war made a strong impression on the miners.

Terre Haute, Ind.—The production of 2,865,163 tons of coal in Indiana during the month of July established a new record for Indiana, the output being more than 300,000 tons greater than the June production. In spite of the increase of production in the state, the supply will not be greater than required. The Fuel Administrator of Indiana expressed the hope last March that Indiana mines would produce coal at the rate of thirty million tons annually. Production has now reached the rate of 34,000,000 tons a year. The estimate of the Fuel Administration was made at a time when Kentucky and Virginia coal could be shipped into Indiana, and it was not required that the southern peninsula of Michigan be supplied with Indiana coal. These changes have made it necessary for the Indiana production to be increased above the tonnage which the Fuel Administration expressed as its desire early in the year.

Lexington, Ky.—On account of the shortage of labor in the mines of the State of Kentucky production will this year fall below the 27,000,000 ton showing of last season, according to an estimate made by F. C. Horton, assistant inspector of mines. This shortage of labor, according to Mr. Horton, is due to increased developments and to the selective draft, which has greatly depleted the miners' ranks. Some of the mines which have a capacity production of 1200 to 1500 tons a day have only been able to load out 300 to 400 tons a day of late. If sufficient labor could be had, Mr. Horton estimates the production would easily be 35,000,000 tons this year, the increase over last year being made possible by new equipment that has been installed in the mines. A coal production of this amount would place Kentucky fourth among the coal producing states of the country. The possibilities of the coal fields of Kentucky after the war are declared unlimited. The known supply at present is enough to last for 600 years, while the extent of the deposits in the eastern parts of the state are unknown.

MARKET DEPARTMENT

Weekly Review

Intense Heat Somewhat Retards Both Production and Distribution—Present Needs Well Supplied, but Anxiety Is Felt for the Future

THE intense heat of the past week has exerted an influence more or less potent upon coal production and distribution. So great was the heat that it was difficult to keep men on the tipples or in the washeries and breakers. Many retail teamsters and car unloaders either worked only part time or refused to work at all. This naturally did much to retard both production and distribution. With all of the heat, however, which in many localities made a high record, the output of the country only fell off about 3 per cent.

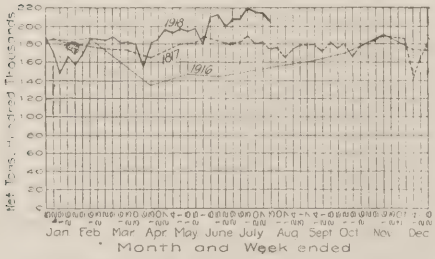
Reports received from all over the country fail to reveal any shortage in present needs. Some regions have been able to accumulate surplus stocks in fair volume; others have not been able to build up any reserves whatever. That portion of the country lying roughly between the Rocky and Allegheny Mountains appears to be fairly well supplied with fuel. True, coal is being pushed to the Northwest via the Great Lakes with all possible dispatch, and some complaint is heard of a fuel shortage (especially in domestic coal) in Michigan; the greater part of this region is nevertheless well supplied. Near its center, in southern Illinois, certain grades of coal are selling below Government schedule.

Scarcity of coal seems to be most pronounced along either coast. New England, while admitting that coal is coming forward in adequate supply to meet immediate needs, is apprehensive as to the future; and the belief appears to be prevalent that not enough coal is being stocked, especially by railroads and large industries. Complaints of a similar nature are heard from other regions such as Baltimore, where industry has been kept going by emergency shipments.

The Pacific Coast also appears to be somewhat short of fuel. Although little scarcity is felt at present, anxiety is expressed for the future; and it is anticipated that other fuels such as wood must be employed in considerable quantities there during the winter.

COAL PRODUCTION

During the week ended Aug. 3 the output of bituminous coal not only decreased over 3 per cent. but recorded the third successive week of decreased production. Production of bituminous coal (including lignite and coal coked) during the current week is estimated at 12,422,000 net tons, a decrease compared with the week preceding of 398,000 net tons, but an increase over the same week of 1917 of 1,563,000 net tons or 14.3 per cent. The average production per working day during the week of Aug. 3 is estimated at 2,070,000 net tons as compared with 2,137,000 net tons during the week of July 27 and 1,810,000 net tons during the week of Aug. 3, 1917. Shipments during the past week decreased from all districts with exception of Cumberland-Piedmont and Somerset, Tennessee and Kentucky and Iowa, Texas and the Southwest States. The increase from the Cumberland-Piedmont district was 7 per cent., from the Tennessee and Kentucky district 5 per cent. and from the district including Iowa, Texas and the Southwest States, 4.8 per cent. Material decreases in shipments were as follows: Western Pennsylvania, 6 per cent.; Ohio, 3.6 per cent.; the district including northern Kentucky, high volatile of southwest Virginia and Virginia anthracite fields, 7.8 per cent.; southwest Virginia, 16.8 per cent.; Alabama, 17 per cent. and the district including Illinois, Indiana and western Kentucky, 6.1 per cent.



Anthracite shipments during the week ended Aug. 3 decreased 1310 carloads or 3.2 per cent., the total movement amounting to 39,632 carloads.

Beehive Coke—Production of beehive coke in the United States during the week ended Aug. 3 is estimated at 606,000 net tons, a slight decrease compared with the week preceding. The average daily production during the current week is estimated at 101,000 net tons as against 103,000 net tons during the week of July 27. The principal operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania report production of beehive coke, during the week ended Aug. 3, at 342,644 net tons and operation of the plants at 76.5 per cent. of their present capacity as against 76.6 per cent. during the week preceding. The carriers furnished a 100 per cent. car supply during the week. The same operators produced 164,350 net tons of coal.

CARLOADS OF COAL ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended: July 13	July 20	July 27	Aug. 3
Bituminous shipments, 123 roads	235,291	229,770*	228,331*	220,823†
Anthracite shipments, 9 roads	42,419	40,664	40,942	39 632

* Revised from last report. † Subject to revision.

BUSINESS OPINIONS

Dry Goods Economist—Cotton and cotton fabrics received the major share of attention in all discussions of conditions in the world of dry goods this week. The two conflicting estimates of the condition of this year's cotton crop had just one point of unity. Each indicated a surplus, and of the two surpluses even the smaller one was large enough to cause men in cotton goods salesrooms to shrug their shoulders when asked what would become of prices if the holders of the surplus cotton decided to realize on it.

Bradstreet's—Trade and industry are quieter this week. Extremely hot weather has acted as a deterrent to industry, and though war essential lines are crowded with orders, civilian business in many lines tends to reflect more conservatism. This relative reaction proceeds from high temperatures, which have discouraged indoor and outdoor work, besides buying at retail, from the continuous induction of men into military life, which is telling on purchases of civilian attire, and from the fact that corn and cotton crop news is decidedly less favorable. The hot wave has, of course, cut down production of manufactured articles, and reorders are light, while less essential industries are being crimped more and more, either by governmental action or by the indisposition of the banks to advance large credits to the so-called non-essential lines.

American Wool and Cotton Reporter—The South American wool situation has been uppermost in the minds of the wool trade, particularly as to the question of getting wools into this country which have been previously bought and stored in South America. Some of the trade are protesting against the fact that not all established houses have been permitted to share in the purchase of this wool. The new clip is coming in fast from the West. The cotton market has taken a decided change. Many have become convinced that there would be a large crop of cotton and that without Government price fixing the weight of cotton would be such that prices would be depressed radically. Cotton is in a strong position and even though the carry-over will be great, the price is not likely to be specially low, and possibly not much lower that it is at present.

Atlantic Seaboard

BOSTON

While situation is comfortable as to current supply the undertone is one of apprehension. Apparently a fixed idea in Washington that New England requirements have been set too high and only through vigorous action will coal be allowed to come forward more than a few weeks longer on the present basis. All-rail movement from Central Pennsylvania continues favorable Wagon coal is a distinct help, although care has to be used in distribution. Shortage of labor makes unloading difficult. Similarly there is more congestion of steamers due to the lack of berth room to discharge railroad fuel. Hampton Roads dispatch is good, but the volume of coal running to the piers has already been reduced, and trouble is ahead when bottoms again reach the loading ports. Baltimore loading continues fair, although the diversion of coal from New York piers still presents a problem. Effort to make up anthracite arrears by shipments all-rail.

Bituminous—While the situation is still curiously mixed and some plants are overwell stocked and others have practically no reserve, the market is what in ordinary times would be called "easy." No consumer finds it difficult to get steam grades, particularly if he is willing to pay the price for water-borne coal. Largely for this reason, many of the small buyers have been lulled into a sense of security, as if coal were always coming forward on the present basis. In other words, all the circumstances would have to continue just as they are now, with an increased tonnage either for lake or other territory or for bunker and other Government requirements, and even then it would be extremely difficult for New England to pile up the reserves really necessary for continued operating during the winter. The larger railroads still have less than 40 per cent. of the reserve it has

always considered only prudent for them to have on hand by Nov. 1, and certainly curtailment now would be nothing short of disastrous in its effect upon New England in December and January.

Those having supervision at Washington are of course beset by serious problems. The heavy movement of troops and enlarged Government activities abroad, not to speak of additional ships for the naval force overseas and the demands of our Allies, all mean increased use of coal, and with all the advertising that has attended New England's efforts to get coal it is only natural the authorities should look to this territory as likely ground for curtailment. It is argued that from Apr. 1 to July 1, there was on paper a shortage of 2,000,000 tons, and yet all the wheels have kept turning. This, however, takes no account of the great extent to which coal has always been accumulated in New England against cold weather when deliveries both by rail and water slow up. One has only to compare receipts today with the volume of coal coming in last January to realize how much New England is dependent upon a reserve supply. Unconsciously those more familiar with conditions in the Middle States, where customarily reserves are much lighter, are apt to measure New England by their own yardstick.

All-rail movement from the Central Pennsylvania district has thus far been maintained on the July average, about 690 cars bituminous, including railroad fuel. The volume of shipments is therefore quite favorable, but it will probably not be long before there are whisperings of car shortage. This always reacts first against New England, although it will be interesting this year to observe the result in this respect of Government operation and the pooling of cars. Just now the situation is of some difficulty because we have good receipts by water; at the same time volume shipments by rail are reaching many of the mills, and in such way as to cause slow unloading. One result is a report through the Railroad Administration that New England is holding up cars and nothing could be more serious as bearing upon efforts here to keep coal coming continuously on the present basis. Here as elsewhere the labor shortage makes prompt rehandling next to impossible. This is especially apparent on wagon coal in box cars which is now being sent to New England from off the Pennsylvania railroad. Great care has to be exercised in distributing this coal to avoid just the kind of car congestion already referred to. The volume of this coal amounts now to perhaps 15,000 tons per week, and is a distinct help toward building up the desired reserve, particularly among smaller consumers and retail dealers.

Early in July there was so much anxiety over railroad fuel, and pressure was brought on Washington to such extent, that a large number of steamers were arranged for to freight the coal. One result is that for a fortnight past there has been actual congestion at the Boston piers and in several cases cargoes intended for railroad supply had to be unloaded for other purposes. In other words, there was a lack of berth room for the number of ships coming forward to the railroad wharves. Arrangements were made this week to work 24 hours a day, and the situation in this respect has materially improved. Apparently ships were loaded for Boston both at Hampton Roads and at Baltimore without much regard to the berths where they would discharge, and it has taken a good deal of ingenuity to give these ships anything like good dispatch. It has been expensive for the railroads concerned, but a suitable reserve is so necessary that no complaint is made.

Temporarily the volume of coal available at Hampton Roads is about on a level with the tonnage reporting, but already there are signs that the amount of coal running to the piers will soon be reduced. By-product plants and the Western trade will now come in for their share, and detention will certainly follow for coastwise ships. Coal is running to the Baltimore piers in fair volume and thus far the dispatch has been good. A proportion of the coal, however, has been taken from the Western and line trade, and it is likely the volume of coal there will also be materially reduced. As it is now quite a tonnage is being diverted to Baltimore from coal that ordinarily runs to the New York piers for Long Island Sound points. How this tonnage is to be made up to ports like New Haven, Bridgeport and New London is still a problem. Most seriously does this affect illuminating gas plants that have relied upon regular receipts from the Fairmont region.

Anthracite — Domestic sizes all-rail are still being received in good volume. Movement through the five gateways continues on a 600 car per day basis. Retail dealers at many of the inland points have had more tonnage than last year at this time, but so great is the demand from the consumer that there is no accumulation anywhere. Deliveries by team are made as fast as receipts by car will permit.

The same thing is true of tidewater dealers, now that an increased effort is being made to build up the receipts of the latter by increased deliveries all-rail. This is being done all along the coast and the number of cargoes actually shipped does not measure the tonnage sent forward.

There continue to be many problems of distribution before the anthracite committee, and only gradually are these complications being cleared up. In many ways 1916 distribution presents an awkward basis for shipments this year, since in the fall of 1916 shipments were notably irregular.

NEW YORK

Anthracite moving easier and dealers optimistic. Excessive heat causes falling off in dumpings. Buckwheat No. 1 in good demand. Bituminous situation shows slight improvement. Demand continues and spot buyers make slow progress. Cars reported better.

Anthracite—Coal is moving easier and the entire situation is an improvement over the previous. While the dumpings for the week ended Aug. 9 show a decrease as compared with the previous seven days, the local trade seems to have handled more supplies. Locally the dealers complain of a lack of egg and stove, with broken, chestnut and pea much easier.

The market is in a fair way now to obtain supplies commensurate with its increased requirements and there are those who believe that orders similar to those issued by the anthracite committee of the fuel administration with regard to shipments to New England, will be sent out with respect to this market. Conditions with regard to the fuel supply in towns on Long Island are said to be bad, and the same is true of near-by towns along the water front which get their coal from this tidewater.

Receipts here are being drawn heavily upon because of orders issued by the anthracite committee of the fuel administration to producers and distributors stating that during this month water shipments to New England should be up to the maximum available boat equipment. At the same time all-rail shipments are to go forward on the present year's basis of allotment to each state. The committee also ordered that shipments of domestic sizes, including pea coal, shall be discontinued to 44 communities in Massachusetts, 45 in Connecticut and 146 in New Hampshire, directing that shipments shall be concentrated to other points in these respective states.

The improvement in the situation has not interfered with the activities for conserving fuel. A movement is on foot looking toward a union of church services in Brooklyn for the winter. Household consumers are securing their requirements in good shape and with reasonable receipts the situation is likely to be satisfactory by early cold weather.

Conditions in the mining fields are good. Production is heavy and with the labor situation remaining as it now is, operators believe they will be able to avert a coal scarcity such as the country faced last winter. It is estimated that of the 26,000,000 tons of anthracite mined during the first four months of the present coal year, 17,500,000 tons of domestic sizes have been placed in consumers' bins. A movement is also on foot to have the mine workers observe Labor Day by remaining at work, but this will not probably be accomplished. With all the mines idle it is estimated there will be a loss of 275,000 tons in production.

There was a loss of 605 cars in the dumpings at the local tidewater docks for the past week, 7004 cars having been dumped as compared with 7609 cars the week previous. Much of this loss was due to the excessive heat, the men at some of the docks refusing to work one entire day.

The steam coals continue active with the heavy demand for Buckwheat No. 1 continuing. Rice and barley are somewhat easier, but by no means plentiful, and with quotations at full circular prices.

Current quotations, per gross tons f.o.b., tidewater, at the lower ports, are as follows:

	Circular	Individual		Circular	Individual
Broken	$6.75	$7.50	Pea	$5.20	$5.95
Egg	6.35	7.10	Buck	5.10	5.90
Stove	6.60	7.35	Rice	4.65	5.10
Chestnut	6.70	7.45	Barley	4.15	4.30
			Boiler	4.60	

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates. Prices for buckwheat, rice, barley and boiler are not fixed by the Government.

Bituminous—Conditions are slowly improving. While free coals continue to be out of the market, regular customers are receiving good-sized supplies and the situation is in better shape. However, larger receipts would be welcome. Cars at the mines arrive in larger number, and some operators say they would be unable to load many more with the present labor supply.

The demand is steadily increasing, war industries asking for more coal than has yet been allotted to them. There has also been a heavy increase in the requirements for bunker fuel and producers whose mines were classified in either Pool No. 1 or Pool No. 71 are finding a ready market for their output.

Orders have been issued discontinuing Pool No. 72 as overseas bunker fuel. This pool was formed a few weeks ago by taking certain coals from Pool No. 10. These coals now revert to Pool No. 10, leaving Pools Nos. 1 and 71 as the exclusive pools for overseas bunker fuel.

Dumpings at the local tidewater docks for the week ended Aug. 9 show that 6763 cars were dumped as compared with 6619 cars the week previous, an increase of 154 cars.

Producers say conditions at the mines are gradually improving. Labor is more settled and, with cars moving easier, production is steadily showing an increase. Shipments to the New York market from central Pennsylvania for the week ended July 20 were 3534 cars as against 3325 cars the week previous.

There is a decided effort being made here to conserve fuel. Outside of the observance of "lightless" nights, one of the department stores is now open from 10 a.m. to 4:30 p.m. five days a week. Saving of fuel is also being accomplished in most of the big office buildings.

Stocks at the various docks are low. Spot buyers report few purchases and these far between. Bunkering is steady with the result that there is little surplus on hand.

Current quotations, based on Government prices at the mines, net ton f.o.b. tidewater, at the lower ports, are as follows:

	Mine Gross	F. o. b. N. Y. Gross
Central Pennsylvania:		
Mine-Run, prepared or slack	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of-Mine	3.08	5.23
Prepared	3.36	5.51
Slack	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite activity halted temporarily by heat. Overshipments to some sections cause trouble. One company close to quota on local trade. Outlook seems better. Labor question unsettled. Public works getting good supplies. Stove and nut in heaviest demand. Steam situation unchanged. Good tide business. Bituminous car supply improved. Good shipments received. Plans for increased production.

Anthracite—Due to the unprecedented hot weather, the various sales agents report the trade has allowed them a week of comparative quiet. They have had fewer personal calls from the dealers than for many weeks and even their telephones have been quieter. The heat also interfered to a considerable extent with retail deliveries and many yards shut down completely during several afternoons. The demand also fell off, temporarily, but will increase now that September is near with new prices going into effect in the fall.

The feature of the week has been the unusual shipments to West Philadelphia, and the methjod of shipping has been severely criticized. Several dealers received more coal in a few days than they could possibly unload in so many weeks. The dealers were anxious for the coal, but in some cases there was considerable transferring. The new car service rates make the rates so exorbitant for demurrage that it is out of the question to allow the cars to stand any length of time. Later when these same dealers ask for more coal they fear the fuel authorities will take the stand that they have not coöperated with them.

It would appear to some that the authorities have judged by the unfilled orders and where a dealer was a few thousand tons behind on his deliveries, took it for granted he would be glad to receive the coal at once. There are others who intimate the shippers complied with these requests of the local fuel people and shipped as they directed, only to show them that they had not yet mastered the situation.

In directions other than West Philadelphia the shipments have not been free and at least one big company is advising its trade that it expects to be one month behind until the New England situation has been relieved. This company has large obligations in New England and the in-

creased percentage ordered there was the cause of restricted shipments to customers in this city.

The company above referred to was also ordered to supply a large block of coal for the public schools here. This is business it has not handled before and further upset their plans for their local trade.

At the office of another big company it was learned that its most desirable trade had received its quota for the first quarter of the 1916-17 coal year, and in some cases this included the increase of 18 per cent. The fuel administration has cut off so many places to which this firm formerly consigned coal that its responsibilities have been greatly relieved. A spirit of optimism is manifest that has been absorbed by some of its largest buyers. Several of the largest retailers state that while they expect trouble all winter they are satisfied the experiences of last season will not be repeated.

Broken is now never heard of as a domestic fuel. Consumers of this size have been converted to the use of egg. Egg coal is not short, except in the suburbs. Stove and chestnut continue to be the sizes most sought after by the dealers and unfilled orders call chiefly for these two sizes. Pea is now actually easy with some dealers but by winter will undoubtedly be in greater demand than any of the other family coals. Less pea than either egg, stove or nut has been ordered and consequently by cold weather there will be less stored in the cellars. Naturally the dealers are crying for it, for they know of the coming demand, but there are a number who even now have fair stocks.

There has been no noticeable change in the steam trade recently. One week is simply a repetition of the preceding one. As a matter of fact there is little solicitation now on the part of steam users for further supplies, as they have by this time felt out all the possible sources of increased supplies. Old customers continue to accumulate almost unusual stocks of all the steam sizes. This is especially the case with several large department stores, who are accumulating extra large stocks on vacant lots. There is little culm activity locally, but heavy shipments are still going forward to eastern points. There has also been an increase in the tide shipments, but the rail movement to eastern points is still considerably in excess of normal.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.25	Buckwheat	$3.40	$4.45
Egg	4.50	5.85	Rice	2.90	3.80
Stove	4.75	6.10	Boiler	2.70	3.70
Nut	4.85	6.20	Barley	2.40	3.30
Pea	3.45	4.70	Culm	1.25	2.15

Bituminous—This week there has been a considerable improvement in the car supply, although there has been no change in the situation as to the adoption of the old rating plan by the Pennsylvania R. R. in the central Pennsylvania region. As a consequence of the improved car supply shipments received here have also increased and essential plants are adding to the already quite large stocks they are accumulating.

Plans are well developed by local operators whereby a systematic effort is to be made to encourage the miners to increase production. This is in pursuance of the Government's plan to have a committee of miners at each operation take charge of this problem and thus reach the men and keep them constantly impressed with the importance of their work to the nation.

BALTIMORE

More than 100 cars of special relief coal aids situation here. Conditions remain tight, however. Complaints of quality heard, even on preferential coal. Little change in anthracite situation except that deficit on apportionment grows.

Bituminous—Faced with facts to show that many important industries not on the actual preferential list were in dangerous condition as to fuel supply, the Washington fuel administration officials arranged for diversion of more than one hundred cars of soft coal to Fuel Administrator Meyer the past week. These came in small batches from District Representative Brydon and in considerable measure were assigned to the packing business which had been hard hit for lack of fuel at the height of the packing season. Others went to the more urgent needs on a list held by the fuel administrator, and by a close distribution and the aid of local coal men the situation was tided over and is still being handled in that fashion.

There is at present wide complaint as to the grade of coal coming through. For a time such complaints were made by those outside of preferential delivery, and the granting of best coal to war industries and public service corporations was given as the reason for the poorer grades reaching general business. Now there are also complaints from every source of much dirty coal. Numerous rejections have been noted from the Tidewater Pool, and a curtailment of street car service in this city the past week was blamed by the electric line officials largely on poor grade coal that cut down boiler efficiency.

Anthracite—Not much change is to be noted in the hard coal trade here. Receipts continue below normal. The local fuel committee has been promised that the full allotment will finally come through—just when is a question. Whether enough can now be secured to give all consumers here the planned two-thirds on orders before winter sets in is extremely doubtful. Some coal men are frank to say that even if the coal was poured in in unexpected quantities in September that the war-limited equipment and forces of the dealers here would not allow of its handling.

Lake Markets

PITTSBURGH

Production well maintained. Ample Lake transportation facilities. Coal needs of the iron and steel industry. Practically no market.

Production of coal in the Pittsburgh district is well maintained and with long range comparisons shows a material increase. There is no surplus of rail coal for stocking purposes, however, as the rule still holds good that after the current requirements of essential industries are taken care of the balance must be shipped in the Lake trade, and the Lake shipments thus far have not increased greatly over the allotments made prior to the ruling that the Pittsburgh district would have to make up for the decreased shipments from West Virginia and Kentucky due to their being required to furnish much more coal for the Navy.

There is an ample supply of Lake transportation. The Lake fleet moved in July 10,659,203 tons of iron ore, making a new record for a month, while the railroads are handling the coal to Lake ports well, no congestion at docks being reported.

If the steel mills require anything like the amount of coal the War Industries Board estimates the Pittsburgh district and other regions serving the steel industry are going to be kept very busy, for in a recent conference the War Industries Board informed the Fuel Administrator that the steel requirements for the present half year are 22,000,000 net tons, and that nearly five tons of coal is required per ton of steel, so that 110,000,000 tons would be needed for the half year. The demand was evidently made with a view to its being scaled down, for coal is hardly plentiful enough to give the iron and steel industry a supply equal to 220,000,000 tons a year. The board had previously undertaken to remind the steel industry that it had never made more than 16,500,000 tons in a half year, and it is obvious that more coal is not the only requisite in increasing the steel output. The allowance of five tons of coal per net ton of finished steel is also excessive. A fair estimate, though a rough one, would be 70,000,000 net tons of coal a year to produce the coke the blast furnaces use, and about 80,000,000 tons a year, for power, for producer gas and for heating steel, making 150,000,000 net tons of coal a year, or 75,000,000 tons for a half year. This amount would probably represent the outside consumption possible by the iron and steel industry if everything else were absolutely favorable to its full operation.

The condition remains that there is practically no open market in coal, such transactions as occur being in almost all cases the result of allocations. The brokers are doing but little business now. The market remains quotable at the set maximum prices: Slack, $2.10; mine-run, $2.35; screened, $2.60, per net ton at mine, Pittsburgh district, with 15c extra permitted to be charged by brokers to buyers.

BUFFALO

Trade slowing up somewhat. Diversion of coal to other points probably the reason. Cars more plentiful. Fear entertained that this district will run short.

Bituminous—The market is hardly keeping up with former activity and there is some uneasiness on that account. The question is how long the diversion of coal that is naturally tributary here will go on. If it lasts all the summer and fall it will leave this territory short of essential requirements. Coal that would otherwise go to points in this territory is being ordered to New England and up the Lakes, so that the operators themselves do not know what promises to make or what orders to take.

At the same time all jobbers and sellers are trying to be active. Some of them are sending out extra men to hunt for coal in order to keep a supply for their customers. They have about dropped the practice of selling at delivered prices. So many items must be added, such as freight, war tax, profit and the like that mine prices have been adopted to a great extent. Everything is so subject to change that often a shipper is unable to fix a delivered price and be safe in it.

This state of things, so many dealers with prices of their own, is such that it often takes considerable figuring and estimating to give a quotation. Consumers appear to understand this and are not insistent on this or that price. What they want is coal. They can no longer buy what they need in the open market. If they get coal for their manufacturing they are pretty sure of a good profit, no matter what it costs. If they do not get it they can do nothing.

Allowing for minor differences the prices of bituminous are $4.65 for thin-vein Allegheny Valley coal, $4.45 for Pittsburgh lump, $4.20 for mine run and slack, $5.85 for smithing and smokeless and $5.50 to $6.10 for cannel, all f.o.b. Buffalo per net ton.

Anthracite—The demand is as insistent as ever, in spite of hot weather. Advices from Canada agree that the amount possible to be got into that territory is sure to be light, but wood and bituminous coal will be laid in to take its place. Shippers and retailers do not agree as to the amount put into cellars here. One says the ordinary amount is delivered and the other is sure of a shortage.

CLEVELAND

Signs are becoming increasingly evident that the movement of bituminous coal to the Northwest must be continued until near the end of navigation. Shipments, which at the end of July were a round million tons behind the Fuel Administration's schedule, continue losing at the rate of 200,000 tons a week. Official orders have been received by operators in the Pittsburgh vein district of southern Ohio, that they are expected from now on to turn over 1200 cars daily to the lake trade. Industrial stocking of bituminous may well be said to be at an end, for the present.

Bituminous—Famine conditions seem inevitable until the close of navigation on the Great Lakes now that D. F. Hurd, secretary of the Pittsburgh Vein Operators' Association of Ohio, with offices in Cleveland, and zone director for the Fuel Administration, has formerly notified operators in the Pittsburgh vein district of southern Ohio that they are expected to provide the lake trade at least 1200 cars a day from now on. This means that receipts for industrial and domestic purposes here will be cut fully 50 per cent., and receipts for the past three or four weeks have been far short of spot requirements. The latest report of the output of operators who belong to the association, which covers the period ended July 21-31, shows that the output totaled 9005 cars, of which 1886 cars went for railroad fuel, 4778 to the lake trade, 1772 to Ohio, 450 to Indiana and Michigan and 119 to Canada.

Shipments of No. 8 coal from members of the association in July as compared with July, 1917, according to official figures compiled by the association, were:

	July, 1918		July, 1917	
	Cars	Per Cent.	Cars	Per Cent.
Railroad	6,094	23.01	7,336	37.91
Lake	12,980	49.37	6,428	33.21
Trade	7,262	27.62	5,590	28.88
Totals	26,291	100.00	19,354	100.00

From this it will be seen that to divert 7200 cars a week to the lake trade will require more coal than was produced for all purposes in July.

Labor conditions in the southern Ohio coal regions are reported only fair, with no prospects of immediate betterment by reason of the increased demand of the war services for men. Car supplies continue at between 90 and 100 per cent.—in any event ample for the labor forces. Detailed figures on the car supply accorded members of the Pittsburgh Vein Operators' Association of Ohio for July are:

Railroad	Car Rating	Supplied in July	Short	Tons Short
B. & O.	16,509	13,794	2,715	135,750
Penna.	9,166	8,174	992	49,600
W. & L. E.	8,263	7,306	957	47,850
N. Y. C.	2,236	1,958	278	13,900
Total	36,174	31,232	4,942	247,100

Anthracite—Due to the operation of the zoning system virtually no anthracite or smokeless coal is entering this market.

Lake Trade—Bituminous is coming forward liberally to lower lake ports, and cargo space is ample; but shipments seem not to be able to get much ahead of 1,000,000 to 1,050,000 tons a week. With a schedule calling for 4,900,000 tons each in August and September, and the lake movement a round million tons behind by the close of July, it can readily be seen why lake vesselmen see the coal season continuing up to the very end of navigation. Revised figures for the week ended Aug. 3 place the shipments at 1,050,000 tons. The estimate for the movement in the week ended Aug. 10 is the same. Reports that Pittsburgh vein operators in southern Ohio would be called upon to supply 1200 cars daily for the lake trade have become fact with the issuance of such an order in the past week. This is one of the results of the visit here ten days ago of Charles P. White, who is in charge of lake and Canadian coal shipments for the Federal Fuel Administration. Government figures show that in July 2,121,603 tons of bituminous coal passed upbound through the Soo canals, while anthracite shipments amounted to 233,764 tons.

DETROIT

Inadequate supply of anthracite and domestic bituminous alarms Detroit manufacturers, who fear migration of labor. Lake movement holds volume.

Bituminous—Distribution of winter fuel in Detroit is still impeded by the restricted supply of domestic stock available. Jobbers report fair amount of steam coal is coming into the market, though the quantity is not sufficiently large to provide a reasonable supply for building reserves after provision is made for the day to day needs of steam coal users. The stock reaching the city is largely mine run of a character unsuitable for use in household heating plants. The proportion of lump and domestic coal is small and jobbers say little success attends their efforts to increase the supply.

Users of steam coal are actively in the market. There is no free coal on tracks and the accumulation of reserve supplies is not general, though some of the larger establishments have succeeded in putting aside a comfortable surplus.

Anthracite—Detroit's anthracite receipts show no improvement. Instead of shipments arriving in increased volume, as the season advances, it is reported the movement has dwindled down to around 18 or 20 cars a day. With the great r proportion of Detroit's domestic consumers having heating plants in which anthracite is ordinarily burned, the situation is assuming an alarming aspect. Manufacturers assert that continuation of operations on war orders is likely to be jeopardized by an exodus of labor from Detroit unless immediate action is taken to increase the present supply of coal and improve the prospects for augmenting the supply later.

Representatives of several large corporations have been appointed to a committee which will go to Washington within a few days to present an appeal to the war industries board, the shipping board and the secretary of war. The committee will also appeal to the federal fuel administrator, if he is back from his vacation. In the effort to improve Detroit's situation, the local Board of Commerce has appointed Edward J. DuBois, vice-president of the American Coal and Coke Co., as a permanent representative in Washington.

Lake Trade—Shipments of coal over the Lake routes are showing a slight increase in volume, and for the week ending Aug. 3 carriers loaded 1,050,000 tons. This is the heaviest movement of any one week for the season. Even this falls short, however, of the schedule of 4,900,000 tons which shippers had decided would be necessary for the months of August and September to assure supplying the Northwest before the coming of winter.

COLUMBUS

The hot weather has had its effect on mining operations and production is smaller. Lake trade is booming. There is a good steam and domestic demand.

The extreme hot weather which has prevailed for a week has had a bad effect on mining operations. Miners are not as active; neither are tipple men or outside labor. The result is that a curtailment of production, while not marked, is having its effect on the demand. Retail trade is active and there is not a great deal of coal going to the dealers because of priority orders. On the whole the tone of the trade is good and prospects are considered bright.

Lake trade is now attracting the major part of the attention of producers and shippers. Under orders from W. D. McKinney, federal representative, about 85 per cent. of the production of Ohio mines is being moved to the Lakes for shipment to the Northwest. Reports show that there is still a shortage in the upper lake region although this is not as bad as earlier in the season. The vessel movement has been good.

The domestic trade is rather quiet, although there are frequent demands for tonnage on the part of dealers. Consumers are placing orders rapidly as a survey of the state shows that many householders have not yet arranged for the winter's fuel. Retail prices are firm at the levels which have prevailed for some time. Retail stocks are small. Some West Virginia splints are on hand but the amount of Pocahontas is small.

Steam demand is also strong but a minimum tonnage is allowed steam users. The question of necessity enters largely into apportioning tonnage for steam plants. The smaller users as well as the heavy consumers have been able to accumulate a fairly good surplus and as a result industry is not suffering. Many large consumers have enlarged their storage facilities and have a larger tonnage on hand than ever before.

Production is rather good despite the labor shortage and the extreme hot weather. The Hocking Valley is working at about 85 per cent. of capacity and eastern Ohio is producing in the neighborhood of 80 per cent. Other fields also show good production figures.

LOUISVILLE

Production continues comparatively light, with car supply inadequate, and labor somewhat harder to secure. Steam demand is normal, with domestic demand heavy, and dealers well behind on orders. So far dealers have been unable to secure any surplus.

Deliveries of coal to steam and domestic consumers have been handicapped somewhat during the past week by the hottest weather in 17 years, the thermometer going to 105 deg., on Monday, Aug. 5, with a street temperature of 117 deg. This made it hard to hold men, and keep animal-drawn carts moving. This has been the most peculiar season of many years. Just after the first of the year the coldest weather for 40 odd years was experienced, and now we have the hottest weather since 1901.

Production in the eastern Kentucky fields is showing no improvement, and is dropping off in the western Kentucky fields due to the heavy drafting of negroes, who are claiming few exemptions, and patriotically reporting when called. With the starting of the cotton picking season it is expected that many negroes will leave the mines for a time, making the situation still worse.

Heavy movement of coal into the Lake district has made the car shortage more acute. However, the use of coal cars is being materially restricted for handling coal alone, and this should aid things somewhat.

In Indiana and points west of the Mississippi florists are having an easier time of it than in the Eastern sections. Indiana florists have been advised that they may burn low grade Indiana screenings in addition to their 50 per cent allowance of steam coal. Efforts of Kentucky florists to secure the same advantage have been of no avail.

BIRMINGHAM

No important changes in market conditions. Demand strong for all grades. Supply slightly improved. Production last week reached highest recorded figure. Shortage of cars causing loss in output at some operations.

The past week did not develop any material change in trade conditions locally. The production for the week ending July 27 showed a gain of about 15,000 net tons over the output of the previous week, according to figures compiled by District Representative E. A. Homes, of the Fuel Administration. This was a record production for Alabama, and it is expected that a substantial increase will be noted each week from now on.

Inquiries for steam coal are showing no diminution and the requirements are in excess of the supply available. The slightly increased production has not affected market conditions as yet, and the output will not likely reach such proportions as will greatly ease the tenseness of the demand on this district.

Domestic trade continues steady and records indicate that more domestic coal was bought by consumers in July than the preceding month. Dealers are delivering coal from the cars set into their yards in many instances and only a few retailers have any coal in stock.

Men in the coal-mining district as a whole appear to be working more steadily, though there is yet much idleness among the mine workers, which is causing a heavy loss in the output. Mines on the Frisco have lost some time during the past week, from one hour to a whole day, waiting on equipment for loading, coal cars being rather short with this line.

Coke

CONNELLSVILLE

Continued completion of by-product ovens. Connellsville ships more raw coal. Ruling on cleaned coke. Merchant oven output maintained.

The feature of the coke situation continues to be increased production of by-product coke. At the Clairton plant of the Carnegie Steel Co., where the first coke was made late in June, the first battery of 128 ovens is now in full operation and producing about 10,000 tons of coke per week. This is sufficient to operate the three Clairton blast furnaces. The second unit is expected to be in moderately full operation by the fore part of September, and three more units by the end of the year. Completion of the remaining six units will occur much later.

The Lorain plant of the National Tube Co., which will embrace 208 ovens altogether, now has half its ovens in practically full operation, with expectations that the remaining half will be in practically full operation within 60 days. The 180 ovens at Cleveland of the American Steel and Wire Co., where the first coke was made in May, are now in full operation. A few of the 204 additional ovens of the Youngstown Sheet and Tube Co. were completed a few days ago, but are only now starting, as there was a delay in receipt of additional coal supplies.

These various new plants draw their coal largely or wholly from the Connellsville region, which accordingly has much difficulty in maintaining its coke production in face of the additional coal that must be shipped. The last week reported upon showed merchant ovens operating at as good a rate as they have attained this year, but production by furnace ovens decreased 12,000 tons. This is the only decrease attributable to the drain of new by-product ovens, so that on the whole the production of coke, by one process or another, from Connellsville coal is increasing.

The local fuel administrator has ruled that coke that is screened and otherwise cleaned may be sold at as high as $6 if it is not in prepared size, and it would appear that even if it is screened from an old dump it would be permissible to sell it at up to $7.30 if over ¾-in. Such material, from old dumps, has brought up to $6.50 and while it is practically as good for heating purposes as new crushed coke its appearance is against it and the retail dealer must be given a concession in consequence.

Scarcely any furnace coke is offered in the market, but a number of operators continue to offer foundry coke rather freely and the foundries appear to be stocking up. The market remains quotable at the set limits, as follows: Furnace, $6; foundry, 72-hr. selected, $7; crushed, over ¾-in., $7.30, per net ton at ovens. Screened and cleaned coke not sized is limited to $6, cleaned crushed under ¾-in. to $5 and breeze to $3, but these prices could hardly be obtained.

The Courier reports production in the Connellsville and Lower Connellsville region in the week ended Aug. 3 at 340,980 tons, a decrease of 11,645 tons. The decrease was wholly in the furnace oven production, the merchant oven production increasing 550 tons to 142,930 tons.

Buffalo—The demand is heavy, as all furnaces are running strong. It is always hard to get a supply, but, at least, this is accomplished to such an amount that no shutting down is reported. Jobbers do not try to handle coke but get a good profit on the breeze that they obtain from the by-product plants.

Middle Western

GENERAL REVIEW

Operators disturbed over Fuel Administration's rulings relative to sized screenings and modified mine-run. Shortage of skilled labor. Idleness reported on account of poor car supply.

Coal operators in the Middle West, in general, and in the southern part of Illinois,

in particular, are disturbed, to put it mildly, over the recent decisions of the Fuel Administration relative to sized screenings and modified mine-run.

The Fuel Administration's statement No. 667 reads as follows: "For all special sizes passed over a mesh over ½ in. in size the mine price for prepared coal is allowed." This paragraph clears up a doubtful point; namely that such coal from Franklin County or Williamson County as special stove (2 x 1¼ in.) or domestic chestnut (1¼ x ¾ in.) shall be considered as much a prepared size as lump or egg. The ruling goes on to state, however, that for special sizes passing over ¼-in. and under ½-in. screens, the mine price for run-of-mine coal is allowed. This classes as mine-run carefully prepared pea coal (½ x ¼ in.), which is given just as much care in producing and preparing as the larger sizes. This coal is not used at all extensively for domestic purposes, except perhaps for underfeed furnaces, but makes a highly efficient steam fuel. This pea coal, or No. 4 nut, as it is sometimes called, is just as expensive to produce and prepare for market as the larger prepared sizes, and there is a question in the minds of the operators affected just why the Fuel Administration made this differential. The ruling goes on to state as follows: "For all fine sizes passing through a mesh of ½ in. or smaller the price fixed is 30c. per net ton less than the prevailing price for standard screenings. If fine screenings or carbon, passing through ½-in. or smaller mesh as a result of producing specially sized screenings are mixed with other coal, the selling price shall not exceed the applicable Government price, less 30c. per net ton." This reduces the price on carbon, or No. 5, as well as ¾-in. screenings from $2.05 per ton to $1.75 per ton. Roughly speaking, 20 per cent. of the entire output of a southern Illinois mine is ¾ or ½-in. screenings. This reduction of 30c. per ton is a serious matter to these operators.

Another ruling unfortunate for the Illinois and Indiana operator was issued around the first of the month. This ruling modifies to a large extent the United States Fuel Administration's statement No. 617, issued July 6, which allows for special prices on modified mine-run. According to the original statement, No. 617, modified mine-run is mine-run passing through a screen with 2-in. perforations up to 6-in. perforations. The new ruling states as follows:

"In certain districts there are mines which prior to Jan. 1, 1916, used 2 to 2½-in. standard screens and which consequently should sell coal passing through such screens at the applicable slack price, according to the terms of the order of May 27. These same mines are now reported as billing this product at the modified mine-run price, thereby overcharging the consumer from 10 to 12c. a ton."

In other words, if an operator in Illinois made 2-in. screenings prior to January, 1916, he can only charge $2.05 per ton for such screenings. If, however, he made 1¼-in. screenings at that date, and say six months ago changed his screens to 2 in. then he is entitled to charge for his coal on a modified mine-run basis, which would bring 2-in. screenings up to $2.17.

The labor situation in the field is practically unchanged. There is a tremendous shortage of skilled labor, such as machine runners, and motormen, but there is a plentiful supply of common labor. The local exemption boards are reported to be coöperating with the operators and helping them in every way to procure men for the mines. The car situation for this period is not as good as it has been for the past few weeks.

CHICAGO

Heavy production almost resulted in sharp break in market. High grade coal scarce. Lower grades selling freely. Car supply poor.

There is not much change in the Chicago market. High grade coal is still difficult to purchase, and the medium to lower grade products are selling freely on a basis of "Government price current at time of shipment," or below this basis.

The recent heavy production periods nearly brought about a sharp break in the market, but this was avoided by placing a large tonnage in the lower peninsula of Michigan, as well as parts of Ohio, for Indiana coal. In addition, the car supply has not been as good as it had been for the past few weeks, and this was also a factor in keeping the market fairly firm.

MILWAUKEE

Fuel administrator receiving complaints of overcharge on the part of some dealers. Registration of coal and coke distributors.

The coal market, if the present method of trading in coal can be called marketing, is abnormally active for the season. Small dealers complain that they are not allowed sufficient hard coal to keep their teams busy. Some say that at the present rate of supply they will not be able to fill their orders until next spring. Bituminous coal, however, is being handled freely.

An additional charge of 75c. is being made by some hard coal dealers on what they term "premium coal," or coal secured by them after special effort and at above normal expense. This has resulted in complaints of overcharge. Fuel Administrator Fitzgerald has referred the matter to headquarters at Washington for instructions. Meanwhile the dealers interested will continue to exact the extra sum.

The anthracite coal situation is improving, as far as this district is concerned, and the opinion is expressed that there is now hard coal enough in sight to meet the needs of the state on the basis of current restrictions. The recent advances of 40c per ton was made, it is alleged, to cover increased freight rates. The new retail margin decided upon by the advisory board of the fuel administration has not yet been announced, but it is practically the same as the margin now in force—$2.25.

The work of registering coal and coke dealers in this district is now in progress. Every fuel handler, including organizations distributing coal to employees or members, must register by Aug. 20, with county fuel administrators, and the certificate of registration must be posted conspicuously. Coal and coke wholesalers are warned, under severe penalty, not to sell or ship fuel to those who have not complied with the registration order.

Two cargoes of hard coal, aggregating 15,300 tons, were received since last week's report. A feature of the week was the docking of a record-breaking cargo of bituminous coal—13,768 tons. August will be a big month if the present volume of receipts is kept up. The record up to and including the 7th, is 15,300 tons of anthracite and 163,716 tons of soft coal.

ST. LOUIS

A continued quiet market, with a let-up in the domestic demand on everything except Carterville. Steam sizes moving slow. Hot weather affecting shipments. Car supply poor, while movement shows improvement.

In St. Louis proper the coal situation is almost at a standstill. The weather the past week has been the warmest on record here for 17 years, and it has affected domestic deliveries. Many of the inexperienced drivers who take the places of those who have been drafted quit after making a load each day, and many of the larger companies had two-thirds of their equipment in the stable. The result is that the yards are pretty well loaded with coal, drawing demurrage, and the scarcity of help to unload steam coal has caused a surplus of steam sizes to accumulate.

In the Southern Illinois field there has been a scarcity of water at many of the mines that is interfering with production. Car supply has been poor in the Carterville field, and transportation not all that it might be. The Missouri Pacific R. R. was short 300 cars for railroad coal in this field last week.

The labor situation is becoming acute again in view of the prospects of losing a large number of miners in the August draft, and only by the most strenuous efforts are the operators enabled to keep a large number of men from enlisting in the Navy in order to evade being drafted in the Army. Somewhat similar conditions exist in the Duquoin field.

In the Harrisburg district, from which territory a small tonnage comes in to St. Louis, the conditions are worse in some respects than in the Carterville field, especially as regards water. Throughout both of these fields the power for the operation of mines is supplied by a public service company, and the service has been so unusually poor that it is also affecting the tonnage produced, causing dissatisfaction among the men.

Conditions in the Mt. Olive field are uniformly steady. There is little variance week after week in this field. The car supply is fairly good. The labor supply is affected as in other fields, but it is not quite so apparent.

The tonnage produced here about equals the demand. Although a large railroad tonnage moves from this field the same as from the Carterville and the Duquoin fields, it is not affecting the domestic deliveries.

In the Standard district there is a car shortage and a surplus of screenings from the mines that do have cars. Added to this is the unequal distribution of empty equipment, which still continues in the face of protests from mines.

The water shortage is also severe at some of the mines here. There is a surplus of coal at the present time in this field that is being moved to the Northern markets and also to towns in Michigan. Locally, St. Louis is pretty well supplied with domestic coal of this grade, and from now on for some time a larger movement of this coal can be expected to move to Michigan and Northern points.

There are no eastern coals of any kind coming in and very little Arkansas. Standard 2-in. lump is a little under the maximum Government price. It is selling as low as $2.35 and $2.40 while screenings are around $1.65 and $1.70. All other sizes from all other fields are bringing the Government maximum. The Government maximum price here is, per net ton f.o.b. mines:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.55@2.70	$2.55@2.70	$2.40@2.70
3x6-in. egg	2.55@2.70	2.55@2.70	2.35@2.55
2x3-in. nut	2.55@2.70	2.55@2.70	2.35@2.55
No. 2 nut	2.55@2.70	2.55@2.70	.....
No. 3 nut	2.55@2.70	2.55@2.70	.....
No. 4 nut	2.55@2.70	2.55@2.70	.....
No. 5 nut	2.05@2.20	2.05@2.20	.....
2-in. scrgs	2.05@2.20	2.05@2.20	1.25@1.50
3-in. lump	.....	.....	2.25@2.40
2-in. lump	.....	.....	2.25@2.40
Steam egg	.....	.....	2.25@2.40
Mine run	2.35@2.50	2.35@2.50	1.85@2.00
Washed:			
No. 1	2.75@2.90	2.75@2.90	.....
No. 2	2.75@2.90	2.75@2.90	.....
No. 3	2.55@2.75	2.55@2.75	.....
No. 4	2.55@2.75	2.55@2.75	.....
No. 5	2.05@2.20	2.05@2.20	.....

Williamson and Franklin County rate is $1.10; Duquoin field, $1; Standard and Mt. Olive fields, 95c.

SEATTLE

State warned to lay in a supply of coal. Coal dealers required to secure licenses. Curtailment of power to save fuel is started. New mining operations discouraged.

If Washington or British Columbia coal is needed somewhere else it will be ordered sent there by the fuel administration, if fuel oil must be withdrawn and coal substituted, or if wood or other fuel can take the place of coal such action will be taken according to A. W. Calloway, director of distribution who has been investigating methods to speed up coal deliveries. The fuel shortage it is believed is going to be felt more next year than this winter and there is no way to avoid this winter's shortage.

Coal buying and distribution in the Northwest is to be readjusted according to Mr. Calloway. California contends it cannot get enough British Columbia coal and must therefore depend upon Wyoming and Utah. Portland argues that it must have Utah coal because it cannot get Washington coal. In eastern Washington consumers are drawing upon Montana and Utah for coal that should be supplied from this state or the Crows Nest fields of British Columbia. Mr. Calloway therefore believes that Washington is going to be compelled to supply her own needs and the needs of steamships here. This will release British Columbia coal which stands shipment better to San Francisco.

Retail coal dealers of the state have been required to register not later than Aug. 15. About 600 coal dealers are affected in the state. The registration is considered necessary for proper distribution, the control of the retail market situation and the securing of reports from retail dealers in the stocks on hand and the amount of coal handled by them.

General Statistics

NORFOLK & WESTERN TONNAGE

Coal tonnage from mines on the Norfolk & Western Ry. and from other railroads, for the month of June, 1918, were as follows:

From	Net Tons
Pocahontas Field	1,511,208
Tug River Field	305,025
Thacker Field	275,267
Kenova Field	96,098
Clinch Valley Field	138,467
Other N. & W. Fields	14,090
Total N. & W. Fields	2,340,155
Williamson & Pond Creek R.R.	183,556
Tug River & Kentucky R.R.	56,842
All other railroads	99,663
Grand total	2,680,216

COAL AGE

Volume 14 New York, August 22, 1918 *Number* 8

Your Troubles

BY FLOYD W. PARSONS

A LOT of men and women continue to talk of their troubles and are grieved because the world doesn't stand at attention while their distress is relieved.

In America today there are countless people who look out on the horizon of their lives and, seeing a glow-worm, think it is a conflagration.

The fact that the fate of all humanity now hangs in the balance is second with them to the fact that one of the children is sick and the mortgage is due.

Why, man, do you not know that all former standards for measuring happiness and sorrow have been destroyed? Mrs. Smith next door has a wonderful son already sleeping in a grave in France, and Mrs. Jones across the street has a Red Cross daughter destroyed by a Hun bomb and buried in alien soil. What are your troubles to these?

You say that your business has been cut in half. Do you not know that hundreds of corporations have had to close up entirely due to the war? You cry out that the cost of your everyday necessities is abnormal. Are you not aware that more people have died of starvation in Europe and Asia this year than have succumbed to enemy bullets?

This is no day to whine and practice self-pity. It is a time that calls for decision and action. All worthwhile things are difficult. We learn by trying. Every day we delay our fight means a stronger enemy. And while we are hammering away, let us grin; there is a big difference between a grin and a smile.

The trouble is not our inability to bear adversity, but rather our inability to forget prosperity. Let us think more of the unconquerable spirit of the people who inhabited devastated Belgium, and we will be less conscious of our own trifling sacrifices.

Sorrow, like ill weather, comes without being sent for; but it will pay no debt and add nothing to the force of our effort. We might as well try to catch the wind in a net as to expect victory from a nation of weepers. It is our sacred duty to strangle the grumblers and mourners.

Griefs appear swift and remedies slow, but time tames the greatest sorrow. No mine or mill can set a new high figure for production if the men working there are morose and dreary.

Let us chase away the joy slacker. We must pool not only our material forces, but our glee forces. The man who holds the ladder is as bad as the one who climbs up it into your house and steals your goods. Any person in America today who goes about shrouded in gloom is as much a member of the Kaiser's army as the surly Prussian who carries a gun.

We are up against a de-humanized nation, a country whose soul has been shriveled and benumbed by the poison of hate and self-worship. We are fighting a people devoted to scientific barbarism—a government whose record of broken treaties and hideous cruelties goes back as far as its history. In order to win and forever silence the Huns and their Kaiser, who impudently anoints himself as the "Sword of God," we must forget our petty troubles and present a cheerful nation behind a cheerful army.

Grin and Work and Fight.

IDEAS AND SUGGESTIONS

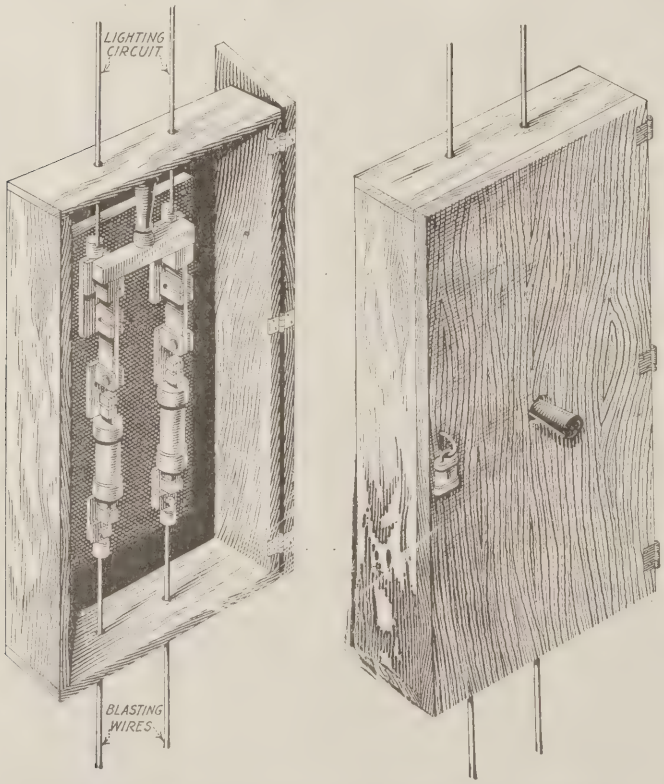
Blasting with the Lighting Circuit

BY THOMAS J. PASCOE

The following method of blasting, which is practiced in a mine in the vicinity of Norway, Mich., is sure to explode every hole: The current is taken from a 110-volt lighting circuit, and the charge is fired by means of a single-throw knife switch, connected as shown in the illustration. The switch is provided with fuse plugs. To explode 15 holes, a 10-ampere fuse is required. The blasting wires are so connected with the switch that, by closing the latter, they are cut into the lighting circuit.

The switch is placed in a wooden box, with a hole cut in the door, as shown. When the door is closed, the handle of the switch projects outside. This is done so that the miner may know positively that the switch is not in contact with the live wires before he attempts to connect his blasting wires to the charge. Otherwise a serious explosion may occur.

The miners prefer the method detailed to the old way with batteries, as it never fails to explode every



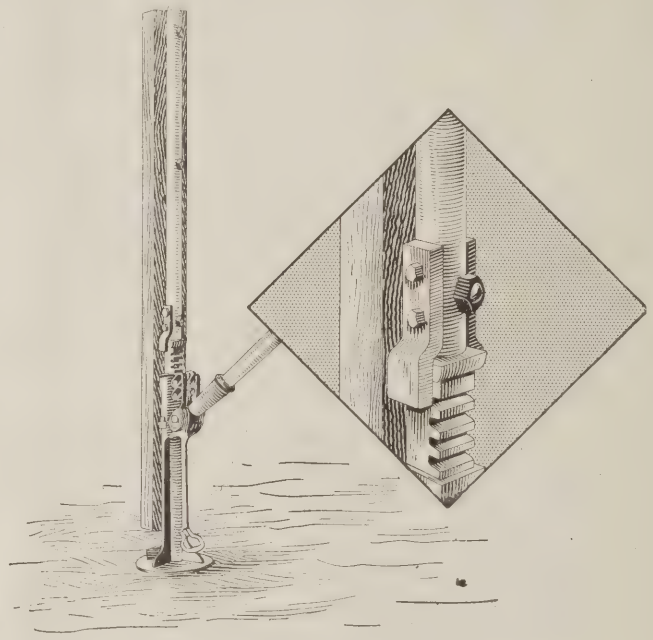
KNIFE-SWITCH USED IN EXPLODING CHARGES

hole at the proper time. The switch box should always be kept locked, and the key be given to the man responsible for the blasting. The knife switch should be placed with the live connections up. Then in case the door should be left open, and the handle drop, it would not come in contact with the live wires.—*Engineering and Mining Journal.*

A Quickly Adjusted "Jack-Prop"

BY HARRY GOODNOW
Du Quoin, Ill.

When a fire is raging at the face of an entry or room the first efforts put forth are to advance a canvas brattice up as close to the seat of the fire as possible in



THIS JACK-PROP IS RAPIDLY ADJUSTED

order to clear away the smoke so that the actual work of putting out the conflagration may commence.

How many practical mining men who read this have carried, into the suffocating smoke, a prop and tried to set it only to find it too long or short. Then with lungs ready to burst a hurried effort is made to guess at or measure the proper length, the heavy timber is hauled out and replaced or cut into supposed size, when another effort is made to set the right length of prop, which goes into place—maybe.

To obviate these troubles and delays a "jack-prop" was devised (as shown in the accompanying illustration). This is composed of two parts, as its name implies, any jack and a piece of pipe socketed to fit the top of the jack. This pipe has a wooden strip bolted to it upon which to nail the canvas.

A supply of these pipes, easily made by the mine blacksmith, and of different lengths, can be kept in a car together with canvas, fire extinguishers, etc. Upon the alarm of fire one man with a mule can take in this car, while another, acquainted with the mine, can quickly gather a few jacks to keep things moving.

Of course, these "jack-props" can be replaced with common props as soon as the smoke is cleared out, thus allowing a few used over and over again to carry the canvas an indefinite distance.

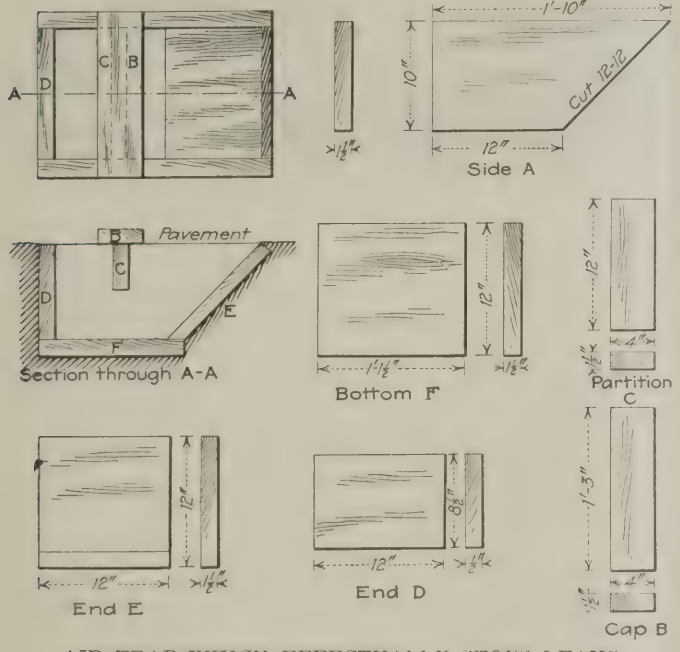
An Effective Air Trap

The old rhyme about "Little drops of water, little grains of sand," etc., might, so far as coal mining is concerned, be paraphrased somewhat as follows: Little drops of water, Running as they can, May mean a mighty air leak, And perhaps a fan. The air trap here described will effectually stop one kind of air leak that is at times quite troublesome.

One advantage of the construction shown in the accompanying illustration is that when the vertical side for the box is placed toward the flow of water a fall is formed that tends to keep the sediment in the bottom stirred up and washed out over the slanting side. Furthermore, where the flow of water is unsteady or intermittent, the trap stands full of water and prevents leakage.

A trap of the dimensions shown is large enough to handle the discharge from an 8-in. pipe and an air pressure up to 4 in. of water. For a greater volume of water, the box may made longer. Confining each side or member of the box to one piece of plank lessens the number of joints that are liable to leak.

The top of such a trap should be set even with the bottom of the ditch carrying the water. The slanting or discharge side should be so placed that a shovel may be used if necessary to clean out the box.



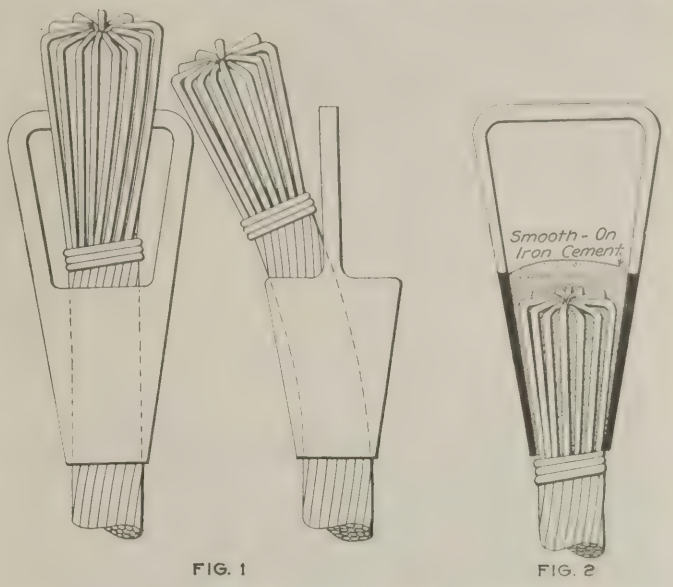
AIR TRAP WHICH EFFECTUALLY STOPS LEAKS

Tile bends are sometimes used in place of these traps. However, there are less satisfactory than boxes similar to the one shown, as they are more difficult to clean and more liable to break.

New Way of Socketing Wire Ropes

Many ropemen who have experienced difficulty in making a satisfactory joint when placing a forged socket on the end of a wire cable will doubtless be interested in a new method developed by John T. Willison, of Ambridge, Penn. Mr. Willison, who was testing 19-strand cables for tensible strength, was particularly interested in making a joint which would be stronger than the cable itself. After trying several methods unsuccessfully, the joint failing in each case before the cable was loaded to capacity, he finally conceived the idea of securing the cable in the socket with iron cement in the way shown in the illustration.

The cable end was first passed into the socket, as shown in Figs. 1 and 2. One of the outside wires was



FIGS. 1 AND 2. METHOD OF PASSING CABLE END INTO SOCKET

untwisted and wrapped tightly around the others. Above this wrap the remaining wires were untwisted and belled out as shown, and the ends turned down. "Smooth-On" Iron Cement No. 1 was mixed with water to a smooth putty-like consistency, and the socket packed closely with this material. The cable was then pulled firmly into place and the cement allowed to metallize. In metallizing, the iron cement expanded to such a degree that it completely filled the spaces between the wires and between the cable and the socket shell and thus wedged the joint securely. A firm union resulted, which, on test, proved to be stronger than the cable itself.

A bunsen burner can be used to show how mixing air with a flame affects combustion. When the air supply is turned off the flame from a bunsen burner is luminous. Its luminosity is due to incandescent particles of solid carbon resulting from the decomposition of hydrocarbons in the gas. The interior of the flame contains no oxygen to burn the hydrocarbons, and they are decomposed by heat into hydrogen and carbon. When the air is mixed with the gas as it enters the burner, the flame is nonluminous and has a well-defined inner cone. In this inner cone the oxygen of the air combines with hydrocarbons of the gas, producing H_2 and CO, which burn on the outer envelope of the flame. The reactions in the presence of oxygen produce gases that are easily burned, whereas the carbon produced in the absence of air is difficult to burn. Similarly, air mixed with volatile matter in the furnace before the tar is decomposed by heat may produce a larger proportion of combustible in the form of gas and less in the form of carbon.—*Bureau of Mines Bulletin No. 135.*

Orient Mine of Franklin County, Illinois

By GEORGE W. HARRIS
Editorial Staff "Coal Age"



FIG. 1. ORIENT PLANT OF THE CHICAGO, WILMINGTON AND FRANKLIN COAL COMPANY.

IF ALL the 324 commercial shipping mines of Illinois would produce as much coal in a year as the Orient mine of the Chicago, Wilmington & Franklin Coal Co. did last year, this country would be provided with one-half of the whole amount of bituminous fuel needed to supply 1918 requirements. Illinois is a great coal state and has some wonderful plants. The Orient mine is about 3½ miles northwest of West Frankfort, in Franklin County, Illinois, where big production is taken as a matter of course.

Standing on the hilltop adjacent to and overlooking Orient town, a person can readily see some of the big producers of this famous section. There are 14 mines around Orient, within a radius of about seven miles, which are producing 50,000 tons of coal daily. Among those participating in this good work are the Old Ben Coal Corporation plants near Christopher to the northwest; the U. S. Steel Corporation's Middle Fork, Benton Coal Co. and Chicago, Wilmington & Franklin mines at Benton on the northeast; the Byproduct Coke Corporation plants, Old Ben No. 8 and No. 9, and West Frankfort mine around the town of West Frankfort on the southeast, and the Ziegler property a few miles west. For the year ended June 30, 1917, this remarkable group of mines, including Orient, produced over 9½ million tons of coal, which was one-eighth of the total production of the state, while these 15 mines were only the 1/22 part of the 324 commercial shippers of Illinois.

The Orient mine is located on a 12,000-acre property, on which two additional plants of about the same capacity as the existing mine will be located. The No. 6 seam here runs from 9 to 12 ft. thick, and if it persists over the whole tract at an average thickness of 10 ft., the property will contain about 212 million tons of coal of this seam alone. It is expected that the new plants will incorporate some of the latest ideas in development which have come to be considered especially applicable to mining in Franklin County. The underground workings will also (similar to Orient) include isolating panels, which are most desirable in case of fire in the mine or an explosion taking place.

On Nov. 12, 1917, the Orient mine made its record run (which is also the record for this field) of 5508 tons of coal dumped in eight hours—this on a single-cage hoist. Needless to say, the cage is the self-dumping type; it is the Olsen pattern, made by the Eagle Iron Works, of Des Moines, Iowa. On the day the writer was at the plant 4900 tons were hoisted in eight hours; this coal was loaded by 441 men, or an average of about 11 tons per loader. In the year ended June 30, 1917, this mine shipped 1,100,000 tons of coal in 272 working days or part days that the mine operated, or about 4050 tons per day on an average. A number of conditions are necessary to enable a record run to be made, conditions which seldom prevail on many consecutive days. Car supply and labor have been erratic for the past year or so, making it increasingly difficult to even maintain normal production let alone record tonnage even for short periods.

The hoist at the Orient tipple is 600 ft. from the landing at the bottom of the shaft to the dump; the dump is 80 ft. above the surface. The No. 6 seam mined

here runs from 9 to 11 ft. in thickness and carries the characteristic blue band, which runs from ½ to ¾ in. in thickness at about 1½ ft. up from the bottom. The bottom rock is fireclay and the top a shale. The latter does not stand well when the coal is removed, making it necessary to leave up about 2 ft. of top coal in the rooms (at least until the rooms are finished) and 3 ft. in entries as a roof. Near the top of the No. 6 coal in Franklin and Williamson Counties is a persistent parting, at which the coal of the main bench easily separates from the top coal; these two benches vary in thickness. At some operations the top bench is the best coal in the mine, the ash running from 3 to 3½ per cent., while the ash content of the lower bench may run from 6½ to 9½ per cent. The heating values of the two benches are in inverse proportion to the ash content, the top bench having the greater heat values when the ash content is lower than in the bottom bench.

From the operator's standpoint nature seems to have favored Franklin and Williamson Counties doubly, in the sense that the coal is thicker than in most other sections and the values of farm lands are as low as any, and considerably lower than in most of the coal-bearing sections of the state. The greatest depth of cover over the No. 6 bed occurs in this general section. Damages for injury to surface would be much more serious in the case of mining a thick seam with little cover where the farm values were high than with low-priced land, as great disturbance to surface would inevitably take place on removal of such a thick bed with little cover.

The room-and-pillar panel system of mining is used at the plant in question, as shown in Fig. 2, which includes a portion of the mine west of the shafts. The rooms are turned on 40-ft. centers—18-ft. pillar and 22-ft. room; they are worked to a depth of 250 ft. Each panel has 16 rooms on each side of the double stub entry. A pillar of coal 20 ft. wide is left between the ends of finished rooms, and the main entries are protected by pillars 150 ft. in width. The 16-room panels are separated by 50 ft. of solid coal. Thus each group of 32 rooms has no connection with the balance of the mine, except where the stub entries connect with the east and west main entries. The shafts are protected by a pillar of about 20 acres in area. The north and south mains are also on the three-entry plan up to the last parting, and double entry from that point to the boundaries. In

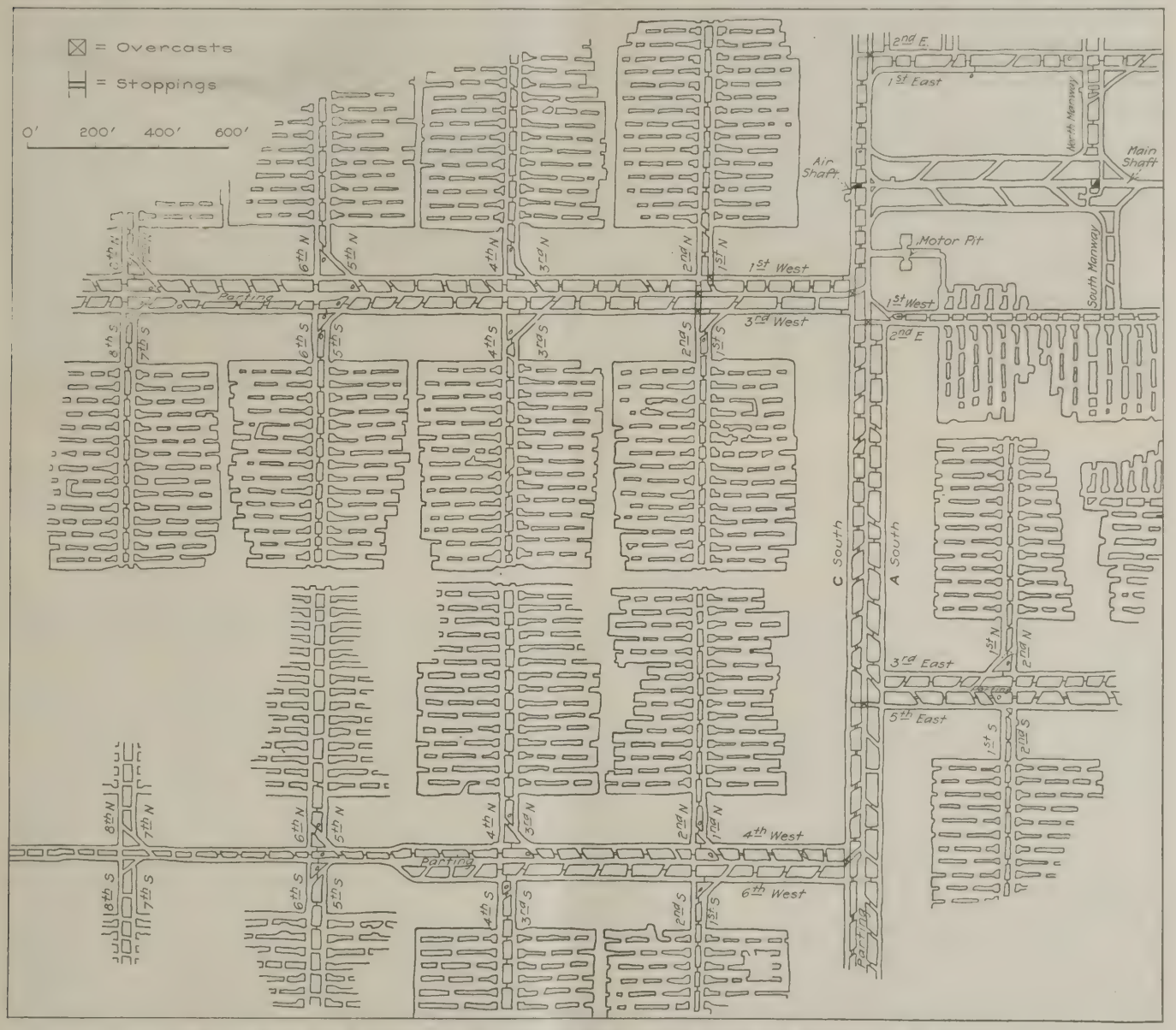


FIG. 2. MAP OF A PORTION OF THE ORIENT MINE SHOWING METHOD OF MINING



FIG. 3. MODERN SHAFT BOTTOM OF THE ORIENT MINE

the case of the triple entry, the center entry is used for haulage; the entry nearest the hoist shaft is the intake; the entry farthest from the hoist shaft and also the haulageway are the return.

As soon as panels are worked out they cave, break to the surface and close. The top coal and as much of the pillars as practicable are recovered, which gives an extraction of from 55 to 60 per cent. Mining in Illinois has undergone some changes in the last few years, perhaps the most notable improvement being the adoption of the panel system by the more progressive operators. Until quite recently little system was practiced by most Illinois operators. The result was most disastrous, except as regards temporary low cost of production. In 1909 George S. Rice, of the United States Bureau of Mines, wrote a paper for the American Institute of Mining Engineers on "Mining Wastes and Mining Costs in Illinois," in which he states: "The influencing conditions causing the great losses that are at present incurred are: (1) Cheapness of coal in place—that is, in the seam. (2) Low market prices, resulting from extreme competition. (3) Character of the seam, roof and floor as determining the method of mining. (4) Surface subsidence due to mining. (5) Interfaced boundary ownerships. (6) Carelessness in mining operations."

The great extent of coal territory offered for sale in Illinois resulted in transfers of coal rights at extremely low figures. Many mines were opened up, and the coal markets were greatly overstocked. All this tended to cause excessive competition and loose mining methods. Thick seams and a shale top which readily weathered encouraged the leaving up of top coal to save expense; this method, carelessness in mining operations and damage suits for subsidence of surface, all resulted in large loss of coal from varying causes.

Since 1909 conditions have changed. Coal lands have enhanced greatly in value, and there is a tendency to the acquirement of large holdings by big interests and development on an extensive scale. There was a growing interest in better methods of mining, greater recovery of coal, less loss through squeezes and more attention to the claims of those owning surface over mine workings. The outcome was an extensive Federal and state investigation into the whole situation and several reports on coal mining in Illinois, with special reference to percentage of extraction. A number of the large companies gave the matter individual attention and instituted reforms, possibly the most noteworthy improvement being the adoption of the panel system of mining and greater system as to proper proportion of pillar to room width and size of pillar to suit the various conditions of top.

With adjustment of the selling price of coal to permit of a respectable profit being made by the operator, another and important incentive was established for better mining. The map of the mine (Fig. 2) accompanying this article illustrates the panel system of mining, the advantages of which are too well known to need much comment. It is especially well adapted to the improvement of conditions in Illinois, in that it tends to localize squeezes which were of such frequent occurrence as to be notorious throughout the state.

Among the interesting features of the Orient underground workings is the shaft bottom shown in Fig. 3. It is typical of the best development in shaft bottoms, in which I-beams support the roof and in turn rest on side walls of concrete. Concrete is a permanent investment in mines, especially in those workings which are as free from water as is the average Illinois mine, with sufficient cover to do away with much danger of large surface breaks. If mine water contains much

sulphuric acid it is said to be detrimental to ordinary concrete. Concrete is used extensively at and around the shaft bottom here, in cases where a permanent support of the roof is essential and the side walls should be kept up. When the side walls and top are whitewashed and the place lit up by electricity, the operations of moving cars and attending to various duties about the shaft bottom, partings and other busy underground places are not only much simplified but the chances of accident are greatly reduced. It seems to be easier to have a place kept clean and in order when the brightness of day is present. At the bottom a cager is in use which was made by the American Safety Device Co., of Bowerstown, Ohio—it is installed at many big producing mines.

The cars shown at the shaft bottom hold about 4½ tons of coal on an average; depending on the topping, they may hold five tons. The cars have Sanford-Day (Knoxville, Tenn.) "Whitney-wonder" roller-bearing wheels, which together with 45-lb. rails contribute to ease of haulage on main line roads. For such service three 15-ton, General Electric, "armor plate" locomotives are used. Six or eight-ton General Electric trolley motors are used for gathering cars, and 21 of these locomotives are necessary at this mine. It requires motive power to move 5500 tons of coal from face to shaft bottom in eight hours.

The coal is undercut by 35 Sullivan shortwall mining machines. This machine is shown at work in a room at the Orient mine, Fig. 4; it is about to make a sumping cut. The Sullivan Machinery Co., of Chicago, Ill., the maker of the machine noted, states that the use of mining machines in the United States has advanced from 545 machines in 1891, when 6,211,732 tons (or 6.66 per cent. of the entire output) was won by machines to 16,198 machines in use in 1911 (the latest year reported), in which 283,691,493 short tons (or 56 per cent. of the total production) where mechanically mined. Several feet of the upper part of the seam is left up temporarily to support the top in this mine as the rock immediately overlying the coal is a shale which gives trouble at certain seasons when unprotected. It is important that such top especially should not be disturbed more than necessary by shots. In machine mining shooting off the solid is practically eliminated, with its attendant injury to top, greater percentage of slack and less lump coal.

In Fig. 5 the coal has been undercut and the shots placed, and the shotfirers are represented as about to fire the shots by lighting the fuses. In the next illustration, Fig. 6, the coal has been shot down and is ready to be loaded. After a close inspection of Fig. 5, a person would not expect such good results as shown in Fig. 6, from the fact that the undercut has not been snubbed. But the shots evidently were well placed and gaged, for the coal seems to have been thrown out well and to be in good shape for loading. In Fig. 7 the loaders have about cleaned up the face of loose coal. The men shown in the room give a good idea as to the height of the seam. Also there is ample room between the car and the roof to permit of loading without much difficulty and to allow generous topping with lumps of coal.

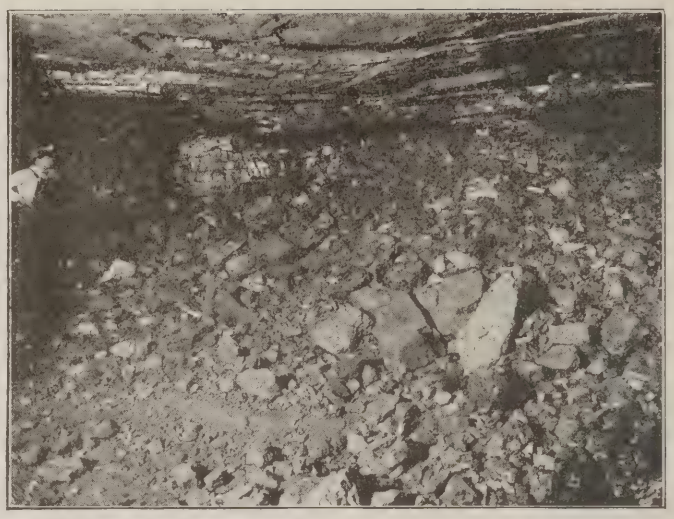
There are about 700 men at the Orient plant, of which number 500 are loaders, 50 are machine men and 150 inside and top company men.

The town of Orient is about 3⅓ miles northwest of



FIG. 4. SULLIVAN SHORTWALL MINING MACHINE AT WORK IN ORIENT MINE







FIGS. 5, 6 AND 7. WORKING FACE AT THE ORIENT MINE
Fig. 5—Shotfirers lighting the shots. Fig. 6—Immediately after the shots have blown down the coal. Fig. 7—Loading the coal into cars

West Frankfort and the Chicago, Wilmington & Franklin Coal Co. runs a miners' train in to the mines in the morning and back to West Frankfort at night, for the accommodation of those employees desiring such service. About 60 per cent. of the men live in the town of Orient, including all office and other organization men. The town at the plant has all grown up in the last two or three years. The company has been building a number of frame houses for $1200 each down, and rents them to its employees or sells them on easy payments. Some 75 to 80 houses have been sold and sales are being made all the time. Also houses are being rented as fast as they can be built.

The vacant acreage so generally noticed in the vicinity of towns in mining regions is partly utilized in the case of Orient. A garden club has been organized, and prizes have been offered for the best garden. The benefits growing out of this activity are manifold. Outside of any material gain in garden produce is the improved appearance of otherwise waste ground about mining towns and the betterment of the morale of the community. Any movement which tends to attract the better class of labor and induce it to buy homes in the town at the mine will simplify problems of management.

A large capacity plant has different problems from one of small output. When the big producer lies idle, overhead charges quickly reach large figures and many employees are affected. During the last year or so, especially when transportation was erratic or entirely inadequate to the needs of operators, storage was resorted to in some cases to enable the mines to run with some degree of regularity. At the Orient mine the trestle system of storage was installed. On either side of this trestle are several parallel tracks on which two 20-ton clam-shell bucket locomotive cranes operate; these machines were built by the Link-Belt Co. When railroad cars were not available for shipping coal at the tipple it was loaded into 15 side-dump cars which emptied at the storage trestle. The 2-yd. clam-shell cranes piled the coal back from the trestle when necessary to permit greater storage, and also reloaded it into railroad cars at other times. Each crane has loaded 20 to 50 railroad cars a day on occasion. This scheme relieved the car-shortage situation and gave an opportunity to hoist; thus the 700 men at the Orient mine were given a chance to work full time. The trestle is kept as a reservoir; it is an elasticity proposition for steady output. The tonnage has sometimes been restricted by the men not coming out to work at times when they had an opportunity to do so. Shipment of coal from Orient can be made over any of the following three railroads, which supply cars to the mine: Chicago, Burlington & Quincy, Chicago & Eastern Illinois and the Illinois Central.

It is interesting to note the performance of the plant in question during the past few years, in which time it has passed from a new mine to the leading producer of Franklin County. In the calendar year of 1915 it shipped 500,000 tons of coal; in 1916, 830,000 tons; in 1917, 1,100,000 tons; and for the 12 months ended April 1, 1918, this mine shipped over 1,200,000 tons of coal. The best month's work was 120,421 tons. To make the fine record (5508 tons in eight hours) which this plant holds, it was necessary to dump three mine cars per minute, each car holding 4½ to 5 tons of coal. As an average daily tonnage of 5200 can be maintained, the management claims that the plant easily has a capacity of 6000 tons in eight hours. Larger capacity has been mentioned in the case of some plants now building, but a mine in Illinois able to achieve that record today would be considered a safe top-notcher, for a time at least. Among others the Orient people con-

sider that the main effort at present is to get coal—and then more coal—and they consider it a patriotic duty to see that everything is done at the mine to achieve this end.

In the recent sale of Liberty Bonds (the third loan) the company subscribed and then arranged a plan so that its employees could make easy payments for bonds subscribed for through the company. In the loan in question 1760 employees subscribed for $136,350 of bonds through the company Liberty Loan club; many others subscribed direct through banks and paid in full. A splendid showing was made on a wide distribution. Also in the Red Cross drives this company apportioned a part of its subscriptions to the counties in which it was operating mines, which subscriptions were heavily supplemented by the subscriptions of individual employees.

The Chicago, Wilmington & Franklin Coal Co. operates six other mines in Illinois. This company purchased mines A and B at Herrin, Williamson County, of the Chicago & Carterville Coal Co. The other plants are at Benton, Franklin County; at Virden, Macoupin County; at Thayer, Sangamon County, and at South Wilmington, Grundy County, respectively. The trademark slogan of Orient coal—"Hot and Bright Like Anthracite"—is full of significance and carries conviction, for the coal makes a fine appearance on cars, as it is clean and bright, stocks well, and is remarkably free from sulphur and less smoky than some grades.

The operating officials of the company are George B. Harrington, president and general manager; T. F. Holmes, general superintendent, and D. J. Carroll, assistant general superintendent. At the Orient plant Joseph Lewis is mine superintendent; G. M. Meagher, mining engineer, and John Rodenbush, mine manager. At the main office in Chicago, and also at the plant at Orient, the writer received the most courteous treatment in his quest for information, photographs and maps, and acknowledgment is here gratefully given for such favors.

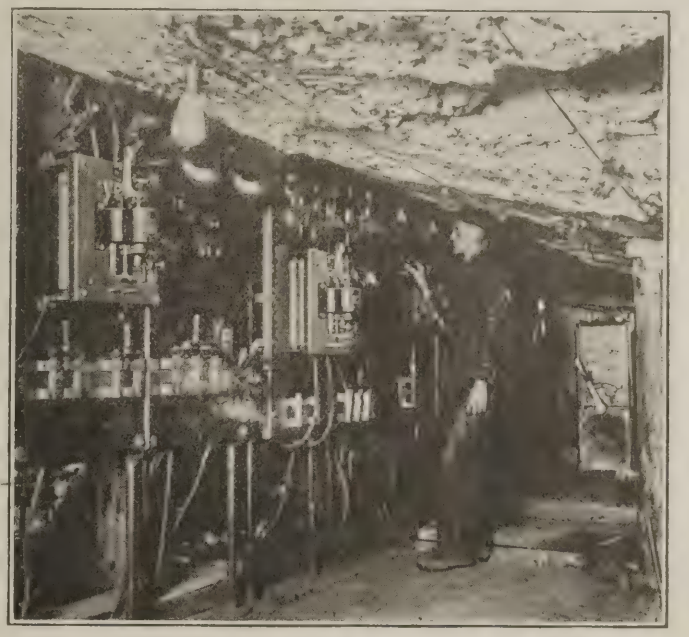
Automatic Circuit Breakers in Coal Mines Effect Real Economies

Coal mines in the Central West which use electric power for operating coal cutters and haulage locomotives are finding economical applications for circuit breakers of the automatic reclosing type. At ordinary mines, with a power house or substation above ground feeding direct current to switchboards under ground, a single large breaker is usually installed at the station and another one for each branch circuit is installed at the underground boards.

To facilitate the operation of such a system a 1200-amp. automatic reclosing circuit breaker is installed in the substation, while below ground two 600- and one 400-amp. reclosing circuit breakers are placed on the switchboard. Each of the latter is connected into a circuit running far out into the workings. If now a short circuit or heavy overload should come on one of the 600-amp. lines on account of a "cave-in" tearing down a trolley wire or from some similar cause, the 600-amp. breaker would open the circuit and keep it open until the trouble was cleared up, whereupon it would automatically reclose. This would not interrupt the men working in places served by the other circuits. If the "cave-in" was not serious, the miners could make sure that the breaker would stay open by grounding the circuit with a chain or crowbar placed between the trolley and the rail. They could then clear, cutting the trolley wire if necessary. With this original ground cleared the chain or crowbar could be carefully removed, allowing the breaker thereupon to close of its own accord.

If the opening of a breaker were caused by a severe overload, and the breaker was of the manually operated type, work would have to be held up while word was sent to the switchboard to close the switch. With the automatic reclosing circuit breaker this delay would not be necessary, because as soon as the load was reduced to the value at which reclosure was desired the breaker would close automatically.

A low resistance shunt around the reclosing coil to the ground prevents the breaker from alternately



SWITCHBOARD INSTALLATION EQUIPPED WITH RECLOSING CIRCUIT BREAKERS

opening and closing at high speed under short-circuit conditions. It will either remain open or closed as conditions justify. The practice of installing an automatic breaker at the substation is usually followed because the attendant is not always right at hand and this unit is required to protect the station apparatus. The rating of this breaker is usually less than the sums of the ratings of those on branch circuits on account of diversity.

In some mines the installation of this apparatus is effecting real savings in money and in labor. One mine which formerly paid a man $5 a day to sit at its switchboard under ground and see that a 1200-amp. breaker remained closed has now replaced this arrangement with an automatic breaker at a total cost of $600. Thus in less than 120 days the mine had its money back, and during that time and ever since it had the productive labor of another man. The usual installations are smaller than this, requiring breakers of 100 to 400 amp., which can be installed for $135 to $150.

Coal Mining and Man Power

By F. A. POCOCK
Philadelphia, Penn.

SYNOPSIS—*At a time when the supply of available men is low and decreasing, and the output per man is also low, any means to increase the output per man should be given careful consideration. The longwall method of mining with certain modifications would appear to be a means whereby the output might be increased.*

DISREGARDING the anthracite region, for what I have to say does not apply there, this country is short of men who are versed in coal mining. The heads of departments are still on the job, and the thinking power of the industry still has its hand on the wheel and can be relied upon to steer the ship. Should this class fail, we still have the mining force of the Government to fall back on for the thinking. Possessed of this, is there no way of increasing the tonnage per worker? Can the thinker not make the worker more productive?

The following is submitted for careful consideration of the men who must do the producing. The fact that three tons per man per day is above the average production in the coal mines of the United States is in itself alarming. It means that the average man is only producing $9 per day, and that he is not working more than 70 per cent. of the possible days in the year.

Now there are a great many bituminous mines to which the following will not be applicable. At all events, however, it applies to the whole bituminous field of the State of Pennsylvania, and therefore to probably one-fourth of the national industry.

The time has come when the merits and shortcomings of the longwall method of working must be considered. Every phase of the system should be carefully taken into account. It is over 30 years since the Scott Co. in the Youghiogheny Valley section, under William S. Gresley, proved this system out. Mr. Gresley was a master in the art, but even he was hampered by the death of Scott. The interests succeeding Scott forced Gresley's resignation.

Cost of Mining Favors Longwall

Today we are in a totally different condition as regards electric power, locomotives, coal cutters, loading devices, and the lack of man power for the industry. Personally I have not the necessary data to give a résumé on the subject; but the costs of mining by longwall, as against the room-and-pillar method without electricity and all that it implies, was generally vastly in favor of the longwall. It therefore stands to reason that if the coal cutter can cut a face 300 ft. in length without having to move ten times, each of these moves involving the time necessary to travel an average of at least 200 ft. over mine rails, the loading of the machine, unloading and setting up again (which must involve at least one-half of the working time), the machine and its two men would be able to undercut at least twice the amount of coal that it can under room-and-pillar conditions. This does not only mean that the cutting expense will be reduced more than half, but that the same man power will produce twice the quantity of coal at twice the power cost. This will furthermore be achieved at one-half of the labor cost and at roughly one-half of the overhead costs.

May Be Feasible to Use Concrete Props

In longwall methods of working the roof must be supported near the face. This involves the use of considerable timber. It is customary not to set props and headpieces, but to build cribs allowing a slight slant from the side near the working face toward the waste ground that has been worked out. Here is where great economy can be practiced. It is necessary to allow the roof to come down gradually, so the lowest pieces can be short lengths of wood that will crush under the load. Above these well-seasoned concrete pieces can be used up to near the roof, where again the last packing, to insure an even load, can be of wood that will take the crush. As most of the concrete pieces will not be injured by the pressure they can be used again and again. There have been a number of references to the use of concrete in mining timbering, but it would seem that if it were adaptable anywhere it would be in longwall work, where all the crushing stress can be supported by adequate sections and the material be recovered and used repeatedly. The necessity for props will be reduced to the few places where the roof is locally bad and must be held to prevent accident to the men working the machines.

As the coal cutters will leave a fairly flat floor, the setting of the cribs will be an easy problem and the wood foundation and finish pieces can be made almost a standard as soon as the finished height of the seam is determined. In this way the cost of timber and timbering can be materially reduced from what it is in the room-and-pillar system.

There is no more heart-breaking work in a thin bed of coal than loading into the car, and there are no loading machines that will work in even a 4-ft. seam. There is, however, no difficulty in designing a conveyor that can operate in less than 2 ft. of height, nor any difficulty in driving a 300-ft. (center to center) length of such conveyor by electric motor. As this is fairly flexible, it can be on such a floor as a coal cutter will leave. It will be necessary to have height in the haulage road, and as these beds usually have a clay floor the cost of making the necessary height will be less by taking up floor than by taking down roof. This also gives the advantage that the top of the car will be little, if any, above the floor of the longwall face. Therefore the coal will not have to be loaded, and the conveyor end can be raised the

necessary distance to allow the coal not only to clear the top of the car but to be taken almost across it; also, the loading can be done without manual labor. It will be necessary to have a second machine working at an angle to the conveyor to load the coal broken down onto the conveyor, but as this can also be electrically driven, and of simple design, there is every argument in favor of its being built.

The method of handling the trip of cars will depend largely on the strength of the roof, on how far back this will stand up of sufficient height to allow the cars to be pushed beyond the loading point of the conveyor. This would of course be the cheapest method of handling the trip. But even if the roof is short and breaks close up, by using a small motor-and-rope transfer and a double track the switching of the cars under the loading end of the conveyor will be a rapid process if flat plates are used as a terminal instead of rails. By this means the loaded car can be sent out after the empty is brought up to its side, or slightly beyond, and the empty be hauled back under the conveyor, against a guide rail which will easily force it over if the wheel flanges are on a flat plate. Thus little, if any, time need be lost in switching the car to the loading point.

Fifty Men Secure 500 Tons a Day

A 300-ft. face in a 3-ft. bed, with a 6-ft. undercut will give 200 cu.yd., or roughly 250 tons of coal. From a haulage point of view this tonnage should be handled in eight hours. The coal cutter should also be able to make cuts of 300 ft. each in an eight-hour period.

It will therefore require two locomotives and two loading machines to give an output of 500 tons per day. The man power for the foregoing operations only will be:

Coal cutter	2	Locomotives	4
Loading device	2	Shot drillers	4
Conveyor control	2	Shotfirer	1
Car handlers	2		
		Total	17

At an average wage of $5 this will amount to $85. This would give a wage cost of only $0.17 per ton. The costs for track and timbermen, cleaning up and other necessary operations are not so easy to estimate, but if the foregoing cost items are doubled, there will still be a large factor left in favor of the longwall method of working.

The tipple, road and overhead costs will not be much affected, except that the road-repair cost may be slightly raised because the tonnage moved is heavier. At all events, here is a basis for considerable discussion. Practical mining men should consider the foregoing from their own standpoint and from local mining conditions; and see if they cannot modify it so as to secure local success. A greater tonnage per man when men are of the greatest value to the whole world is well worth securing.

One thought more. Assuming that it will take double this number of men to keep these 17 at work; or if, say, 50 men can secure an output of 500 tons per day, we will have raised the tonnage per man per day to 10 from, we will say, the best, or 4. In other words, this would mean an increase of 250 per cent. Is this not worth attempting?

Colorado Meeting of A. I. M. E.

The American Institute of Mining Engineers will hold its meeting in Colorado from Sept. 2 to Sept. 7, and the program will be as follows:

Sunday, Sept. 1

Registration at Brown Palace Hotel, Denver.

Monday, Sept. 2

9:00 a.m. Technical Session on Metallurgy.
Automobile trip to the ferro-alloy plant and other points of interest in Denver, followed by mountain trip.
1:00 p.m. Luncheon at Hosea Lodge in Genessee Park, Lookout Mountain.
7:00 p.m. Dinner at Country Club, Denver.

Tuesday, Sept. 3

8:15 a.m. Entrain for Colorado Springs.
11:00 a.m. Arrive Colorado Springs. (Headquarters, Broadmoor Hotel.)
12:00 noon Memorial to Dr. James Douglas.
1:00 p.m. Luncheon at Broadmoor Hotel.
2:00 p.m. Technical Sessions, Ore Dressing and Cyanidation; Coal and Coke.
Moving Pictures of Employment of War Cripples in Industry.
8:30 p.m. Reception and dance.

Wednesday, Sept. 4

All-day trip to Cripple Creek.
8:00 p.m. Technical Session, Geology and Mining.

Thursday, Sept. 5

8:00 a.m. Automobile trip to Pike's Peak.
2:00 p.m. Visit to Golden Cycle Mills.
4:00 p.m. Memorial Meeting for Members of the Institute who have given their lives in the Service of the Allies.
8:00 p.m. Technical Session, Petroleum.
Moving Pictures of Employment of War Cripples in Industry, especially in regard to Mining and Metallurgy.

Friday, Sept. 6

8:30 a.m. Entrain for Pueblo.
12:30 p.m. Luncheon at Minnequa Steel Works, Pueblo.
7:30 p.m. Banquet, Broadmoor Hotel, Colorado Springs.

Saturday, Sept. 7

Optional visit to Leadville and Red Cliff.

The program for the entertainment of the ladies is still in a formative stage and has not been announced. At the session on coal and coke the following papers will be read in brief and discussed: "The Byproduct Coke Oven and Its Products," by William Hutton Blauvelt; "The Use of Coal in Pulverized Form," by H. R. Collins; "Coal Mining in Washington," by F. A. Hill; "Carbocoal," by C. T. Malcolmson, with written discussion by W. R. Cox and N. W. Roberts; "Development of the Coke Industry in Colorado, Utah and New Mexico," by F. C. Miller; "Price Fixing of Bituminous Coal by the United States Fuel Administration," by Cyrus Garnsey, R. V. Norris and J. H. Allport.

In the combustion of coal the law of mass action manifests itself by the fact that in boiler furnaces considerable excess of air above the theoretical requirement is necessary to insure complete combustion within the furnace. If the air supply is reduced to nearly the theoretical amount the combustion is so slow that a large percentage of the gases may leave the furnace before they are burned.

Provincial Rights Dispute in Canada

By ROBERT DUNN
Victoria, B. C.

SYNOPSIS — *Title to a large part of the coal-bearing lands of Vancouver Island are in dispute. A review of the half century that has elapsed since the white man's occupation of this region reveals that all parties have apparently acted in good faith. There has, however, been an overlapping of the prerogatives of the Province and the Dominion.*

FOR many years, a bitter dispute has been waged as to the title to a considerable proportion of the coal-bearing lands of Vancouver Island, British Columbia. An event of recent date promises to bring this struggle into national prominence by plunging the Government of the Province of British Columbia into a controversy with the Dominion Government at Ottawa over the question of provincial rights.

Meanwhile, to sum up the situation in a few words, the Canadian Collieries Co. (Dunsmuir) Ltd., finds its title to extensive island coal areas confirmed; the Granby Consolidated Mining and Smelting Co. is in a position of some doubt as to its proprietary right in coal areas, the development of which already has cost hundreds of thousands of dollars; while the early Vancouver Island settlers, who claim the coal rights in lands occupied by them in pioneer days and whose claims have been maintained by the Provincial Government, see ahead a continuance of the fight, with the issue shrouded in uncertainty.

Before going further let me explain, briefly, what is at stake. The accompanying map of Vancouver Island shows the Esquimalt & Nanaimo Ry. belt, stretching from the southerly extremity of the island northward along the east coast. Incidentally there will be found marked the chief coal-mining centers of Ladysmith, Nanaimo and Cumberland. This belt covers an area of 3296 square miles. It is one-fifth of the total acreage of Vancouver Island and its actual reserve of bituminous coal, to quote the 1915 report of B. D. Dowling, of the Canadian Geological Department, is placed at 1,060,000,000 short tons. With these facts in mind it is not difficult to understand the determined effort being made by the rival claimants.

The recent event referred to is the disallowance by the Dominion Government of provincial legislation passed early last year and known as "An Act to Amend the 'Vancouver Island Settlers' Rights Act, 1904.'" In other words the federal authorities have said to the province, in effect: "You have gone beyond your power in giving to settlers this opportunity to acquire the coal under the lands which they homesteaded. The title in question has been otherwise vested and the Act is *ultra vires.*" I understand that all this is meaningless and without significance to one outside British Columbia who never heard of the matter before, but it will be appreciated that, with the gantlet thus thrown down, it is more than probable that the province will take whatever measures are available to assert and maintain what it deems to be the legislative rights conferred upon its government when it became a part of the Canadian Confederation.

It is necessary in endeavoring to make the situation clear to look back over half a century. Vancouver Island then was a wilderness. There was a Hudson Bay post at Victoria, the capital of the province now, and a settlement at Nanaimo, B. C. Coal had been discovered near the latter town and at some other points. The late Robert Dunsmuir, who became the coal baron of western Canada, was the first to enter into coal mining in this section to any extent. Between 1860 and 1871 quite a number of settlers went on the lands, the title to which is now in dispute, and under the law of that day obtained freehold titles—that is, rights over the surface and under-surface values, with the exception of gold and silver, which minerals always were vested in the Crown.

Closed the Lands to Settlement

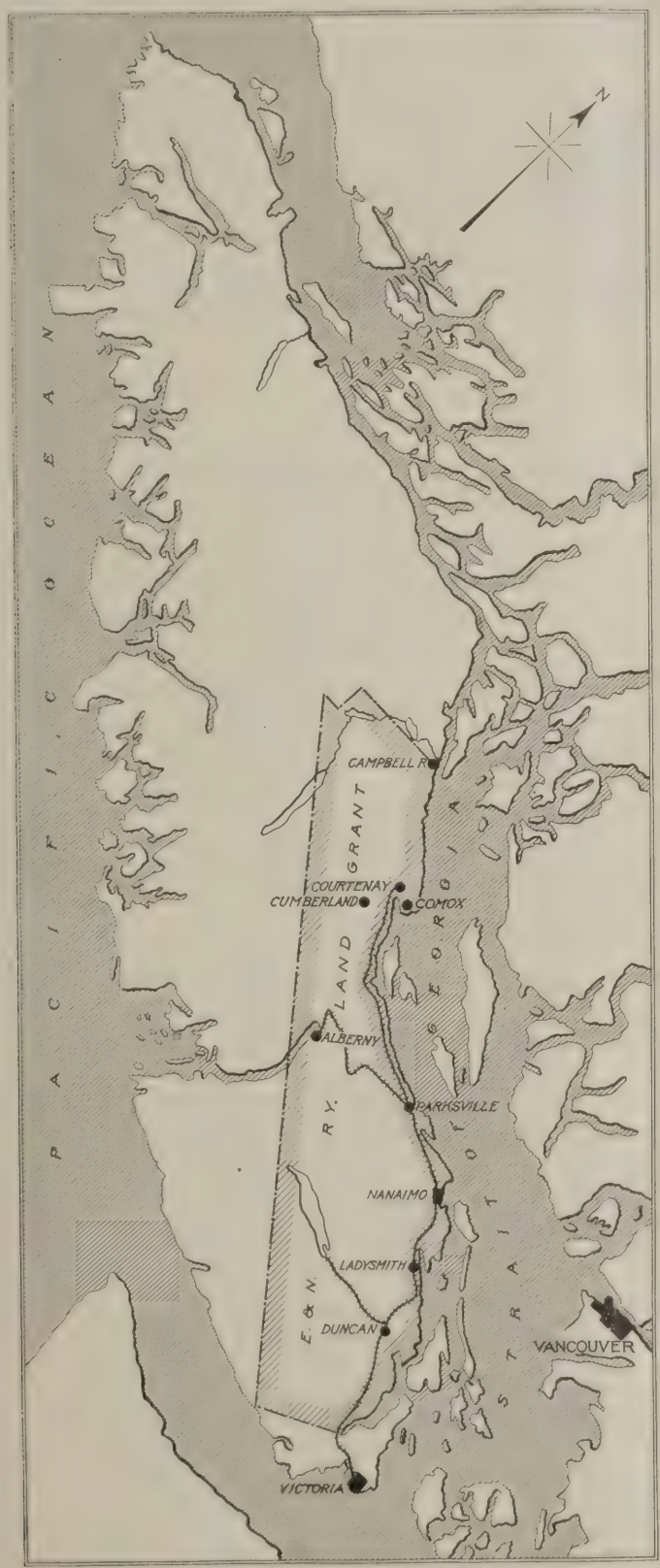
In 1871 British Columbia went into the Canadian Confederation and provision was made in the Terms of Union that a tract of land extending 20 miles on each side of a proposed railway running from Esquimalt (near Victoria) to Nanaimo should be reserved as a part of the subsidy to those undertaking the construction of the road. Accordingly the British Columbia government declared a reserve on these lands, which it is contended closed them absolutely to settlement. In 1884 British Columbia conveyed these reserved lands, the same as are shown in the illustration, to the Dominion together with "all coal, coal oil, ores, stones, clay, marble, slate, mines, minerals and substances whatsoever thereupon, therein and thereunder." In turn the Dominion Government assigned the lands, with its under-surface rights, to what is known as the Esquimalt & Nanaimo Railway Co., which concern, whose principals included the late Robert Dunsmuir and some capitalists of the United States, undertook to build the railway and did carry out its contract.

Subsequently, those who took up land in the belt when the reserve was supposed to be operative—that is, between 1873 and 1884—declared that the reserve was not valid because it was imposed in accordance with the Terms of Union, which provided that British Columbia should not alienate or sell any further portions of these public lands *in any other way than under right of preëmption, requiring actual residence of the preëmptor on the land claimed by him.* They advanced other seemingly sound arguments, and in 1904 the British Columbia legislative assembly passed the Settlers' Rights Act, which gave them a year in which to make their claims to the coal under their properties. Those whose rights were considered satisfactory were given provincial titles covering under-surface minerals, and the government agreed to support them should the company contest their legal rights.

The company fought, asking for disallowance at the

national capital and prosecuting a test case through the various courts of the land to the Privy Council, without success. Then an agreement was reached between the government and the company, the latter being recompensed to the extent of 20,000 acres of public lands, if it would leave the settlers in peaceful possession.

It was thought that this disposed of the matter, but not so. It developed that many settlers with as good claims as those who got titles had failed within the year to lay them before the proper authorities. They began clamoring for recognition, which the present government, in 1917, decided should be granted. And so came the Settlers' Rights Amendment Act of 1917, which has been disallowed. It simply extended to Sept. 1, 1917, the period in which registration of claims could be made. In that period 179 applications were made, covering, according to a statement issued by the company, 33,000 acres, about 90 per cent. of which refer to coal lands, and the greater part of which, it is believed, contain coal seams of commercial value.



MAP OF VANCOUVER ISLAND, SHOWING ESQUIMALT & NANAIMO RAILWAY BELT

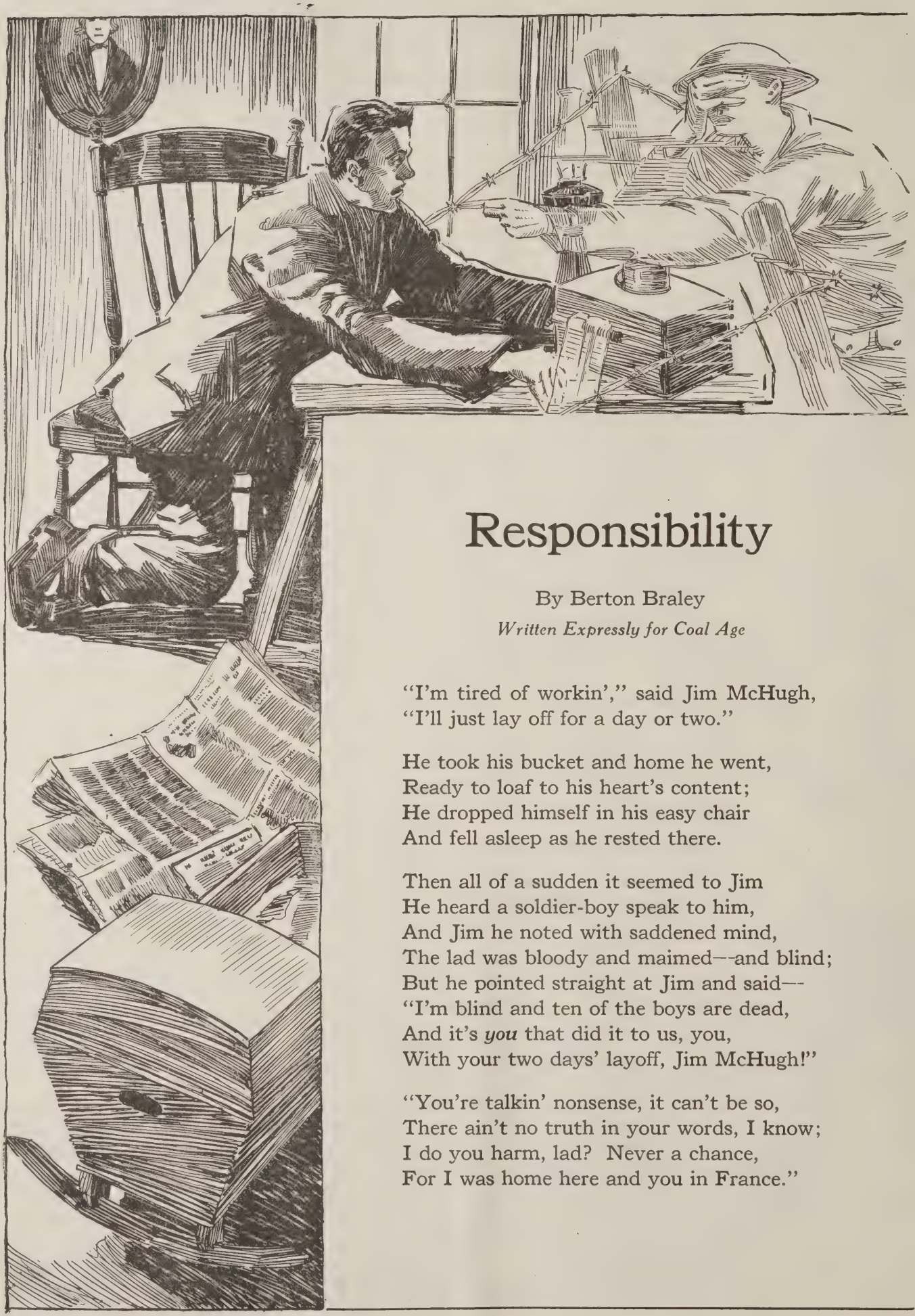
Some of these claims were investigated by the provincial government and several were allowed, provincial title being issued. Two such titles have been purchased from the settlers by the Granby Consolidated Mining and Smelting Co., and on the land covered by them, situated a little south of Nanaimo, this company has erected its new coal-mining town, constructing houses for workmen, tipples and plant, driven three slopes and struck a splendid bed of coal, in one instance 14 ft. in thickness at the face. This firm, also on the strength of the newly developed coal area and with a view to doing its own coking at its smelting center at Anyox, B. C., is engaged in the installation of byproduct ovens. In short the whole investment represents an outlay of $1,000,000, to put it conservatively. Its embarrassment as a result of the Dominion government's unexpected action thus becomes clear.

In 1910, after the Esquimalt & Nanaimo Railway Co. had reached its understanding with the then existing provincial administration, it disposed of part of its lands, its coal mines, and further "all coal and fireclay in, upon, and under the said lands and control of the right to acquire all the coal and fireclay under the remaining lands in the Esquimalt & Nanaimo land belt." The purchaser was the Canadian Collieries (Dunsmuir), Ltd.

Having the property this company pledged it as security in the issuance of a bond issue of £2,054,800 (nearly $10,000,000) and in the sale of preference shares to the value of $5,000,000. One of its strong arguments, therefore, in asking that the Dominion government disallow the Settlers' Rights Act of 1917 was that it sanctioned the alienation of property to which it held title and which had been mortgaged to the investors of Great Britain and the United States to secure operating capital. This assertion, however, that confidence in British Columbia security among financiers would be shaken, was only incidental to the main contention that the settlers had no vestige of right in the property for which they were setting up a claim and that acquiescence in their demands would practically amount to confiscation.

What the government of British Columbia will do is as yet undecided, but it is considered likely that, apart altogether from the actual merit of the settlers' case, it will maintain to its utmost, on principle, the provincial jurisdiction over all matters relating to property and civil rights.

In Many Cases where coal has been lost in robbing it has been found profitable to open gangways for re-robbing. This would not be necessary if a systematic robbing of the pillars had been carried out.



Responsibility

By Berton Braley

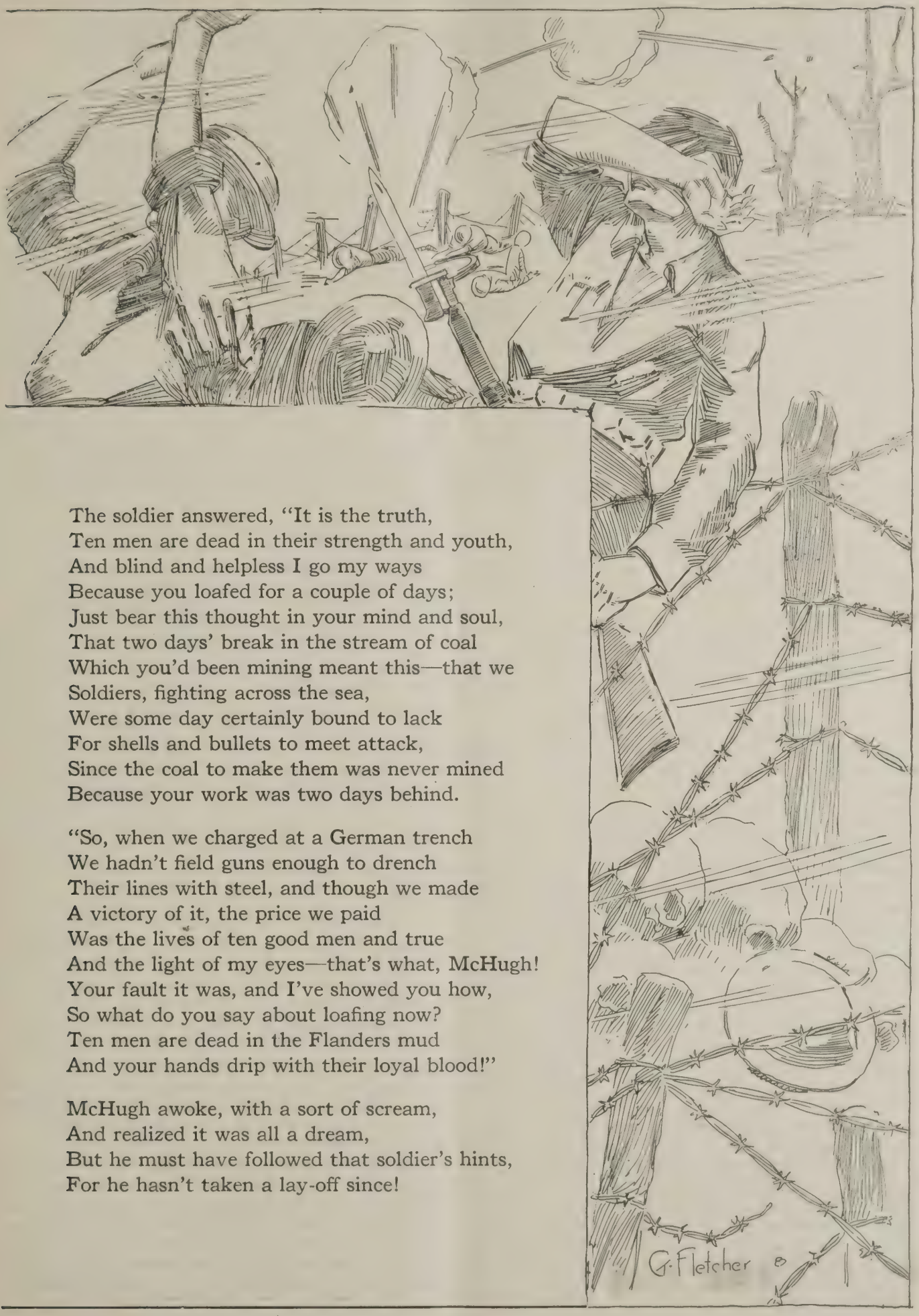
Written Expressly for Coal Age

"I'm tired of workin'," said Jim McHugh,
"I'll just lay off for a day or two."

He took his bucket and home he went,
Ready to loaf to his heart's content;
He dropped himself in his easy chair
And fell asleep as he rested there.

Then all of a sudden it seemed to Jim
He heard a soldier-boy speak to him,
And Jim he noted with saddened mind,
The lad was bloody and maimed—and blind;
But he pointed straight at Jim and said—
"I'm blind and ten of the boys are dead,
And it's ***you*** that did it to us, you,
With your two days' layoff, Jim McHugh!"

"You're talkin' nonsense, it can't be so,
There ain't no truth in your words, I know;
I do you harm, lad? Never a chance,
For I was home here and you in France."



The soldier answered, "It is the truth,
Ten men are dead in their strength and youth,
And blind and helpless I go my ways
Because you loafed for a couple of days;
Just bear this thought in your mind and soul,
That two days' break in the stream of coal
Which you'd been mining meant this—that we
Soldiers, fighting across the sea,
Were some day certainly bound to lack
For shells and bullets to meet attack,
Since the coal to make them was never mined
Because your work was two days behind.

"So, when we charged at a German trench
We hadn't field guns enough to drench
Their lines with steel, and though we made
A victory of it, the price we paid
Was the lives of ten good men and true
And the light of my eyes—that's what, McHugh!
Your fault it was, and I've showed you how,
So what do you say about loafing now?
Ten men are dead in the Flanders mud
And your hands drip with their loyal blood!"

McHugh awoke, with a sort of scream,
And realized it was all a dream,
But he must have followed that soldier's hints,
For he hasn't taken a lay-off since!

Can Output Be Increased Scientifically?

By W. E. JOYCE
Sandy Run, Penn.

SYNOPSIS—*Various causes are ascribed by various people for the short coal production. Some writers say the great cause is the draft, others allege drunkenness among mine workers. Whatever may be the underlying cause the effect must so far as possible be rectified. It would appear that here a little modern science might be used to good effect.*

SPEEDING up production of anthracite coal with a dwindling force of operatives has resolved itself into a serious problem. To say that the failure to materially increase the output is due to the draft is as untrue as to say it is due to drunkenness among the miners.

That the draft is regarded by many mine managers as the greatest menace to future shipments is shown by the vigorous appeals being made to the exemption boards in all districts of the mining field.

That drunkenness is believed by many others to be responsible for the shortage of coal is shown by the numerous letters appearing in many public journals and magazines.

There is no doubt of the matter being serious, and to secure a satisfactory solution for all concerned it demands consideration that will be free from bias of every kind.

Even Outsiders Are Interested

People outside the coal-producing area are quite as much concerned as those depending upon it for a livelihood. The people of the mining communities who have sent their sons to the front are already violently objecting to having placed in the hands of coal-mining officials the right to say who shall or who shall not be excused from military duty. This is virtually what is being asked of exemption boards at the present time on the ground that certain employees are absolutely necessary to the production of coal at different mines. In objecting to granting such privilege, it has been pointed out that already where exemption or deferred classification has been granted on appeals of certain mining officials, their representations as to the real value of the man to production of coal were greatly overdrawn. In fact it has been shown that in a certain case an individual upon whom it was claimed the production of a mine largely rested was not employed at the mine at all, but was engaged doing chores about the bosses' homes and worked as a gardener for the widow of a former superintendent.

Another case is cited as showing the cupidity of officials. A man who was seeking an increase in wages was put off from time to time. When he last called and asked about his promised increase the official said to him: "We have done better for you than granting you a raise; we have had you placed in the deferred class by the exemption board."

There was widely published in coal-region papers during the recent past an extract from an article originally appearing in a New York publication which purported to show that drunkenness among coal miners was rampant; that drinking bouts and protracted orgies were the vogue in all mining towns. Of course, the real cause for coal shortage was thus traced.

It is evident that the situation calls for more intelligent treatment. Chairman Hurley of the Shipping Board in his address before the coal operators meeting in Philadelphia recently, pointed the way in a definite manner when he likened the mining situation to conditions in the shipbuilding industry when the Government took hold. He said inefficiency among department heads was responsible for 50 per cent. of the trouble, and it was necessary to reorganize from the top down.

It is not recorded in reports of the meeting that his remarks were applauded. They were probably too personal but highly pertinent. It is singular, too, that no reference to Mr. Hurley's solution appears in the discussions that have since occupied much space in trade journals and other publications.

The people of the mining districts not directly connected with the mining industry are, perhaps, in position to best weigh the question. There are difficulties developing, even now, that threaten to complicate the problem of production by bringing discord among the miners themselves. Among these is the refusal in many instances of laborers to work on the day-wage plan with a contract miner.

That miners are not delivering coal on a 100 per cent. basis is unquestioned. But how to improve this without dislocating the means by which present output is secured requires the application of a sympathetic interest not readily found outside the mining field itself. Certainly it will not come from the radical exponent of the draft nor of the drunkenness tales, so that in consideration of finding a means for reaching the best solution, the board selected should not be without representation from the mining section itself.

Charge of Drunkenness Is Resented

People of the mining communities resent the charges of drunkenness as a gross libel. Failure of men to report for duty on account of liquor forms but a small percentage of the existing absenteeism. At one colliery recently when 19 men were reported absent on the day following United Mine Worker President Hayes' appearance on a speech-making tour, urging men to renounce pleasure during the war period, it was found that 11 of the 19 men absent were teetotalers. Funerals, picnics and personal affairs formed the burden of excuses assigned.

And this will sum up the situation in a general way as far as drink is concerned. It is safe to say that drinking among railroad men is more extensive than among coal miners, and when one considers the cosmopolitan class of workers following mining it is quite astonishing to find such a low percentage of drinkers among them. During the heavy demands for coal last winter when piteous appeals were sent out for coal

supplies and urgent calls made by war projects, it was a weekly occurrence to find on Monday mornings several extra train crews crowding the trains bearing coal diggers to their places of employment. The extra crews were being sent to yard centers to take the places of railroaders who failed to report for work or requested leave of absence on various pleas.

These things happen within the mining district. Is it any wonder the people resent the calumnies constantly being circulated about their home sections? The iron and mill districts of the country are far more prolific in furnishing "horrible examples" for the temperance advocates than the coal mining communities, yet these districts are not being everlastingly traduced and villified as are the mining communities. This, however, is not said in defense of liquor drinking in any form. It is set forth rather as a deterrent upon the disposition among many magazine contributors to magnify conditions. We should have cold, hard facts upon which to build a decision when considering the question of military draft, drink and coal production.

In an open letter recently sent out by the manager of a large coal company, the statement was made that the operating force had been reduced 40 per cent. during a given period. An analysis of this falling off disclosed the fact that of the total number of men who had left the company's employ 20 per cent. had been drafted or volunteered for military duty while 80 per cent. had left to work under conditions more desirable elsewhere. It is significant that the treasurer of this same company appearing before a Federal Commission a short time ago declared under oath his company had made a profit of 50 per cent. in mining the previous year.

Wages Are Not All

Considering the hours of work about coal mines, the question of wages is not alone the cause of men seeking employment elsewhere. For the son of a coal miner to try and better his condition in life by going into some other industry, surely is not wrong. He has ambitions and these ambitions are invariably fostered by his parents. If conditions at the old home are not congenial can he be blamed for going where he finds them more desirable?

The company making a 50 per cent. profit is certainly in a position to go into the social life of its employee and to apply up-to-date methods in an effort to learn how to get results.

Whether this is being done or not it is not the purpose of this article to indicate, but the fact remains that men are leaving the mining districts to find work elsewhere.

In this connection it should not be forgotten that the falling off in mine employees began long before war was declared by Uncle Sam. As early as 1914 one of the larger coal companies advertised for 1000 coal miners for a single district.

It is not impossible that a solution may be arrived at on a scientific basis. The purchasing power of a dollar under all conditions has already been reduced to formula. The relation of labor to the rise and fall in prices of commodities and living conditions is also being tabulated, and as wages and capital are both involved, does it not seem possible that scientific light might illumine the pressing question of how to secure the much needed maximum coal production?

Legal Department

Alabama Prop Law—An Alabama miner who failed to designate the places where he desired selected props or timbers delivered by his employer is not entitled to recover damages for injuries on the ground that an accident to him directly resulted from the employer's failure to furnish props or timbers. (Alabama Supreme Court, Clark vs. Choctaw Mining Co., 78 Southern Reporter, 372.)

Liability Concerning Vehicles Carrying Passengers—One permitted by the general manager of a coal-mining company to ride gratuitously upon a hand car used in carrying express matter to the company's mine was legally a passenger as to whom the company owed the duty of using reasonable care for his safety, consistent with the mode of conveyance. Hence, such passenger is entitled to recover damages for injury resulting from a collision between the hand car and a train, due to negligence of the operator of the car. (West Virginia Supreme Court of Appeals, Hodge vs. Sycamore Coal Co., 95 Southeastern Reporter, 808.)

Co-Employees of a Mining Company Who Were Not "Fellow Servants"—Plaintiff, while employed by defendant mining company in assisting in shoving cars loaded with slate and other refuse from the mouth of a mine to a dump, was injured through negligence of another crew pushing another car over the same track. Held, that the members of the two crews were not "fellow servants" within the established rule in Kentucky that an employer is not liable for injury to an employee when caused by negligence of a fellow servant, with certain exceptions, as where it appears that the negligent employee had previously manifested such incompetence or carelessness as to charge the employer with negligence in retaining him in the service. (Kentucky Court of Appeals, Paradise vs. Elk Horn Mining Co., 203 Southwestern Reporter, 291.)

Negligence of Mine Superintendent—Pennsylvania Mine Foreman Law Construed—In affirming judgment for $9000 in favor of plaintiff for injury sustained through a fall of rock from the roof of a gangway into which he had stepped in defendant's mine, in which he was employed, to avoid an approaching car, it is held by the Pennsylvania Supreme Court that the recovery was sustained by a jury's finding of negligence on the part of the mine superintendent in failing to obviate the dangerous condition which had previously been drawn to his attention. It is also held that the Pennsylvania statute, providing for the appointment of mine foremen to have charge of anthracite coal mines, contemplates the placing of a foreman in charge of each separate mine; there is no compliance with the statute in placing in the charge of a single foreman several distinct mines, together constituting one colliery. (Kolalsky vs. Delaware & Hudson Co., 103 Atlantic Reporter, 721.)

Validity of Sole Selling Agency Contract—Corporate Management—Where a coal-selling corporation acts as the sole agent in selling all the coal produced by several mining companies, a contract of agency between it and one of such companies is not invalid as being in restraint of trade, if the selling corporation is not owned or controlled by the producing companies and sells the output of each mining company as its own product, and at such price as it will command in the market. A shareholder in a private corporation is not precluded from voting on a matter before a stockholders' meeting merely because he has a personal interest in that matter at variance with the company's interest. If a mining corporation has not issued its full authorized capital, it is discretionary with the directors to sell part or all of the unissued stock, subject to the right of each stockholder to buy his pro rata share of such stock. (West Virginia Supreme Court of Appeals, Thurmond vs. Paragon Colliery Co., 95 Southeastern Reporter, 816.)

Water Indicator and Motor Stop

By FRANK HUSKINSON
Lafayette, Colo.

SYNOPSIS — *On the mine water-supply system considerable trouble was experienced because the supply pump, which could not be watched all the time, would sometimes either pump the well dry or overflow the tank, or both. This difficulty was obviated by means of electric stops that operated just before the danger points were reached.*

THE water supply for domestic and power uses for a certain mine was stored in a large water tank upon the hillside, so that it would flow by gravity to the village hydrants, the boilers and other connections. This tank was fed from a well located in the valley of a creek, about half a mile away. A triplex pump driven by a 15-hp., three-phase induction motor was employed to pump water into the tank.

As most of the pumping was done at night by the watchman, there was no way for him to tell how much water was in the tank. Also at times the pump was forgotten and all the water pumped out of the well, allowing the pump to run on air. This is one of the worst things that can happen to a pump, as it soon cuts the packing and allows the valves to become loose and leaky, causing considerable trouble as well as expense.

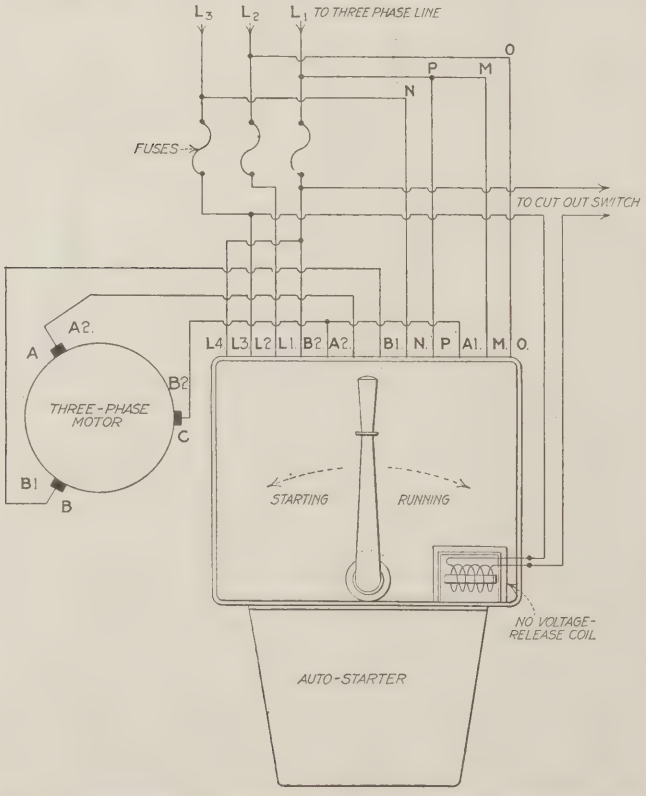


FIG. 1. ELECTRIC CONNECTIONS TO THE AUTO-STARTER

After a few cases of trouble of this character, and after the tank had been run over a few times, I decided that I would overcome this trouble by placing an automatic cutout on the motor, to be operated by the lowering of the water in the well and by the action of the gage on the tank when it was full. The cutout switch must stop the motor just before all the water was pumped out of the well, and it must also stop the motor just before the water in the tank would run over. While I was at it I decided to put in a set of visual signals on the water tank, so that anyone could tell at any time the amount of water in the tank.

In order to readily understand the principle and action of the automatic cutout arrangement on the motor operated by the cutout switches placed in the circuit, refer to Fig. 1. This shows the standard connections of a W-H auto starter, a type that can be used on several different kinds and styles of induction motors with good results; also it is a common type to be found around coal-mine installations.

The operation of the auto-starter is simple, and familiar. The lever is first pulled over as far as it will go on the starting side. As soon as the motor reaches full speed the handle is quickly moved from the starting to the running side (or position) where it is locked in place by the catch on the no-voltage-release coil. The action of this coil is to hold the auto-starter lever in the running position as long as current is flowing through the coil. Whenever this current is interrupted the coil loses its magnetism and releases the catch that holds the lever over on the running side. The lever instantly returns to the off, or neutral, position. It must be operated by hand in order to get motor started again.

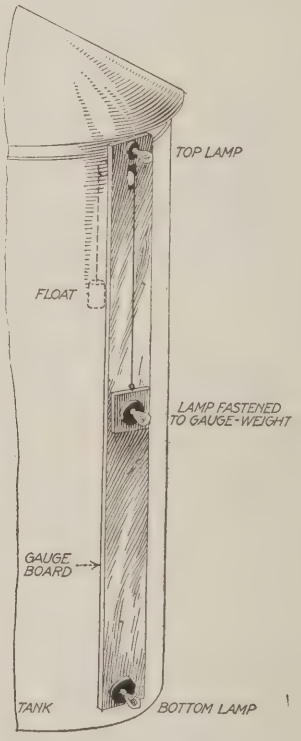
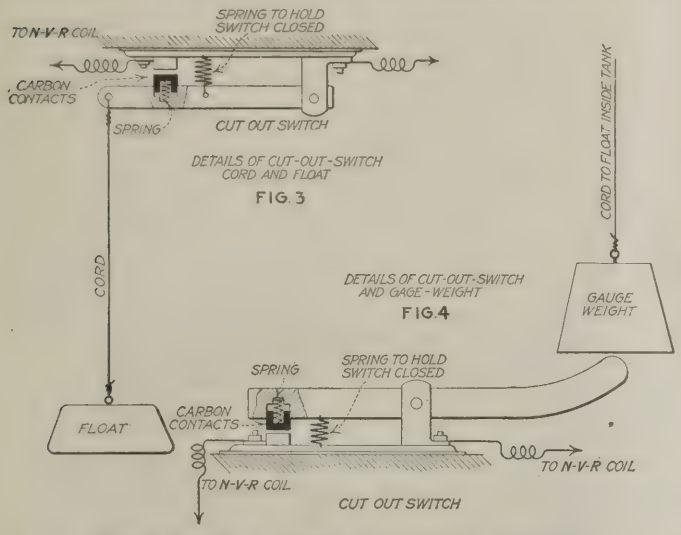


FIG. 2. ILLUMINATED TANG GAGE

In my arrangement to automatically shut off the motor whenever the water in the well was pumped down to a certain level, I arranged a special switch in series with this no-voltage-release coil. This switch had a strong cord fastened to the hinged portion, or blade, and on the other end of this cord was a large-sized float. This float was placed in the well and the length of cord was made such that just before the height of the water would allow the suction pipe to take air, the weight of the float would pull on the cord and cause the cutout switch to open the circuit in the no-voltage-release coil. This allowed the auto-starter lever to return to the off, or neutral, position, thus stopping the pump motor. As soon as the water rose in the well the cutout switch would automatically close. The circuit would thus be closed in the no-voltage-release coil, and the motor be in readiness to start again. Fig. 3 shows details of the float, cutout switch and connections.

In the arrangement to automatically shut off the pump motor, whenever the tank became full, a special cutout switch was placed on the gageboard of the tank and connected in series with the cutout switch and the no-voltage-release coil. The special cutout switch was placed at the bottom of the gage-board and arranged so that the gage-weight would come in contact with the handle of the cutout switch and cause it to open the contacts just before the tank was full of water, thereby opening the circuit in the no-voltage-release coil and allowing the auto-starter handle to automatically re-



FIGS. 3 AND 4. SUMP AND TANK CUTOUTS

turn to the off, or neutral, position and stopping the pump motor.

As soon as the water fell in the tank the gage-weight would leave the switch handle and the cutout switch would automatically return and make contacts again, thereby closing the circuit in the no-voltage-release coil. The pump motor would then be ready to operate again. Fig. 4 shows details of the tank, gage, cutout switch and connections.

This same arrangement can be applied to any protective device or apparatus that employs in its circuit a no-voltage-release coil (such as a switch or circuit breaker), the results being the same.

The visual signal to determine the amount of water in the tank from a distance was arranged by the use of three electric lights (see Fig. 2). One lamp was placed at the top of the gage-board, another at the bottom, while the third was fastened to the gage-weight with enough flexible cord to allow it to travel up and down the gage-board. With the three lights arranged in this manner it was an easy matter to gage the distance between the center or gage lamp and the other two, which distance indicated the amount of water in the tank.

With the motor protected by the automatic cutouts, the chances for trouble due to the pump running on air are eliminated. The visual signal is of great help to the pumper and the mine officials, as they can determine at any time the amount of water in the tank. With the tank protected from any liability of running over, quite an economy is effected in the saving of water and the unnecessary wastage of power due to the running of the pump motor.

With both tank and motor protection, the pumper can start the pump and leave it safely, with no fear of its running on air or the tank running over. It will be automatically shut off when all the water is pumped out of the well or when the tank is full.

A protective device of some kind should be put on all pump installations that are liable to exhaust their source of supply and run on air. The arrangements just described will work satisfactorily on almost any kind of an electric pump motor installation that utilizes an induction motor and an auto starter, or on any protective device that has a no-voltage-release coil embodied in its circuit.

Minecdotes

Mules Versus the Juice

The mine electrician and the pit boss were exchanging reminiscences of the past. The pit boss had just finished telling about his experience with a mule. "Mules," said the electrician, "always remind me of my first attempt to become a second Edison.

"It was this way: I had attained the advanced age of 13 and held the honorable position of trapper. Of course, at that time the height of my ambition was to become a mule skinner. This idea was fostered by the drivers, who were wont to help themselves liberally to my lunch and oil.

"One day we had a surprise. The company was going to put electricity in the mine. The use of electricity was not well known at that time around coal mines. I saw great prospects in the future and made a trip to town and bought a lot of electrical toys and books, with the result that in a short time I was much interested in the 'juice,' as the old timers called it.

"After many delays the big day came for using the 'juice' at the mine. The end of the trolley line was about 400 or 500 ft. from my door, and there were five lamps connected to the trolley line and rails. This made more light on the parting, it seemed to me, than if the sun had been shining there. Furthermore the electric locomotive was a seven-day wonder to most of us.

"A friend suggested that I could keep everyone away from my lunch and oil if I attached a wire to the trolley and onto my oil can and lunch pail, but that I would have to stand on a piece of dry wood myself whenever I touched them. I thought this would be fine, so I gathered up a lot of old bailing wire and proceeded to put in a line from my door up to the trolley line, working on it secretly and keeping it concealed so that no one knew what I was doing. I remember I had it under the rails and buried all over the parting. In some places it was fastened to the timbers.

"At last it was all in place, and I had my oil can and lunch pail sitting upon it at the door. I took a stick and laid the other end of the wire on the trolley line. I saw it make a big flash, but it stuck fast to the wire, so I went back to my door and awaited results.

"Well, results came quicker and in a much different way than I had expected. The first driver out had not much more than come through the door going onto the parting with his load when his mule seemed to

wake up all at once and started kicking and running. Every time that mule hit the rail there were sparks a-flying. The driver jumped off the car, stepped on the rail, and say, I sure thought he was crazy. He hollered, 'Oh, I am killed! I am killed!' He swore that the mule had kicked him all to pieces, and I am positive that the animal was at least 20 ft. from him and rapidly going further.

"Well, it was about the same with all of the mules. As soon as they would get through my door they would suddenly come to life and start to kicking and running. It made no difference what the driver said. They sure were a lively bunch, sparks flying from their shoes every time they hit the rail; and the drivers themselves seemed to have the same symptoms as the mules, only in some cases they were worse. I was enjoying myself hugely and wondering what caused all the excitement.

"Finally, the electrician was sent for. He was much puzzled for a while until he came to my door. There he stopped and filled his lamp with my oil. I was surprised to see him pick up the oil can, as I had it setting on a wire; but he had on a pair of gloves. Next he removed his gloves and reached over for my lunch pail. I don't really know whether he got hold of it or not. He acted worse than any of the mules, and the next thing I knew my enjoyment was cut short. The electrician had me by the ear and was telling me about a whole lot of things that were coming to me if I didn't show him where I had that wire fastened to the trolley line. I sure did show him. He cut it off and made me take up all of my line and said a lot of things to me about the 'juice,' etc.

"After a while the mules became quieted down and the mine resumed normal operations. It was some time before the drivers and myself were on good terms again. That was my first attempt to become a second Edison, and I never see a mule or hear mule mentioned without vividly remembering it."

How Our Coal Output Is Consumed

The following table has been calculated from that given in Fuel Administration Order No. 553 and published in *Coal Age*, on June 15, 1918, Vol. XIII, page 1116:

ESTIMATE OF BITUMINOUS COAL USED IN 1917 AND TO BE USED IN THE COAL YEAR 1918-19

	In 1917	Per Cent.	In 1918-19	Per Cent.
Industrial	204,907,000	36.58	242,024,000	38.68
Domestic	66,915,000	11.95	75,678,000	12.10
Gas and electric utilities	33,038,000	5.90	37,941,000	6.06
Railroads	155,000,000	27.67	166,000,000	26.53
Exports	24,000,000	4.29	24,000,000	3.84
Beehive coke	52,450,000	9.37	52,450,000	8.38
Bunker—foreign	7,700,000	1.38	10,000,000	1.60
Bunker—domestic*	5,000,000	0.89	5,000,000	0.80
Used at coal mines for steam and heat	11,000,000	1.97	12,500,000	2.00
Total	560,010,000	100.00	625,594,000	100.00
Used from storage	4,375,000	0.079	.....	.....
Imports	907,000	0.17	.....	.....
Estimated production	554,728,000	99.04	.....	.....
Substitution of coal for oil mainly in west	.....	.....	2,000,000	0.32
To increase stocks†	.....	.....	7,000,000	1.12
Total requirements for 1918‡	.....	.....	634,594,000	101.44
Production 1917	554,728,000	99.04	.....	.....
Production 1918-19 required for needs	634,594,000	113.3a	.....	.....
Increase required	79,866,000	.....		

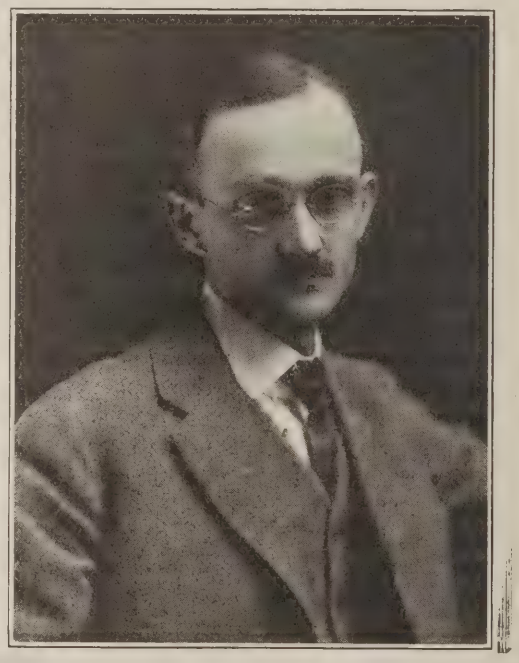
* Including Great Lakes. † For industrial plants and public utilities outside of New England, a ten days' supply. ‡No allowance for estimated conservation. *a* Production needed 1918-19 compared with use in 1917, not compared with production 1917.

Who's Who In Coal Mining

John Adrian Garcia

The late Marshall Field one time tabulated three things which one was to remember if he desired to achieve great things. These were the value of time, the success of perseverance, and the joy of originating. John A. Garcia, vice president and treasurer of the Allen & Garcia Co., engineers, of Chicago, Ill., evidently steadily kept before him this trio of principles as a guide, for hardly anything he has done since he received the degree of mining engineer from the Missouri School of Mines and Metallurgy in 1900 but could be traced to the conscious or unconscious application of the rules enumerated above.

Born in St. Louis, Mo., Aug. 26, 1876, Mr. Garcia early evidenced that he was willing to pay the price of



JOHN A. GARCIA

success in honest effort. No task at which he was put was looked upon as painful drudgery, to be reluctantly endured, but as an opportunity to be seized with joy.

After graduating from the School of Mines, Mr. Garcia spent several years in Arizona, Colorado, Arkansas, Missouri and the Middle West states in copper, lead and zinc mining, on railroad construction work, and as a chemist, etc. In 1903 he entered coal-mining work as mining engineer in the mining department of the Missouri Pacific R. R. He then became successively chief engineer of the Rock Island Coal Mining Co., Indian Territory; Consolidated Coal Co., St. Louis; Dering Coal Co., Burnwell Coal Co. and Consolidated Indiana Coal Co., Chicago.

Having made a study of his business, and knowing his profession in every detail, Mr. Garcia in 1911 formed with Andrew Allen, of Chicago, the Allen & Garcia Co., to handle the design, construction, development and operation of coal mines. The record this company has

throughout the United States speaks volumes for the success of the partnership, which has taken its place with the leaders in the development of the industry.

Mr. Garcia's specialty is to examine and report on coal mines and to direct the operation of properties. To assist in solving the problem of big tonnage, Allen & Garcia designed a cage to meet the most exacting conditions. This item of coal mining development is cited as it exemplifies the part Mr. Garcia is taking in making coal history. Quoting his words: "If we can help in any way to better the conditions of the industry, make mining safer, or improve our methods, it is not only our duty to do so, but our pleasure as well."

In spite of his devotion to his many duties, Mr. Garcia has still found time to contribute various articles on coal mining and kindred subjects to the trade and technical journals and mining societies. He takes a good grip on the joys of life and plays the game like a man. He is a member of the University Club of Chicago, the Engineers' Club of Chicago, and the Western Society of Engineers. He is married, and the father of two children—a boy of 14 and a girl of nine.

Novel Scheme for Boosting Production



OFFICIALS GAVE UP THEIR SUNDAY TO LOAD COAL AND SET AN EXAMPLE FOR GREATER PRODUCTION; PROCEEDS WENT TO THE RED CROSS

J. T. Morris, superintendent of the Stotesbury operation of the E. E. White Coal Co., operating at Glen White and Stotesbury, W. Va., employed a novel scheme of getting more coal out by using all of the officials at the plant on Aug. 4. It is true, of course, that Sunday should be observed, but, as he puts it, "Our boys in the trenches work on Sunday, so it won't hurt us." The autos were left in the garage that day and each man went after the coal with the true spirit of the citizen who wants to do his part.

The scheme was put up to C. R. Stahl, assistant to the general manager, and he was asked what he thought about it. His answer was characteristic of the man who can see things at a glance for their true worth. "Fine," he said; "I'll load five tons with you."

So there you have the scheme. Each official was to load five tons of coal in addition to his regular work, and on Sunday at that. Through the generosity of E. E. White, president and general manager, and the efforts of his loyal men, the proceeds go for the benefit of the American Red Cross and to help win the war, as the banner on the loaded car of coal in the illustration shows.

Those men who loaded five tons each were L. C. R. Stahl, assistant to the general manager; J. T. Morris, superintendent; E. T. Lilly, mine foreman; Tom Wattis, Bill Wattis, Edward Hylton, R. L. Spease, William Dover, assistant mine foremen; Charles Crews, chief electrician; J. K. Hodges, store manager; S. L. Deck, outside foreman; G. E. Rowe, warehouse clerk; James Hewitt, mining engineer; and Moscoe Duncan, timber foreman. Frank Thompson, motorman, and Claude Vaughan, brakeman, volunteered to haul the coal.

If every official in similar positions would each load five tons, the State of Virginia would have 300,000 tons to its credit from this source alone.

Reinforced-Concrete Pit Props

By M. Meredith
Liverpool, England

In consequence of the extreme shortage of pit timber, a considerable degree of interest attaches to a series of tests of reinforced-concrete props and beams which has been made in one of the engineering departments of the Manchester University. These concrete props and bars, which are made by the Lilleshall Co., Ltd., of Priors Lee Hall, Shropshire, England, are reinforced on the "Keedon" system, props up to 6 ft. long having three $\frac{3}{8}$-in. steel rods passing through corner hoops in triangular steel frames, fixed at intervals, and those 7½ ft. long having rods similarly placed through hoops in square frames. For beams the frames are oblong, with the four rod hoops arranged on the outside instead of on the inner, as in the case of the props.

Three of the most interesting tests on the first day related to a 6-ft. concrete prop, made on the semi-dry system, reinforced with $\frac{7}{16}$-in. rods, but not containing Keedon hoops. This prop, which was six months old, was submitted to a pressure of 10 tons quickly, then increased at the rate of a ton a minute. At 30 tons the ends cracked, and at 34½ tons the prop fractured at the ends. It was then shortened to 5 ft. and again tested, breaking at 41½ tons. Again it was shortened, this time to 3 ft. 9 in., and fractured at 42½ tons.

A concrete prop 4 ft. 6 in. long and 4¾ x 4½ in., with $\frac{3}{8}$-in. rods, through Keedon hoops, made on the semi-dry system 12 weeks ago, crushed at the ends under a pressure of 26 tons, while a replica of this prop held 25 tons for 5 min. before breaking at one end. It was reset and broke at 12 tons, the ends of the rod curling round the concrete. The particular point of interest in these two series of tests was that the older the prop grew the firmer it became. In another test a 6-ft. concrete prop with rods and Keedon hoops caused a surprise by breaking at 19 tons. This was attributed by the makers to some fault in mixing and to the newness of the prop.

The timber customarily used in pits in pre-war days was Norwegian and Russian larch, and it seemed a pity not to have put some of this timber under test at the same time, so that comparative values might have been more precisely judged. Instead, a piece of pitch pine 4 ft. long and 6 in. in diameter was tested and broke at the ends at 37½ tons. The test was interesting but was of little or no value, as wood of that quality is not used for propping. Moreover, the clean-sawn ends were placed against the steel faces of the testing machine, whereas the concrete props had wood cushions at each end of 1⅛ in. thickness.

On the second day, however, some Welsh larch props —the timber that is being principally used just now— were introduced. A piece 5 ft. long and 5 in. in diameter was submitted to a pressure of 10 tons in 30 seconds, and then this stress was increased at the rate of four tons a minute. It broke at 25 tons, which gave 2800 lb. to the square inch. A piece 6 ft. long and 6 in. in diameter broke at 30¼ tons, or 2580 lb. to the square inch. One of the final tests was the trial of a 6 ft. 6 in. reinforced-concrete prop 7 in. in diameter as a bar, but when the load registered 22,800 lb. the bar was bending so much as to dangerously threaten to fail suddenly, and it was therefore withdrawn unbroken.

There were many other tests, but these seemed to be the most interesting. On the whole the views expressed by the experts present gave the impression that the demonstration was favorable to reinforced concrete. The fact that a prop could twice be cut down and reused, each time to greater advantage, furnished a reply to the objection made in some quarters that concrete props, unlike timber, could only be used once.

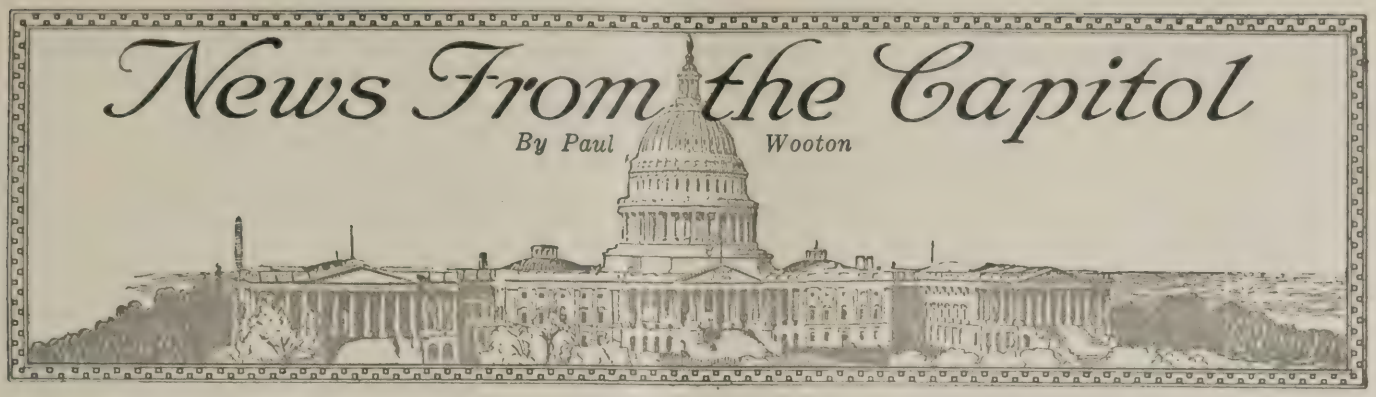
Then again, in no test did the concrete prop collapse by buckling or breaking in the center, as is usual with wood. Moreover, the prejudice entertained by miners to anything but timber, on the ground that props of the latter material "talk" to them—that is, that the creaking of timber just prior to a collapse affords them a warning to clear out of danger—should be removed by the fact that under the test pressure the concrete props also gave warning by a cracking sound and a crumbling at the ends.

Another thing that appears to favor concrete as against wood is that in deep mines, such as prevail in the Doncaster area, props of concrete may be safely left in a worked-out section, whereas timber must be removed as a precaution against fire. In this process as much as $25 and sometimes even $75 has been spent on the removal of a single piece of timber.

One point seems quite clear—namely, that concrete props and bars may be used to great advantage in main roadways, for while the initial cost is certainly greater than that of timber, in the pre-war era, the life is practically for all time, so that the ultimate cost shows a marked reduction.

To what extent general circumstances will permit of the use of concrete props at the coal face is another matter; but if they are advantageous for the roads any difficulties with regard to their use at the face should not be insuperable. Not only is timber scarce in these days, but steel scrap, such as rails and tube, suitable for cutting to pit sizes, is now almost unprocurable. Steel rails cut to lengths of from 6 ft. to 9 ft. have in the past been found extremely serviceable for propping near the face, interspersed with timber props. In such cases the longer pieces are bolted together, two thus making one support. The shorter lengths, however, are used singly. Eight-inch steel girders used as cross bars with timber props have stood in some of the main roadways for 15 years or more.

The difficulty now, however, lies in the inadequate supply of such material, and with plenty of concrete available reinforced-concrete props and bars look like a solution for an awkward problem. They are a "war" innovation, the first having been made in October, 1914. Arrangements are now being made to secure for them a permanent market. The makers, we understand, are now turning out about 3000 tons a week of the props, but how much greater the output will have to be, if the new system is favored by the mining authorities, may be judged from the fact that the normal consumption of pit timber in the collieries of Yorkshire, Derbyshire and Notts—which coalfields together yield 26 per cent. of the whole output of the United Kingdom—is 1000 tons a day. It may be of interest to add, however, that for every ton of timber used the three counties named produce an average of 170 tons of coal, compared with the low average of 33 tons of coal for every ton of timber used in the coalfields of South Wales.



Men Responsible for Greater Output

Production managers, on whose shoulders will rest the immediate responsibility of turning the curve of production upward, have been appointed by James B. Neale, of the Fuel Adminstration. The production managers and the fields over which they will exercise authority are:

Charles O'Neill, central Pennsylvania; F. B. Reiman, western Pennsylvania, north of Pittsburgh; R. W. Gardiner, Pittsburgh and Panhandle District; James S. Amend, Westmoreland, Irwin Gas, Ligonier, Latrobe and Greensburg; W. L. Byers, Connellsville region; Howard P. Brydon, Cumberland, Piedmont and Upper Potomac, Maryland, and West Virginia; F. M. Lockhart, Somerset-Myersdale; J. J. Roby, eastern and central Ohio; William H. Wallace, Michigan; James H. Pritchard, southern Ohio; H. F. Price, Big Sandy and Elkhorn; A. L. Allais, Hazard; J. W. Dawson, high-volatile fields of southern West Virginia; E. E. White, New River and Winding Gulf; R. D. Patterson, Tug River and Pocahontas field; G. D. Kilgore, Clinch Valley and southwestern Virginia; Howell J. Davis, Harlan field in Kentucky, Tennessee and Georgia; Judge H. C. Selheimer, Alabama; W. G. Duncan, western Kentucky; W. J. Freeman, Indiana; F. C. Honnold, Illinois; Ira Clemens, Iowa, Missouri, Kansas, Arkansas, Oklahoma and Texas; A. K. Craig, Montana and northern Wyoming; Thomas Sneddon, Utah and southern Wyoming; J. F. Welborn, Colorado; George T. Brown, New Mexico; Brooks Fleming, Fairmont-Clarksburg, and D. C. Botting, State of Washington.

Restrictions Lifted on Screenings

To meet the screenings situation, the Fuel Administration has lifted the restrictions on the use of that class of fuel by the manufacturers of clay products. This extensive industry will be permitted to buy screenings in unlimited quantities during the next 30 days. They will be permitted to store such screenings for use as they desire during the remainder of the year. This action was taken to relieve the accumulation of screenings in the Middle West.

Spreading Gospel of Conservation

A new force looking to the saving of coal is the recently created conservation section of the Railroad Administration. The section is under the management of Eugene McAuliffe. Just at this time, Mr. McAuliffe is sending out 500,000 extracts from the proceedings of the International Railway Fuel Association convention. Those portions of the proceedings which would be helpful to engineers and firemen were sent to all such employees of the railroads in the country. Likewise, other abstracts were made and sent to those most likely to profit by them. The abstract of the proceedings of the convention has been printed tastily, with the more important features brought out in black-face type.

Speakers to Boost Production

The production department of the Fuel Administration is increasing the number of its speakers to fifty. It is expected that one of the Administration's orators will be placed in each coal-mining district. In addition, a coöperative agreement has been effected which will permit of the use of the four-minute men on Labor Day and the Sunday preceding. Having noted the splendid effect of the "sings" among the soldiers, the production stimulators expect to encourage this practice among the mine workers.

To Take Prompt Action on Applications for New Coal Mines

Applications for permission to open new coal mines are to receive prompt action. A committee consisting of Frank G. Jones, chairman, S. M. Taylor and R. L. Ireland has been designated to pass on these applications for the Fuel Administration. The policy of the committee is to keep in view at all times the maintenance of the largest possible flow of marketable coal. Numerous applications now are pending. The committee assures that action one way or the other will be taken promptly on all of these requests.

Call Off Convention in Order to Work in Mines

An example of the practical results which are being obtained by James B. Neale, the director of production for the Fuel Administration, is the cancellation of the convention of the Russian Brotherhood Organization. A general assembly had been called for Sept. 16. Mr. Neale called the attention of the officials to the advisability of curtailing any gatherings which would necessitate the absence from work of a considerable number of miners. Jacob S. Koda, of Mt. Carmel, Penn., the supreme president of the organization, has advised Mr. Neale that he is in entire accord with the spirit of his request and that the convention has been indefinitely postponed.

Summary of Coal Loaded Since January

A summary of coal loaded since the beginning of the year has been issued by the Railroad Administration as follows:

	Decrease, Cars	Increase, Cars
Month of January	79,172	.....
February	.....	31,250
March	.....	46,613
April	.....	73,408
May	.....	84,998
June	.....	88,840
First four weeks of July	.....	113,188

Increase—1918 over 1917—359,125 Cars

The increased loading of coal, which is being effected, is shown by the returns for the week ending July 27, which follow:

	1918	1,917
Total cars bituminous	224,572	193,144
Total cars anthracite	40,942	43,050
Total cars lignite	3,657	2,813
Grand total cars all coal	269,173	239,007

To Conserve High-Grade Coal

Every effort is being made to cut down the demand on the high-grade coal of West Virginia, Pennsylvania and Maryland. Small as are the exports of this coal to the west coast of South America, steps are being taken to supplant even that demand. The Fuel Administration has arranged for the trying out in Chile of coal produced in the State of Washington. It is believed that this coal will be found to be adequate to the industrial needs of Chile, thereby relieving the eastern fields of that tonnage.

Coal Shipments Show Increase

An extract from the report of the regional director for the Alleghany region to the Director General of Railroads reads as follows: "In June anthracite coal loading was 63,187 cars, an increase of 4179 cars over last year; bituminous, 191,767, increase 22,781. July anthracite loading was 69,630 cars, an increase of 2329 cars; bituminous, 223,014 cars, increase, 35,100. Coal dumped at tidewater increased 223,537 tons in June, and 444,916 tons in July, as compared with corresponding months last year. Byproduct ovens are being operated at 94 per cent. of their capacity."

Laundries Not to Be Curtailed

No curtailment of fuel for laundries is to be made by the United States Fuel Administration. After a conference with representatives of the industry, it was decided that the matter of fuel supply for that industry could be handled best locally.

Detroit Assured of Adequate Coal Supply

Detroit has been assured an adequate supply of coal for domestic use. A delegation from Detroit visited Washington last week to emphasize the necessity of an early supply of coal sufficient to meet the needs of domestic consumers. The Fuel Administration declined to increase Detroit's allotment of anthracite, but will see to it that that city has a sufficient supply of domestic sizes of bituminous coal. The steam-coal situation in Detroit is described as excellent and it was not discussed at the conference.

New Lake Coal Handling Charges

Adjustments of charges for handling and forwarding lake coal have been made by the Fuel Administration as follows:

a. A lake forwarder may charge 20c. per ton on cargo coal for his services.

b. A lake forwarder may charge 25c. per ton for fuel coal furnished a vessel, and 50c. additional, or a total of 75c. per ton, where the coal is delivered to the vessel by barge or scow.

c. A purchasing agent may be employed by the lake forwarder to buy either cargo or fuel coal and charge a commission of 15c. per ton, if not prohibited by Rule 3 of Publication 22 from so doing.

d. A lake forwarder may pay a purchasing agent 15c. per ton for buying either cargo or fuel coal for him and add same to the 20c. allowed for cargo coal and the 25c. or 75c. allowed for fuel coal.

e. A licensed distributor acting as a lake forwarder or lake fueller who purchases coal from an entirely independent mine, or from a mine not owned or controlled by another lake forwarder or lake fueller, may add the purchasing agent's commission of 15c. per ton to the 20c. per ton allowed on cargo coal, and to the 25c. or 75c. allowed on fuel coal, but such sum cannot be added if the lake forwarder has employed an independent purchasing agent in the purchase of such coal.

f. No commissions whatever can be added by lake forwarders or lake fuellers to the applicable Government price of anthracite coal.

Brief Washington Notes

The Bethlehem Coal Co. reports that Charlie Mitchell, of Helens Run, near Fairmont, has mined 217 cars of coal in twelve days. At 82c. a car, his earnings for the period was $177.94, a daily average of $14.88.

A saving of 2,000,000 tons of coal a year is expected to result from the Fuel Administration's order making a reduction of 25 per cent. in the amount of fuel which may be used by the manufacturers of cement.

Hope of better transportation service for coal shipments is contained in the announcement of the Railroad Administration that to date 80 per cent. more grain has been handled than at the corresponding time of last year.

Five cents may be added to the mine price of coal delivered directly from mine tipples to locomotive tenders, or such other sum as may be agreed upon between the operator and the railroad receiving the coal, the Fuel Administration has ruled.

Equalization of storage was the subject of two conferences last week between Dr. Garfield, J. D. A. Morrow, C. E. Lesher, and other officials of the Fuel Administration, with J. J. Storrow, a delegation from New England and several state administrators. Prompt steps are expect to equalize storage.

The speed ship "Tuckahoe," which was built in the record breaking time of 37 calendar days, continues to make phenomenal time in the important coal carrying trade between Hampton Roads and New England. The "Tuckahoe" has set for other colliers in this trade a pace of four round trips a month. The average has been two round trips a month.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The labor situation looks quite critical at present, the practice of paying bonuses at the less responsible operations being the cause of the trouble. A mine with favorable conditions can afford to pay bonuses because the price of mining is set sufficiently high not to close those operations which are working under conditions not so favorable. So the well-circumstanced mines pay bonuses, and the men in adjoining mines wonder why it is not done at their mine where perhaps the conditions are just as favorable, but where the operator is willing only to pay the union wage and feels in fact a mandate from the government compels him to pay no more. Everybody has been opposed to bonuses—the Fuel Administration, the union and the old-time operators—but the practice has only in a few cases been strenuously combatted and the system has gone on. In fact it can be and probably is done more or less secretly and even disavowedly. On Aug. 16 Frank Hayes, the president of the United Mine Workers of America, announced that a meeting would be held today, Aug. 22, at which all the district presidents would be assembled. Mr. Hayes announces that the wage increase "can be met and applied by the coal operators without the necessity of an increase in the selling price of coal to the consuming public," and he adds that the payment of bonuses by many mine owners "is undisputable evidence that the industry is able to bear an advance in wages." All will agree that it is clear evidence that certain parties who are paying bonuses, and doubtless some others also, could stand an increase in wage scale without being deprived of their entire income. But to allege that this proves that all could stand the increase is untrue. In fact if the union wins out and prices remain fixed there will be a lot of concerns forced out of business, far more doubtless than the country could afford. Certainly, further readjustments of prices would have to be made.

> *We urge upon all concerned the absolute necessity of regular attendance at work and the need for working full time in accordance with the terms of our agreement so that every colliery in the anthracite field may be operated to a maximum of its capacity each day in the year as provided for in our agreement. To the end that the mine workers may be provided with all the equipment necessary for efficient operation, we urge upon all operators that they anticipate their needs well in advance, the difficulties of securing mine material at this time being abnormal because of the pressing requirements of other war industries. Where grievances arise and are taken up for settlement as provided for in our agreement, we urge company officials to be prompt and liberal in making adjustments to the end that unnecessary disputes may be avoided and unnecessary delays eliminated, and we pledge upon behalf of the board an earnest endeavor to make prompt adjudication of such disputes as do arise. We further urge upon operators and mine workers alike a united effort to make up for lack of numbers by added efficiency in work and operation.*—Anthracite Board of Conciliation.

It is regrettable that the steel business has seen fit to increase wages 10 per cent. just recently thus renewing its raid upon the coal industry, and cutting its own throat, for already the steel companies are complaining that they cannot get coal. A better plan by far would have been to keep the price steady and seek to increase the working force at the steel mills through the operations of the Department of Labor. The bidding for workers increases the industrial unrest. The mine worker is constantly leaving and returning and losing time, efficiency and the industrial habit in the process.

Mr. Hayes says speaking of the payment of bonuses:

"The practice has become so widespread that the stability of the entire industry is threatened and the coal operators themselves are becoming alarmed at their own handiwork.

"The Fuel Administration is conducting investigations to find out the reasons for the conditions and the identity of the operators who are bidding for labor by the payment of bonuses. Many of the operators' associations have petitioned the Fuel Administration to save them from the disastrous results of the bonus system.

"If bonuses are eliminated from the pay envelopes of the miners now receiving them the industry will lose thousands of men and it can ill afford to do so, for they are necessary if the production is to be even maintained at its present level and still more necessary if the nation's demand for a greatly increased output is to be satisfied.

"If the wages of those not now receiving bonuses are not increased by an equivalent of the bonuses now being received by other miners, then the industry faces a sure and certain loss of needed man power.

"For the protection of our entire war program, to keep the wheels of basic industry going full blast, it is necessary that a wage adjustment be made on a basis that will put an end to the wholesale competition for men and hold the miner to the mines where he would like to remain, if he is but given a wage equivalent to that which he would receive if employed in other industries."

In the anthracite region the matter of a new wage scale is no less urgently discussed, though bonuses do not exist. However, variations in wage scale from mine to mine are common. But these variations are not the real cause of the trouble, for the mine workers want larger increases than these variations represent. As stated last week, the miners in the northern district want an increase of 25 per cent. The brakemen and "motormen" of the Delaware, Lackawanna & Western R.R., Coal Department, are not satisfied with a raise of that character. They desire their rate lifted from 40c. per hour to 75c.

A few weeks ago some individuals made a request to Fuel Administrator Garfield for permission to reopen the wage scale. The answer was not favorable. Dr. Garfield refused to consider any increase in price outside of the seasonal increase provided and his decision made an increase in wage an impossibility. Recently he has received an application from the officials of the union. So far he has not replied, but it is unlikely that his reply, when received will be favorable. The mine workers contend that the recent awards to the railroad shopmen by the Railroad Administrator and to the street-car men by the War Labor Board give these men more pay than is received by many of the workers in the anthracite industry.

There is a degree of apprehension that some carefully veiled German propaganda are back of the trouble in the anthracite region. Only the most unprincipled person would be guilty of the declarations actually being made at meetings of union men to the effect that the operators are deliberately restricting production. It is almost unbelievable that men representative of the northern anthracite region would accept such sweeping charges and embody them in a resolution, but this they have just done. A charge that

an employer is disloyal is a well recognized weapon in the armory of the defeatist, as has been noted in Italy.

As evidence that the enemy aliens are still active, the fact may be even now stated that on Aug. 1 Alexander Frank, an Austrian, was arrested at the Wilson Creek mine, just north of Carbondale, one of the mines of the Delaware & Hudson Co. He was accused of having placed 65 sticks of dynamite in the Wilson mine with the purpose of wrecking it. The explosive was found hidden among props and was uncovered by men who were cleaning out a chamber. The prisoner refused to explain his action.

After All, Fight Is About Words, Not Facts

Seward Button, the chief of the Department of Mines of the State of Pennsylvania, it will be remembered, recently declared that the output of anthracite was cut down by drunkenness, idleness and the ease with which a sufficient wage could now be made. The miners want him removed. The general mine committee of subdistrict 4 of district 9 has passed resolutions condemning him and asking Governor Brumbaugh for his removal.

After several paragraphs reproaching Button and exculpating the mine workers, the committee concludes with the following acknowledgement of the facts which perhaps exactly expresses all that the wicked Seward Button tried feebly to make plain:

"Resolved further, that in passing these resolutions we are not unmindful of the fact that no industries with large bodies of employees can be absolutely free from isolated cases of men who neglect their work through drink or who are controlled by the hook worm."

All that Seward Button demands, all the industry demands, all that the nation demands is that the mine workers shall find these men and expose them so that all the world may know them. It is necessary that these men should be brought into line, and the mine workers are the people to bring them. We want the mine workers to "isolate" them still further. They should be made to feel as "isolated" as the "Man Without a Country." The mine workers should show plainly that these drunkards and "hook worm" sufferers are not accepted members of the mining fraternity, and the sober and industrious workmen should do it so plainly that the public would be under no misapprehension about the matter. The removal of Button will not do the work. The drunkard and the laggard must be removed.

Kennedy Is Suggested for Union President

An attempt is being made to groom Thomas Kennedy of the Hazleton district for the presidency in place of Frank B. Hayes who is now filling John P. White's unexpired term. The anthracite mine workers want recognition in the union, the office having gone too frequently, they believe, to the bituminous regions. Kennedy has not made up his mind whether to run or refrain. He says that he will decide definitely before Oct. 1.

The United States Fuel Administration has requested the Roman Catholic priests to eliminate weekday services, which are used by the foreign population as an excuse for absence from work, which absence is often prolonged.

The suggestion has not been received everywhere with favor, though the priests almost universally are heartily in favor of doing all within reason to increase the production of coal. One priest, the Rev. M. A. Lambing, pastor of St. John's Roman Catholic church at Scottdale, made a public statement objecting to the request and said that instead of seeking to stop the weekday religious services the administration should turn its attention to the liquor problem. For every bushel of coal lost through attendance at church, he claims, there are tons lost through insobriety. He charges that the request of the Fuel Administration is in effect putting a tax on Catholic piety.

The strike which occurred Aug. 3 at the Dodge colliery of the Delaware, Lackawanna & Western R.R. Coal Department came to an early end. It involved, however, over 1000 men. The company makes the statement that the cause of the strike was the demand made by six miners who had been working in the Dunmore No. 1 vein that they be given a higher rate than the scale called for. They were told that they could accept the rate or leave, and quite unexpectedly a strike was declared.

The G. B. Markle Co.'s day men are seeking changes in the wage scale. The engineers of that company are striking for an 8-hour day. They will not come to their work till 7 a.m. Heretofore they would get the engines ready so that the men could be in the mine by that time.

A holy day occurred last week, Aug. 15, the Feast of the Assumption, and that with the great heat had a deterrent effect on production. The Lehigh region did not shut down for that feast day; the miners worked as usual. The Lehigh Coal and Navigation Co.'s collieries in the Panther Creek valley operate on all church holidays and they do not have as much irregular work as elsewhere. The men can be brought to time for irregular attendance as they do not have the broad opportunity to wander from mine to mine afforded them in the northern region where the mines are operated by a number of different companies.

Hot Weather Drives Surface Workers Home

The outside workers in the recent "hot spell" complained so much of the heat that an early closing of the collieries was necessary and the electric storms at places made a further closing down obligatory as they put the electrical machinery out of commission. The East Point Coal Co. at Pond Creek was laid idle by the storm of Aug. 12.

The recruiting trouble is now less acute than in the past. It is beginning to be understood that we must not call miners if we do not want them to enter the army. If they are to be suffered to remain at work, it must be clearly understood that they are not wanted in the national service. Once they are called, they will insist on serving, feeling that a failure to serve will subject them to criticism.

Some of the mine workers in West Virginia are making remarkable records, among them Charlie Mitchell, an American miner of Helen's Run, Worthington, W. Va., a mine owned by the Watsons of Fairmont, operating as the Bethlehem Coal Co. Office records show that during the last 12 working days in July Mitchell loaded a total of 217 cars at 82c. a car and that he made a daily average of $14.83 or a total for the 12 days of $177.94. This is believed to be the record for northern West Virginia.

The coal operators of western Kentucky are enforcing the "work or fight" law. Under the enactment of the session of 1918 every man from 17 to 60 years of age must work at least 36 hours a week. At two mines in Hopkins County 37 miners were recently arrested for failure to work, the arrests being made as they left the mines. Of these 35 were employees of the Victoria mine and two of the Grapevine Coal Co. Ffteen of the men were fined $20 and a day's work on the roads, and the others were dismissed. The men had been working at most two days a week.

Miners Must Work Whenever Occasion Offers

Slow work has been the order of the day at these mines; last year the companies could get few cars and in years previous few orders. The opportunities to work in western Kentucky and in Kentucky generally are none too good even now. In the week ending July 27 the car shortage was 17.3 per cent. and on Aug. 3 12.4 per cent. But the people of Kentucky are bound that Kentuckians shall work whenever they have the opportunity.

The fuel administration in Michigan has given the mine workers almost all their demands. They have conceded to them the 10 per cent. increase in passenger rates, forbidding the operators to charge it to their miners. It has given them the increase in wage of 10c. per ton, but it will take effect Aug. 16 instead of from last fall.

In Arkansas, 400 miners employed at the Central Coal and Coke Co.'s plant No. 6 went on strike Aug. 14. A trifling dispute as to who should sprag the cars at the bottom is said to have been the cause of the strike. Superintendent W. H. Risper says the men refused to sprag the cars and that two trips of 12 cars each were permitted to run into the dump of the mine. The men alleged that the

pit rules exempt them from the work of spragging the mine cars. About three months ago Tom Wimberly, a miner, lost a finger trying to sprag cars and he charges that when he asked for compensation the company refused to pay him, presumably because he was not employed for that purpose. Following this action, the miners gave the company three days' notice that they would not sprag the cars. The notice expired Aug. 14 but the system was not changed. A short time ago the company's employees at its No. 3 mine refused to go to work because the tipple was unsafe. A new one is being built and will be completed about the latter part of this week.

In Nanaimo, British Columbia, a draft-evader by the name of Goodwin was killed in making his arrest and certain labor leaders sought to make capital out of the matter. The funeral was largely attended and trouble was feared between the military police and mine workers. It was at one time declared that if the police were not withdrawn and if draft-evaders were not given immunity a strike of all the coal miners on Vancouver Island would be ordered. But better counsels prevailed and there has been no trouble.

It appears as if the miners of the United States will persist in the celebration of Labor Day, Sept. 2, despite the need for coal. The miners declare they wish to demonstrate to the public on that day the importance of the mine workers' services. It appears that the downward trend of the curve of production for the 5 weeks following the week after the Fourth of July in 1917 will be repeated this year. It has been so far as recorded. The Feast of the Assumption, the hot weather and the poor car service will doubtless show in the coming report of the Geological Survey. Sept. 2 was comparatively harmless last year, but it seems likely that this year it will reduce tonnage considerably.

Garfield Pleads for More Anthracite

Dr. H. A. Garfield addressed the following letter to the Board of Conciliation in the anthracite region:

"Our country is in the midst of a dreadful war across the sea and is facing a very serious situation at home. The war abroad cannot be won and the situation at home cannot be successfully met without a marked increase in the production of coal.

"Much more coal is needed if General Pershing's army in France is to receive from the great army of mine workers at home the complete support which it so richly deserves. Coal is the bed rock on which our industrial system rests, and without an adequate supply, our war program of ships, food, clothing and arms and ammunition must drag. The papers each day bring word from France of the splendid achievements gained by bravery and sacrifice on the part of our overseas army. Surely our army of mine workers and operators at home will see to it that equally cheering news of our achievements goes to France. We are justly proud of our soldiers and must give them good cause to be justly proud of us.

"Much more coal is needed if hardship and suffering in many homes in this country is to be avoided during the coming winter. Surely our army of mine workers and operators will see to it that this situation is successfully met.

"For an increase in the anthracite tonnage I turn to you, knowing the splendid results which you gentlemen, as the Board of Conciliation, have obtained during the past fifteen years and knowing that you represent the two effective elements necessary to increased production, namely, operators and mine workers. The operators must strive for higher efficiency and for uniformly good physical conditions in their collieries. The mine workers must report for work each day and must not only stay in the mine the hours prescribed by the wage agreement, but must also see to it that there is a marked increase in the tonnage.

"In the anthracite wage agreement, dated May 5, 1916, under which you are now working, there is the following clause:

"'An 8-hour day means hours of actual work for all classes of labor, at the usual working place, exclusive of noon time, for six days per week, if the operator desires to work his mines to that extent, excepting only legal holidays. The time required in going to and coming from the place of employment in or above the mine shall not include any part of the day's labor. Drivers shall take their mules from the stables to the usual working place before starting time and shall return them to the stables after quitting time, compensation for such service being included in the day rates established for this class of labor. If, because of breakdowns, repairs, or the requirements of transportation, or other causes essential to efficient operation, it is found necessary to extend the normal workday of any employee, or any class of employees, the operator may do so, at his option, paying for overtime a proportional rate per hour as determined from the rates established under Section 1 hereof.'

"Under date of Apr. 26, 1917, in a joint conference of anthracite operators and miners, the following resolution was unanimously adopted:

"'Be it resolved by the coal operators and mine workers, represented in the Anthracite Joint Conference, that we hereby instruct the Conciliation Board to offer its services to the Council of National Defense and to render such assistance to the council in maintaining the production of coal and in enlisting the maximum coöperation of employers and employees represented in the anthracite coal-mining industry, so as to meet the requirements and needs of the Government as set forth by the Council of National Defense; and also to provide for public necessities.'

"The offer of assistance expressed in the resolution has been accepted by the Council of National Defense. It is therefore with a feeling of full confidence that I look to the anthracite industry to meet the needs of the nation in this crisis. This will require the very best effort of every one from the highest official to the smallest breaker boy and I know that it will be cheerfully given. The plans to be followed to make every man and boy connected with the industry realize the gravity of the crisis and his own individual responsibility in it, I shall leave entirely to you, saying only that there must be no doubt in the minds of the operators and mine workers but that the anthracite tonnage must be largely increased. Here is a splendid opportunity for the highest patriotic service. You and your fellow workers will make the best of it, I'm sure."

The Board of Conciliation promptly wrote a letter addressed to the anthracite operators and mine workers, saying:

"To the end that the efforts of the United States Fuel Administration may be successful, we solicit the utmost measure of your whole-hearted patriotic coöperation toward adequately meeting this great public emergency. We recognize that the best efforts of operators are now handicapped by the abnormal difficulty in securing necessary machinery and material for operation. We also recognize that the ranks of the mine workers are depleted, but we believe that greater production can be secured in spite of these difficulties if the program of united effort herein suggested is generously supported by mine workers and operators alike, working together in full coöperation and sympathy to the common end of winning the war and supporting with the last pound of enrgy your neighbors, friends, relatives and fellow workmen now at the front in France in the National service."

The latter part of the letter is displayed in the center of the first part of this department. The letter was signed by W. L. Connell, S. D. Warriner, W. J. Richards, John T. Dempsey, Thomas Kennedy and James Matthews, comprising the full board.

Miners Want Commutation Service

The mine workers at Herrin, Ill., who work in the Williamson and Franklin County field lying to the north of that village, are complaining that "miners' trains" are not provided to take them to their work. They purpose forming a committee to deal directly at Washington with William G. McAdoo, Director of Railroads, and they have requested Congressman E. E. Dennison to head that committee.

The mines near the town of Herrin have, they claim, the better supply of mine workers while the newer and more efficient mines, where a greater tonnage per man can be produced, being farther away, can hardly get any men at all. The mine workers point out that every day in the southern Illinois fields miners' trains leave Sparta, Duquoin, Christopher, Harrisburg and Marion, and every night bring the miners back. They think they are even better entitled to this service at Herrin, for the mines surrounding Herrin produce more coal than the mines surrounding any one of the cities mentioned.

EDITORIALS

The Miner as a Casual Worker

A LITTLE thought will convince us that the miner is not like other men. Somehow he has the casual habit, that habit which we rightly regard as typical of the Middle Ages. No longer are there 300 working days in his year; in fact there are far from that number. Even when the mines are working irregularly the days on which they do work do not find a full force engaged. The miner is a casual worker with the industrial habit only partly developed.

The casual character of the miner's life arises from two causes—the irregularity of the opportunity for labor and the fact that mining labor has always been recruited from that industry which is most casual and seasonal, an industry, in fact, which we shall see later has hardened its casual character in some countries by something approaching ordinance.

It is needless to speak regarding the opportunity offered for steady work. Everyone who knows the industry is aware that the mines, in normal years, only work about 200 days. There is hope, however, for steadier work in the future. The industrial use of coal is likely to grow larger per capita, whereas the domestic use of it per capita is likely to be more or less steady. We shall never ask for more than a comfortable heat, for anything above that heat is undesirable.

Houses are now being built so as to economize what heat is supplied. The leaky old frame houses of the past let in an immense quantity of cold air and did not keep out the cold because the walls were too thin to prevent the conduction of heat. While the number of rooms to be heated per capita is an uncertain quantity, it does not seem likely to increase with time. True, the workingman is demanding more rooms, the rich man is building himself a spacious house, but at the same time the tendency of the middle class in the big cities is toward small apartments and toward more aggregate living with consequent saving in heat.

Moreover, byproduct coke, which is more and more used as a domestic fuel, can be stored and therefore its use will help to spread the production of coal over the year. The water powers also, which need supplementing with coal during the summer and are well supplied by the streams in the winter, serve to act as a balance wheel to the industry.

So much for the future. What about the present? The domestic requirements of bituminous coal are only 12 per cent. of the whole bituminous production, according to Dr. Garfield's summary, which we print on another page. The Geological Survey in 1915 put it at 16 per cent., coupling with it the small steam trade. As already indicated it is the domestic trade which is markedly seasonal.

However, it is true there are other uses that are seasonal. In the winter more gas is consumed and the railroads use more fuel, and possibly head winds at sea may cause a greater use of bunker coal. The mines use more coal both for power and heat. (This latter item is credited separately in Dr. Garfield's account.) But on the whole the seasonal character of the trade even in normal years applies only to about 15 per cent. of the product, for a part of the domestic business is for summer consumption though not much is used in that season. Thus, all things considered, the seasonal character of the coal trade is not so great as might be thought. A trifling change in methods might make the bituminous industry run evenly the year round. No account has been taken of the anthracite industry, for that is already more or less satisfactorily stabilized by the regulation in price.

The other important cause for the casual work of the bituminous coal miner arises from his past associations. The mining industry has been recruited in this country largely from native and foreign farmers, and farming is one of the most seasonal of industries. In consequence the farmer is quite apt to be casual in his labor.

So much is this true of the farmer that most of the great feast days which are so faithfully celebrated by the foreign population occur in the winter. The summer is relatively free of celebration probably because such days as were instituted for that period died a natural death, lacking public support. The inception of many of these feasts dates back several centuries before the Christian era; others are not so old, but are related to those which have an earlier existence. They are mostly placed in that part of the year when people engaged in agriculture found celebration did not interf re with attention to their physical needs. At present they tend to come just when our industrial life ordinarily demands the greatest amount of activity and when the demand for coal gives the operator the intensest anxiety.

But it is not necessary that these feasts should thus interfere with production. Foreigners coming to this country and engaging in other occupations than mining do not keep them to anything like the same extent as the mining population. The verdict is, "You must work on these days or move out," and they work. They soon get the industrial habit of working whenever the chance offers.

In many years the mines have more men than they want. When this occurs the operator does not care much whether his men work or are idle. When, later, men get scarce those who have been secured have to be nursed. The operator is like the man with a leaky roof. When the weather was fine, repairs of the roof were not necessary; when it rained, it was impossible to repair it. It was therefore never repaired. Similarly, in the mines there is never any serious attempt to correct the casual habit. The operator feels it would be unjust as well as uncalled for to do it so long as his operation works so casually, and, when the mine runs steadily he is afraid that to correct the failing would cause him to lose men, for output is dearer to him than discipline.

Some cure should be found. It is probable that it will be worth all that it costs in the satisfactory opulence that the miner will enjoy when he works every day, and in the certainty that he will feel if he knows every day that the man on whose services he relies to help him get out his tonnage will not be on a spree and leave him in the lurch.

Drivers of Yesterday and Today

A WHILE ago a good friend of this publication, and a man with wide knowledge of mining, wrote a letter of criticism from which a few words might be culled as a text for a further dissertation on the proposition to which his objection was taken. He says:

"Some time ago I saw an article in *Coal Age* in which you predicted that the day was not very distant when all employees in coal mines would be paid by the day, and contract work abandoned altogether. I was surprised to see this from you, for you certainly know about coal mining and the class of men who are following it, and you know that unless they are paid by the piece they will do nothing at all. The driver today does not give within 10 per cent. of what he did five years ago in return for the money he receives, neither does the trackman, timberman or, in fact, any other dayman; and I regret exceedingly to say that some of our present-day mining bosses are not much better."

In all of this statement there may be a degree of truth, if the writer means to say that the driver—let us give that functionary our whole attention—does not put himself as whole-heartedly into his work as he did in the years past. If his dictum is that the driver is not making as much of a study of his task, and is not early and late hustling at it as he used to be in the past, we shall not try to reply to that statement. The matter is at least debatable, and so little is it a matter of statistics that we are little disposed to debate it.

The giants of the days that are gone perhaps were not such giants after all—but perhaps they were. We shall not attempt to consider the question. We do know, however, that the industry in general agrees unanimously that the driver of 1918 is not willing to do as good a day's work as the driver of 1915. The war and the shortage of help have wrought a marvelous change in him in those three short years.

But the assertion we tried to make was not that the driver and his like were trying to do as much work or were working as hard as ever, but that they were actually *achieving more.* Formerly the driver hauled 2 or 3 one-ton cars on a level; now with his hand on the controller of the locomotive he pulls 25 two-ton cars. Formerly he drove his mule at three to six miles an hour, now he "lazies along" at 10 miles.

Formerly he waited long at partings, now as there are few "motormen" on a run he goes along merrily most of the time. It being as easy to sit on a moving locomotive as on one standing still, he has no tendency to keep his controller handle at "off." We do not say he is morally better; we say he is so aided in his work by mechanical appliances that he does not do 10 per cent. less but from 1000 to 3000 per cent. more.

Where he still walks along with his hand on a mule's hip and a whip coiled over the kerchief on his neck, we have shortened his journey by moving the locomotive parting so that without excessive work he is handling a large tonnage. He no longer has to go clear to daylight or half that distance with every trip he gathers. Efficiency has been thrust upon him, whether he will or no. Efficiency is always sure sooner or later to be thrust on the dayman. We cannot afford to leave him to his native inefficiency. On the whole he does not care much so long as his wage is secure.

The contract miner, of course, has had some help given him. When mines were not unionized or when the unions where weak, machines were introduced and a scale profitable to miner and operator introduced. But now the union is adamant. There must be no more mechanical changes unless the miner gets the whole benefit. In fact the union has been trying to readjust matters so as to deprive the machine operator of his whole advantage. The union wants the operator to shoulder the risk and expense, to supply the power and give his men the benefit. As a result we read about this and that new type of machine for lightening labor, but few are interested. You have to prove not only that it lightens labor, but that the union will permit that lessening of labor to show a lessening in the cost per ton.

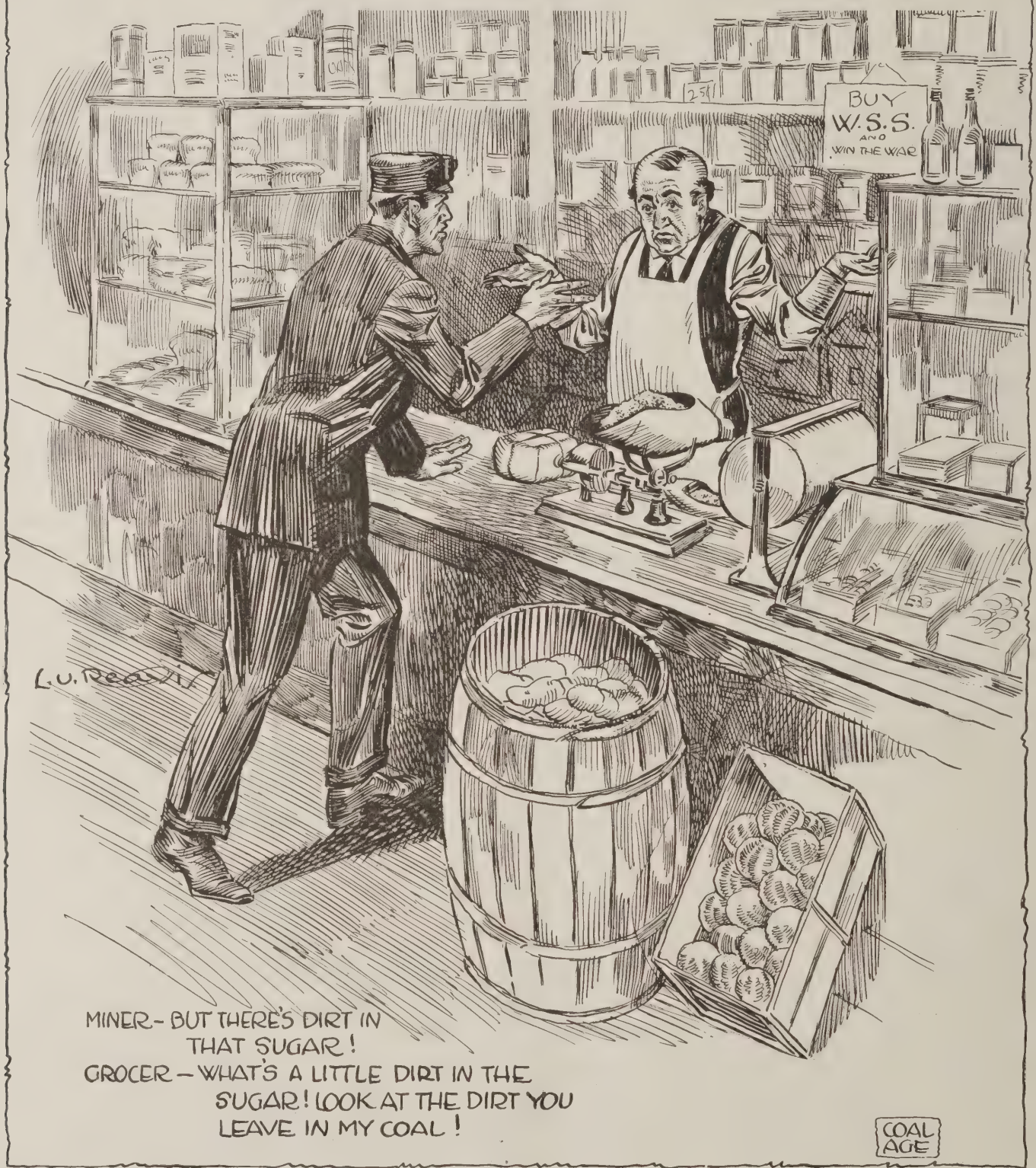
The various elements in the cost of handling coal *after* it is mined have gone up but little. The cost of mining has steadily gone up. We are getting less and less for our money, and the condition will never be cured till day-labor replaces piece labor. Then the efficiency of changes made in mining methods will be placed squarely up to the operator, and the gains made by successful variation of those methods will go to him. There will be an income in the providing of facilities for operation; there will be a reward for inventiveness; supervision will not be an expense, but a source of income; the mine will become a factory. We shall not spread our forces over a whole township. We shall bring them together and give them the many mechanical devices they need.

Suppose the coke drawers had formed a powerful union and had secured a scale for drawing which would not permit of variation. Where would the various mechanical devices for coke drawing have gone? To the scrap heap. Fortunately, it was found possible to pay for coke drawing by machine at a lower scale or more generally by the day. Immediately the ovens were made of a different shape, the coke pusher made its appearance and the coke loader followed.

There is a big future for the man who will rearrange his mines so as to make close supervision possible, who will so place his forces that the men can work without delays and who will then by mechanical aids make the performance of the work easy. But the reward will only come to him if he operates his mine with day labor and secures for himself the profit of the methodical plans put in operation. On the other hand, if, having given of his best and having expended his money, he is to find the cost of digging and loading coal is as heavy as ever, the cost of power, supervision, repairs, ventilation, drainage and every other item increased, where will be his reward except as he can get it from larger output provided per unit of tipple force?

Mere hustling will never result in effectual progress. We can speed up the workman till his muscles refuse further service but only machine operation will really save the situation and there will be few machines introduced unless the operator profits by introducing them.

Sauce for Goose Is Sauce for Gander



You don't want to buy a poor article, neither do other people. Give the public good clean coal. They are entitled to it. They don't expect to get roof-slate, bone and sulphur when they pay for clean coal.

DISCUSSION BY READERS

Scraper Mining in Low Seams

Letter No. 1—Kindly allow me to draw attention to what appears to be a serious misstatement of facts in regard to the originator of the scheme for utilizing a scraper for conveying the coal from the face of a chamber to the gangway, in the working of a seam of low coal.

In the "Annual Equipment Issue" of *Coal Age*, July 20, p. 92, appears an article written by H. G. Davis, in which he mentions what he is pleased to call "a simple face conveyor." After describing the device and its application to practice in mines of the Delaware & Hudson Co., working a 38-in. seam of anthracite, Mr. Davis states that Cadwallader Evans, Jr., now with the International Salt Co., in northern New York, "was the first to introduce this system in the coal mines," and adds, "I am under the impression that he has patented some parts of the equipment."

While Mr. Davis gives no dates, in this connection, permit me to draw attention to the fact that, to the best of my knowledge, this matter was first brought to the attention of the coal industry in the anthracite region, in an article that was published in the Employees' Magazine of the Lehigh Valley Coal Co., April 1916, pp. 67-69, where it is stated that the scraper was tried out about two years previous, Jan. 15, 1914, at the Seneca Colliery of the company.

WHERE THE FIRST SCRAPER WAS BUILT AND USED

The article goes on to say that the scraper was built in the Seneca Colliery blacksmith shop and had been in constant use up to that time, a double-drum electric haulage engine being employed to pull the scraper back and forth, in place of mule power. The writer of the article mentions further that the scraper was then being successfully used in the following four collieries of the Lackawanna Division: Seneca, Maltby, Stevens and Exeter. This article was reprinted, at the time, in the issue of *Coal Age*, June 17, 1916, p. 1044.

If I am correctly informed, the Mr. Evans to whom I have referred did not enter the employ of the Delaware & Hudson Co., where Mr. Davis states the scraper has now been introduced, until the latter part of 1915, coming there from Nova Scotia. It is worthy of note that one of the employees of the Lehigh Valley Coal Co., who was acquainted with the experiments that had been conducted at the Seneca Colliery of that company, and who had sketches of the system there employed, left the Lehigh Valley Company and started to work for the Delaware & Hudson Co., shortly after Mr. Evans became one of the officials of that company.

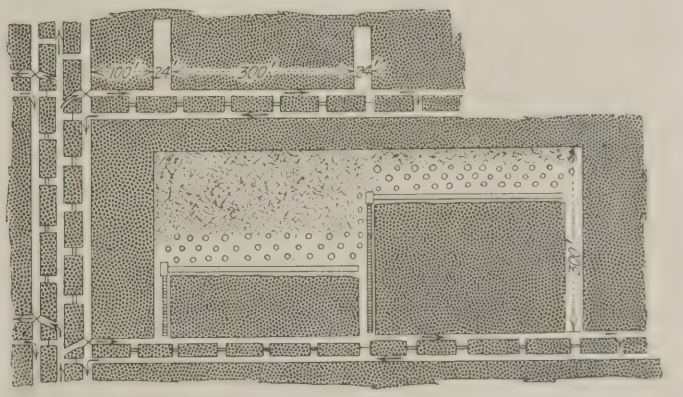
It would seem an injustice to the coal-mining industry that Mr. Evans should take any steps, if such is the fact, to patent this device that has been in use so long a time in anthracite mines. While it cannot be claimed that the scheme is perfect, it is far superior to any other method that has yet been tried. I can state with certainty that those who first developed the idea had no thought of monopolizing it by applying for a United States patent, their whole purpose being to make more profitable the mining of low coal in the anthracite mines.

JOHN LLOYD, Efficiency Engineer,
Wilkes-Barre, Penn. The Lehigh Valley Coal Co.

Coal Conveyors at the Face

Letter No. 2—Having had considerable experience with the Blackett conveyor, when mining coal on the longwall advancing plan, the letter of "Mining Engineer," *Coal Age*, July 20, p. 142, drawing attention to the great advantage of the face conveyor in mining coal under favorable conditions, interested me.

The face conveyor is particularly adapted to the mining of thin coal; and, believing that its use in this connection will be of interest, I beg to present a plan that I have found can be quite generally applied to



PROPOSED ARRANGEMENT OF CONVEYOR FACES

the working of thin seams of coal and makes possible a good percentage of extraction at a reduced cost of operation.

The plan presents the following advantages that are well worthy of consideration: (1) The work is concentrated in a small area, which bears a marked contrast to any form of room-and-pillar working where the men are much scattered. (2) The work is all retreating and the loss of much coal thereby avoided. (3) A greater degree of safety is secured than where pillar work is necessary. (4) A less length of track and fewer cars are required.

OUTLINE OF METHOD OF WORKING THIN COAL

Briefly described, the plan of working is as follows: As shown in the accompanying figure, cross-entries or levels are driven to the right and left of the main haulage road and air-courses, at distances of 350 ft. apart. The main entries are driven three abreast on the full pitch of the seam, the center entry being the

main haulage road and intake air-course, while the two side entries are the main return airways.

The two return airways are flanked by pillars of coal 100 or 150 ft. in thickness, depending on the roof pressure and the character of the overlying and underlying strata. Beyond this pillar, as shown in the figure, rooms are turned to the rise at distances of 300 ft. apart, and driven up a distance of 100 yd., where they are connected by driving a heading across the face. A 50-ft. pillar of solid coal separates the faces of these rooms from the next pair of cross-entries.

When all is ready, a conveyor is installed at the face. Bottom is lifted in the room so as to permit the conveyor to load the coal directly into the cars standing on the track at the head of the room. About 15 men can work on a single face 300 ft. long, which gives each man 20 ft. of coal to load. This arrangement makes possible a large output of coal at a reduced cost of operation. As shown in the figure, two or three rows of posts are kept standing back of the conveyor. The posts are set at regular distances apart and staggered. As the work advances, the conveyor is moved forward and the timbers in the rear row are then drawn and stood nearer the face.

General Form of the Blackett Conveyor

The general form of construction of the Blackett conveyor is well enough known not to need further description than to say that it is of the type known as "scraper conveyors." The troughs are made in lengths of 6 ft. and are flexible enough to allow of considerable bending, which permits the line of the conveyor to be moved forward 5 ft. in 20 yd. The troughs are 10 in. in height and 19 in. wide on top. The endless chain that operates the scrapers passes over a return drum, which rests on a sliding carriage that permits the tension of the chain to be increased when necessary. I have found the Sylvester post-drawing chain of great assistance in moving the drum forward.

In one mine, in England, the installing of a face conveyor increased the output from 4 tons to 10 tons per man, while the labor required was much less, eight men and two boys taking the place of 18 men and 18 boys under the old system.

A conveyor known as the Mickly conveyor, which was used to a limited extent, consisted of a low car attached to a rope passing around a sheave at each end of the face. This car was hauled to and fro along the face and traveled on rails that extended over the top of the mine car standing on the track at the roadhead. The contents of this truck conveyor was dumped into the mine car through doors in its bottom.

Oak Hill, W. Va. William Dickinson.

Mining Equipment

Letter No. 7—Many interesting and instructive articles have appeared in *Coal Age*, from time to time, under the caption "Mining Equipment." The letter signed "Patriot," July 20, p. 140, proved particularly interesting to me. Like the writer of that letter, I find it hard to understand why the average coal-mining executive seldom makes public his views and opinions when they would be of such great benefit to the industry.

I heartly endorse the statement made in the letter to which I have just referred that "the columns of *Coal Age* perform a powerful function." Let me add further, that the views presented in these columns reach a far greater number of interested people than when spoken at an institute meeting or other assembly.

In his letter "Patriot" attributes the lack of coöperation and understanding between many men of the coal-mining fraternity, to business policy, professional jealousy, or a failure to see the advantages to be gained by proper intercourse on matters relating to the operations in their charge. I am convinced however, that a more probable cause is carelessness or, at times, press of business. Allow me to second what has already been said by this writer, and urge compliance with his suggestion that coal-mining executives acquaint us, through the columns of *Coal Age*, with the results they have obtained from the labor, equipment and methods employed.

Officials Generally Willing To Impart Information When Asked

It has been my experience that executives of coal companies seldom refuse and are generally glad to supply information concerning the performance of equipment they have installed, whenever this information is asked. I have observed the same willingness to impart information when these executives have been present at institute meetings and other places where such matters were being discussed. This strengthens my conclusion that their failure to offer these facts and figures, for publication in the coal-mining press, does not arise from unwillingness on their part to give the information desired. It is more the result of thoughtlessness or lack of time.

Let me say, in closing, that at the present time many thousands of dollars' worth of equipment is being purchased by various coal-mining companies, for improving their facilities for producing, transporting and preparing coal for the market. This makes it all the more urgent that every coal-mining executive should charge himself with the duty of informing his fellow workers of results that will be of benefit to all.

Pittsburgh, Penn. Worker.

Ventilating a Gassy Slope Mine

Letter No. 2—Mining men will differ, no doubt, in respect to many details regarding the ventilation of a gassy mine, but the information asked by "Mine Foreman," *Coal Age*, July 25, p. 191, as to the best system of ventilating a slope mine, driven in a seam dipping 6 per cent. and generating large quantities of gas, should bring out many good practical ideas.

My theory regarding the ventilation of such a mine coincides, almost precisely, with that described by the editor, in his reply to this inquiry. It is my opinion that such a mine should not be opened by less than three main slopes driven on the full dip of the seam. These slopes should have a cross-section not less than 6 x 10 ft. above the roadbed and, as stated, the center entry should be the intake and main haulage road, while the two side entries are the return air-courses.

In my opinion, it would be well to turn off the first pair of levels to the right and left of the main road, at a distance of 100 or 125 yd. from the mouth of the mine,

instead of 150 yd., as suggested by the editor. My idea is that a shorter distance would give less trouble in the handling of the gas generated in this seam. The three slopes should all be driven at the same time, in order to get the best results in the ventilation of the mine and enable the crosscuts to be driven at proper intervals.

As has been stated, the first-right and first-left levels should be intakes and haulage roads, while the second-right and -left levels are the return airways. This arrangement will afford the best haulage facilities for the rooms driven to the rise of the levels. An overcast must be built at the mouth of each of the first-right and -left entries, so as to conduct the main return air over the haulage road on these levels.

For the ventilation of the mine, I would install two 7-ft. centrifugal fans, placing one of these at the mouth of each return airway and operating one continuously, while the other is held in reserve for use in emergency. By this system, no difficulty should be anticipated in securing the proper ventilation of the mine. The condition is such that the colder intake air will tend to fall readily, following the dip of the seam; but, after its temperature has risen, owing to the absorption of the natural heat of the mine, the return air will follow the rise of the seam, in passing out of the mine. This will have the practical effect of making the entire circulation in the mine ascensional, and less power will be required to maintain the circulation. I shall watch the further discussion of this subject with interest.

OSCAR JONES,
Gas Inspector.

Worley, Ky.

Letter No. 3—"Mine Foreman," of Tower Hill, Va., *Coal Age*, July 25, p. 191, asks a very fair and timely question, hoping to gain what information is available in respect to the best method of ventilating a slope mine in a gassy seam pitching 6 per cent. He is wise in seeking this information before starting to spend money in the development of such a proposition.

There are many questions that one would naturally consider when opening a mine, aside from that of ventilation. These relate to haulage, drainage, economy of mining the coal and operation of the mine, including the installation of pipe lines and conductors, for supplying power and light in the workings, and suitable means of ingress and egress that would insure the greatest degree of safety.

Regarding ventilation, my plan would be to drive five headings on the dip of the seam. Two of these would be used as intake airways and haulage roads, while the remaining three headings would serve as return airways. The location of these main slopes is important. They should be central to the bulk of the coal to be mined.

At the first favorable opportunity, when the slopes have been driven a suitable distance, I would start three branch headings, say to the right, and a short distance further down the slope three branch headings to the left. It would be my purpose not to drive these right and left branch headings opposite to each other, believing thus to afford greater strength in the roof formation and provide better facilities for laying the switches and making other haulage arrangements.

Assuming favorable conditions, the present improved methods of machine mining will yield as good coal in the headings as can be obtained in rooms. For this reason, unless the demand for coal was urgent, I would probably start no rooms until the headings had been driven, say 800 ft. This plan would give ample means for a large production of coal when needed. My preference would be to limit the length of the branch headings to say, 1200 ft.

For the ventilation of the mine, two large fans should be installed, in the most suitable place, at or near the mouths of the three return airways. These fans should be of the reversible type to permit of reversing the air current should this be needed.

R. W. LIGHTBURN.

Perryopolis, Penn.

Sealing Off Fire on Intake

Letter No. 11—Kindly permit me to offer my plan of sealing off the fire, described by "Ancora," *Coal Age*, June 22, p. 1173, as having gained such headway on the intake of a pair of blind headings that it has been decided to seal off the entries.

To avoid tedious repetition, I will pass over the suggestions of the several correspondents in regard to approaching the fire with caution, employing two crews to relieve each other, and short-circuiting a portion of the air current by opening the nearest stopping outby from the fire. Further, I would slow down the ventilator slightly, or otherwise reduce the volume of air passing in these headings, believing that 30,000 cu.ft. per min. is more air than is needed at present under prevailing conditions. My opinion is that sufficient air should be permitted to pass over the fire to carry off the smoke and gases while the first stopping is being built on the intake.

SUGGESTS CLOSING THE INTAKE FIRST

My plan is to build the intake stopping first, leaving an opening in it 2 x 2 ft., which is to be closed later, by a trapdoor, when the return stopping is in place. Then, before starting to build the return stopping, I would speed up the fan and increase the circulation, in these entries, to 50,000 cu.ft. per min., if possible. Next, erect a brattice on the return airway so as to deflect this current toward the place where the stopping is to be built. This would have the effect of driving back the gases generated by the fire. Both the intake and return stoppings should be built just inby from the crosscut opened, or about 18 yd. outby from the fire.

My theory is that, under this arrangement, sufficient air will be supplied to the fire to produce carbon dioxide, which will have an extinctive effect and prevent the formation of an explosive mixture. A 2-in. pipe should be built into both the intake and the return stoppings, about a foot from the roof. Near the bottom of the return stopping, I would also place a 3-in. pipe with a valve, and another 2-in. pipe about half way between the two, as that might be found useful in case it was decided to employ water in extinguishing the fire. Having completed and sealed the return stopping, I would immediately close the trapdoor in the intake stopping, and leave the fire to die out for want of air.

My plan contemplates the possibility of being compelled to drown out the fire by the use of water. For

that purpose, I would build good substantial stoppings and make these water-tight. It is not stated in the inquiry whether the headings are running to the rise or to the dip or are level, and these conditions may modify the method slightly, in case it becomes necessary to use water to extinguish the fire.

If the headings are running to the rise and making some water, this will naturally drain from the face toward the fire, while if the headings run to the dip, it will be necessary to pump a considerable quantity of water through the pipes built into the stoppings. The same is true, but a less quantity will be required, if the headings are level. JOHN L. WHITE.

Portage, Penn.

Letter No. 12—When this discussion was first started I decided to wait and watch its development, as I knew many practical ideas would be advanced. Before giving my own views, formed by a long practical experience in the fighting of many mine fires, permit me to comment briefly on some of the statements that have been made.

The discussion was opened by W. H. Noone, *Coal Age*, July 6, p. 33. After naming as the three dangers encountered in mine fires, the following: (1) the formation of an explosive mixture; (2) the generation of poisonous gases when the air supply is limited; and (3) the ill-effects of these gases on the workmen, Mr. Noone suggests the building of the first stopping on the intake, after short-circuiting the air current by opening the stopping next outby from the fire. He then proceeds to direct this air current up the return airway and through the last crosscut, extending it from that point inby to the face of each heading.

VALUABLE TIME LOST IN BUILDING BRATTICES

In all my experience in fighting fires in mines, I have never known or heard of this method being employed. In my opinion, valuable time would be lost in building this line of brattice, if indeed it would be possible or safe to attempt. Let me suggest, also, that both the intake and return stoppings should be as close as possible to the opened crosscut, in order to supply fresh air to the workmen.

In his letter, July 13, p. 79, Oscar Jones makes some good suggestions, but let me say that any fire that would permit of the building of both stoppings at the same time, as he proposes, is a fire that could be extinguished in another way and avoid the necessity of building the stoppings. Another interesting letter is presented by R. W. Lightburn, July 20, p. 143. His plan of carrying the stoppings to a height of 4 or 5 ft., before attempting to complete either of them, is a good one, but he omits to mention the need of inserting a pipe in the stopping, which is always important, and, like Mr. Jones, he suggests building both stoppings at the same time.

On the same page, another correspondent, Thomas Jones, starts his letter well, but I fail to see the advantage of sealing the return airway first, as he advocates. By so doing he would subject the workmen to the heat, smoke and poisonous gases, coming from the fire. In my opinion, this could hardly be done, except at a great distance out on the entry; but that would be a bad plan. Again, his proposal to "wait a short time to allow the space behind this stopping to fill with the smoke and gases generated by the fire," is of doubtful value; because there will be some circulation of air, which will flow into the space along the floor of the entry still open and discharge at the roof. This will operate to dilute the gases Mr. Jones hopes will shortly fill the space back of the stopping.

PROPOSED METHOD OF PROCEDURE

In describing my own method or plan, let me say that this is a fire that has passed the first stages of development when it might have been handled in the ordinary way, and must now be sealed off so as to enable other districts of the mine to be worked with safety while waiting for the fire to gradually die out.

Assuming that all necessary material and tools have been collected quickly and that a few cool-headed men, organized under an experienced leader, have reached the place, the first step is to open the nearest possible stopping outby from the fire so as to short-circuit the air at that point. Then, start to cut out the floor and rib, on the intake, as close to the fire as practicable, and set in place 8 x 10-in. square timbers to enable a double-plank partition or stopping to be constructed and the 10-in. space between the planking filled with clay. This stopping should be sealed and made air-tight at once, so that no fresh air can reach the fire.

Having completed the intake stopping, work on the return must be started immediately. The men must be worked in relays, using only safety lamps. First, a curtain is hung on a frame, a short distance inby from the opened crosscut. Follow this immediately with a light 1-in. board brattice, the men holding their heads low while performing the work, so as to avoid, as far as possible, the smoke and gases traveling at the roof.

The light brattice just erected will keep back much of the smoke and gases from the men, while the heavy double-plank stopping is being put in next. This is constructed in the same manner as that built on the intake, except that a 2- or 3-in. pipe 6 ft. long must be built in this stopping and provided with a valve. It is important to permit no one to enter the return airway while the work of sealing off the fire is being performed, except the men engaged in building the stoppings, and they must be aided, in every way possible, by directing the fresh air current so as to reach them.

CONDITION OF AIR BEHIND STOPPINGS

Regarding the two questions relating to the condition of the air behind the stoppings, it may be said that the conditions would be much the same whether the first stopping were built on the intake or on the return. The air behind the stopping would be unfit to breathe and, perhaps, explosive owing to the presence of carbon monoxide. Having never sealed the return airway first, I can give no opinion based on that method. Tests taken after both airways are sealed show that the air behind the stopping is generally non-explosive, but will kill a mouse in less than five minutes when exposed to the flow from the mouth of the pipe.

In closing, allow me to say that, in the handling of 23 fires, by sealing them off with air-tight stoppings, none of the workmen have become unconscious or been injured in any way. In one or more instances there have been as much as 40 tons of coal burned, but the fire has been extinguished without delaying the work.

Worley, Ky. GAS INSPECTOR.

INQUIRIES OF GENERAL INTEREST

Exhaust of Gasoline Locomotives

We have had some discussion, regarding the danger of the exhaust from a four-cylinder gasoline locomotive when used in a mine. I would like to ask how much air will it take to render harmless the exhaust from this locomotive, assuming that the four cylinders are each 4 x 5 in. and the engine is run at a speed at 1500 r.p.m.

Also, kindly state to what extent carbon monoxide (CO) is soluble in water.

————, Tenn. MOTORMAN.

To give an answer to this question based on the volume of burnt gases exhausted from the four cylinders of this engine when running at the given speed would be misleading and of no practical value, in respect to the danger arising from the poisonous gases that are liable to form a considerable proportion of the volume of the exhaust.

It is well known that extremely small percentages of carbon monoxide are highly poisonous and may often prove fatal when breathed for any length of time. On the other hand, it is practically impossible to name the percentage of this gas, in the exhaust of a gasoline locomotive, that would represent even average conditions in mining practice. Some have estimated that, when a gasoline engine is running normally, under favorable conditions, the exhaust from the cylinders contains about 1 per cent of carbon monoxide.

In the series of tests made by the engineers of the Federal Bureau of Mines, and described and tabulated in Bulletin 74, published by the Bureau, it was found that the percentage of carbon monoxide, in the exhaust of this type of engine, varied from a fraction of 1 per cent. to 15½ per cent. This wide variation, it was stated, is dependent on the rate of fuel consumption as determined by the adjustment of the carburetor, speed of engine, proportion of load, and temperature, as determined by the efficiency of the water jacket. These tests showed that the maximum production of carbon monoxide occurred in the exhaust when the engine was running at full speed, under full load, requiring a high rate of fuel consumption.

Very much will depend on the intelligence and skill of the motorman and his ability to adjust the carburetor to the speed and load under which he is running. The percentage of carbon monoxide increases with the temperature of the mixture; and, on this account, it is of the utmost importance to maintain a cool water jacket.

As is well known, the usual construction of the engine is such that each cylinder gives one explosion during each alternate revolution of the shaft. A four-cylinder engine would thus give two explosions per revolution of the engine, or 3000 explosions per minute when running at a speed of 1500 r.p.m. The piston displacement of one 4 x 5-in. cylinder is $4(0.7854 \times 5^2) = 78.54$ cu.in. in a single stroke.

A calculation based on 3000 explosions per minute in this engine, gives, therefore, for the volume of exhaust gases $(78.54 \times 3000) \div 1728 = 136+$ cu.ft. per min. Assuming the worst condition shown in the tests of the Bureau of Mines, where the exhaust gases were found to contain 15.5 per cent. carbon monoxide, would give $136 \times 0.155 = 21+$ cu.ft. carbon monoxide gas.

One-tenth of 1 per cent of this gas in the mine air would be extremely dangerous where the men are forced to breathe such air continuously. A degree of safety can only be assumed to be attained when the percentage of this gas is reduced to 0.01 per cent. To secure this condition, on the assumed basis, would require $21 \div 0.0001 = 210{,}000$ cu.ft. of air in circulation.

Assuming a normal velocity of 600 ft. per min., this circulation would require a sectional area of 350 sq.ft. It must be remembered, however, that we have assumed the worst condition that could arise, as determined by the tests of the Federal Bureau of Mines, although it cannot be denied that such a condition is possible when running the engine under full load, at full speed, especially when the water jacket is not working to the best advantage. Even under favorable conditions, an inexperienced motorman, through an unfortunate combination of circumstances, may develop as bad or even a worse condition than that we have mentioned.

The great danger, in the use of a gasoline locomotive in a poorly ventilated mine or airway, arises when a motorman allows his engine to continue running while he is waiting for a trip. The danger is much increased if the ventilation is temporarily slackened or completely cut off owing to the setting open of a door. An ample circulation of air is always important on the haulage road where a gasoline locomotive is employed. The utmost caution is required also, on the part of a motorman when pulling a heavy trip up a grade and moving with the air current. In such a case, the motorman may be enveloped in the gases exhausted from his engine and be overcome before he is aware of the danger.

On the other hand, the most improved types of locomotive possess advantages that particularly adapt them to the conditions existing at certain mines where there is a long-distance haul from the mouth of the mine to the tipple; or where the main haulage road is of ample size and haulage is performed on the intake air, provided the length of haul, inside of the mine, is not too great.

Attention has often been called in *Coal Age* to the fact that much of the trouble experienced in the operation of gasoline locomotives arises from the employment of incompetent motormen who fail to understand the proper adjustment of the carbureter to the load the motor must carry. It is this lack of adjustment that causes most of the trouble. One of the chief advantages of this type of motor, where conditions will permit of its use, is the economy in its operation.

Carbon monoxide is only slightly soluble in water; 100 vol. of water will dissolve 3 vol. of the gas.

EXAMINATION QUESTIONS

Mine Foremen's Examination, Pittsburg, Kan., May 15, 1918

(Selected Questions)

Ques.—What precautions would you adopt to prevent the accumulation of firedamp on top of falls where it is difficult to remove the gas with the air current?

Ans.—Trouble from gas on falls is mostly met in pillar workings where every effort must be made to prevent its accumulation, by erecting a special form of brattice with canvas so arranged as to deflect the air current to the top of the falls. When the falls are high it is frequently difficult to remove the gas from its lodging place.

Where the condition is particularly dangerous because of the accumulation of large quantities of gas on falls in abandoned places, and it is not practicable to seal off such places completely, the precaution should be taken of sinking drill holes from the surface to tap the gas and drain it from the mines. In any event, the volume of air should be increased as much as possible and the current directed so as to sweep the falls.

Ques.—What are the causes of falls of roof, and how would you make an inspection to determine the security of a roof in a mine?

Ans.—The extraction of the coal in a seam leaves the roof without support at that place, and the character of the roof may be such that it will tend to fall in the opening, unless it is properly secured by timbers. Falls of roof are caused by driving too large openings or carrying too small pillars, which yield under the great weight above them and cause the roof to break in the opening. The lack of systematic timbering or the use of a system that it not adapted to the condition will often induce a squeeze and cause heavy roof falls. Falls of roof are also caused by the presence of gas or water in the roof strata, whereby an undue pressure is exerted on the roof where it spans an opening.

In order to determine when a roof is secure, a careful examination should be made to detect the presence of any slips or fault lines in the strata. The roof should be sounded with a pick, while holding the other hand against the slate or rock to detect the effect of the blow. The manner of placing the timbers and the condition of the posts should be carefully observed and their effect studied. A careful watch should be kept for the first evidence of a squeeze, which would seriously affect the security of the roof.

Ques.—The pressure producing ventilation being 20.8 lb. per sq.ft., what is the water-gage reading?

Ans.—The water gage corresponding to a pressure of 20.8 lb. per sq.ft. is $20.8 \div 5.2 = 4$ in.

Ques.—What conditions would guide you in determining the width of headings and rooms?

Ans.—The conditions that must be studied, in determining the width of headings and rooms, in coal mining, are the following: Thickness and character of the overlying strata; thickness and inclination of the seam and the hardness of the coal; the character of the roof and floor of the seam; the presence of gas or water in the strata; and, finally, the method of working and system of mining employed.

Ques.—How many cubic yards in a room 65 ft. long, 14 ft. wide and 3 ft. high?

Ans.—The cubic contents of this room is $65 \times 14 \times 3 = 2730$ cu.ft.; or $2730 \div 27 = 101.1$ cu.yd.

Ques.—What conditions would a low or lowering barometer indicate in a mine? Explain fully.

Ans.—The existence of a low barometer, assuming this is stationary, may be taken as a fair indication that the atmospheric pressure will shortly increase. When the barometer continues falling, however, the atmospheric pressure grows steadily less and less, and this should be taken as a warning of a possible increase in a gaseous condition, in a mine having large abandoned areas that are more or less filled with gas or in workings where the nature of the roof is such that gas accumulates above the draw-slate or other roof formation.

A decrease of atmospheric pressure is always followed by the expansion of gas, which is thus forced out onto the roads and travelingways in the mines. The decrease of atmospheric pressure, indicated by a falling barometer, however, does not have the effect to materially increase the emission of gas from the pores of the strata in which it is confined, as is often supposed. The forces tending to hold the gas occluded in the strata are far more powerful than the slight change in pressure caused by any ordinary fall in the barometer.

Ques.—The rubbing surface of a square airway is 150,000 sq.ft.; the length of the airway is 4000 ft.; what is the perimeter?

Ans.—The perimeter of this airway is $150{,}000 \div 4000 = 37.5$ ft. The airway being square, the length of each side is $37.5 \div 4 = 9.375$ ft., or 9 ft. $4\frac{1}{2}$ in.

Ques.—How should a fan be located with reference to the top of the air shaft? Which do you prefer, direct-connected or belt driven? Give reasons.

Ans.—A ventilating fan should never be located directly over the fan shaft, but should be set back a short distance so as to protect it from injury in case of an explosion occurring in the mine. There should also be provided explosion doors above the shaft, which will relieve the pressure should an explosion occur.

A belt-driven connection is generally preferred to direct connection, for the reason that the former gives a greater flexibility, insures a more uniform operation of the fan and a less strain on its members, arising from any sudden change in pressure due to some unexpected occurrence in the mine. A belt connection permits of a gradual absorption of the shock that would otherwise be imparted to the fan shaft and its bearings, besides allowing change of speed by using a smaller or a larger pulley.

COAL AND COKE NEWS

Harrisburg, Penn.

Soft-coal production in the central Pennsylvania district is about all that could be expected. According to the statement of the operators, the mines are getting all the cars they can use and the effects are being seen in tonnage shipped. Better car supply is the largest factor in this increase, though the per capita output of the miners has also incrased.

Richard W. Gardiner, manager of bituminous coal production in the Pittsburgh district, states that he has no fear of a coal shortage for domestic consumers and essential industries in his field, provided the railroads furnish the necessary cars.

Discussing the matter, Mr. Gardiner said in part: "With the amount of tonnage which will be released at the close of the Lake season, and with the district representative having the authority to order this coal shipped where it is needed, it does not seem possible that the conditions of last winter will be repeated. A number of consumers of coal are of the opinion that the docks at the head of the lakes are receiving too much consideration, but people who think this are losing sight of the seriousness of this lake situation. The only way of getting coal to the great Northwest is by water transportation over the lakes, and when the lakes freeze the movement is stopped."

Mr. Gardiner said that because of the demands of the Lake region and the steel and other essential industries, Canadian shipments of bituminous coal from this district are being curtailed greatly. He said this condition of affairs is likely to exist for some time and that, because of this shortage of cars, shipments to concerns on the preference list may also be considerably curtailed until the lake shipment has been completed, which will be about Oct. 1.

The Anthracite Consumers' League, through Representative Frank C. Reese, will ask the Government to investigate the cost of production of coal. Reese is confident that an investigation will show that the cost does not warrant the high prices. He said: "We would like to know whether there has been included in the cost of coal the money paid for the rental and fixed charges of the Schuylkill Canal, which was taken over by the coal trust and allied railroad companies to avoid its competition in the carrying of coal, and which has since been allowed virtually to go to ruin. The high price now charged for anthracite acts as a depression on industry and business, and the Government should thoroughly inform itself as to the basis of these charges."

Charleston, W. Va.

If it should transpire that less coal is produced in West Virginia during August than was the case during July, it will be due solely to a statewide shortage of cars in August—a condition of affairs now regarded as an anomaly, since for the most part in the last few months operators have accepted the car supply as a matter of fact. Complaints as to a bad supply come from all parts of the state. Last Saturday the supply dwindled away to 440 cars in the Fairmont district—only about one-fourth of the normal supply. This shortage seems to have been caused by congestion at many points, according to admission of railroad officials, who claim they will have the matter straightened out in the next four or five days.

It is given as the opinion of operators that it is useless to make an effort to increase the production of coal if the continued shortage of cars is permitted to exist. It is hoped, however, that the present week may see the end of the unfavorable conditions.

Mines in the New River field have recovered to some extent from the power shortage of last week, which for a few days put a dent in production figures. This week the operations are forging ahead and are making some progress toward increasing the output over previous months. The New River district is one of the few districts of the state which has not suffered in the last few days from a poor car supply, and even that district has felt it to a limited extent.

While the Pocahontas and Tug River districts made a fine showing during July, production during the early part of August dropped, with a dull thud, 43,920 tons. Much work seems to have been lost through celebrations of speeding departing selected men for military service since the number of hours worked shows a decrease.

The Fairmont District has been literally "shot to pieces" for the last week. There were not enough cars on hand one day last week to supply railroad fuel orders, and it was feared that there were several railroads which might have to confiscate coal in order to keep their engines going; 440 cars was the sum total on the region—approximately one-fourth of the supply. The number of cars in the region had not fallen as low as that since about the middle of April. However, the supply was much better at the beginning of the week, there being 1931 cars on hand in this region last Monday; the mines supplied by the Monongah division of the Baltimore & Ohio as a result operated to full capacity. On the other hand, the mines on the Monongahela railroad have no cars at all as the result of several cloudbursts. Congestion in the East on the Baltimore & Ohio has been cleaned up, and steps are being taken to prevent a recurrence of such congestion. Restrictions were placed on shipments to the east and as a result there was a large movement to the lakes. The region is still laboring under the pressure to supply coal to Curtis Bay under Government orders.

Some idea of how seriously crippled the mines of the Kanawha District were last week may be obtained from the fact that production was only 168,030 tons—a drop of about 42,000 tons. The lack of cars was almost totally responsible for this decrease in production, the hours lost from car supply amounting to 1347. Total hours worked were 5388 and hours lost from labor shortage amounted to 410. The car supply this week shows no improvement and operators in this district are up in arms.

Clarksburg, W. Va.

An interesting and well attended meeting of the Northern West Virginia Coal Operators' Association was held Tuesday, Aug. 13, at the Waldo Hotel. Coal men representing the Clarksburg Fairmont and east West Virginia fields were in attendance. Topics pertaining to car distribution, routing and increased production were before the meeting for discussion.

The executive committee of the association discussed routine matters pertaining to the affairs of the Association. F. J. Patton, secretary of the association, reported a full attendance of the members of the committee. At the conclusion of the business meeting, numbers of the visiting operators took advantage of the opportunity to visit some of the mines in the vicinity of the city. Automobile parties were made up and many of the local mines were inspected.

The evening session was featured by a banquet at the Waldo, when the local coal men, headed by "Uncle" Dan Howard, entertained the visiting operators. J. M. Orr acted as toastmaster and called on a number of the prominent operators present to discuss various phases of the coal situation. D. R. Dawson, district representative of the United States Fuel Administration, was the first speaker. He discussed the car supply problem and distribution of available cars. R. B. Isner, of Elkins, member of the executive committee, discussed the financial affairs of the association. He was followed by F. J. Patton, of Fairmont, secretary of the Association, who stated that there were from 500 to 600 operators in the northern West Virginia coal fields and it was the aim of the association to have a one hundred per cent membership.

Other speakers were Lloyd Bailey, representing the Pennsylvania-West Virginia Coal Company; "Uncle" Dan Howard, president of the operators' association, and Harry W. Sheets.

Ottawa, Canada

An important statement impressing upon the public the urgent necessity of getting in supplies of soft coal immediately was made on Aug. 14 by C. A. Magrath, Canadian Fuel Controller. He declared that the seriousness of the situation did not seem to be appreciated, as evidenced by the fact that domestic coal is not being purchased in sufficient quantities, and he could not emphasize too strongly the danger of actual suffering in the cold months if action is not taken at once. He drew particular attention to the fact that the allotment for the Canadian West, as recently announced by Mr. Peterson, the Deputy Controller, was entirely contingent upon the coal being available in the United States. Since April the allotment of anthracite coal for Canada has been cut by one million tons, and the United States has restricted supplies all over that country.

The Western allotment of anthracite is only half the amount normally consumed, and this will be available provided it reaches the head of the Lakes, but even this is not an assured fact. As long as the war is on no guarantee can be given regarding anything in the matter of improved coal. Unnecessary hardship will result if the Western people do not follow the advice given that 50 per cent of soft coal must be in before any hard coal is supplied. "Western mines can produce and the railways can deliver domestic fuel," continued the controller, "therefore I positively and absolutely refuse to be responsible this winter if people suffer."

In reference to complaints made as to excessive prices charged for coal in Winnipeg Controller Magrath said that he was prepared to take drastic action in any specific cases brought to his attention where the law had not been complied with.

PENNSYLVANIA

Anthracite

Hazleton—Two powerful electric pumps will be installed at the No. 5 colliery of the C. M. Dodson Coal Co. at Beaver Brook. The pumps will be placed in concrete beds and can be operated even if entirely flooded.

Hazleton—The Lehigh Valley Coal Co. is planning for increased stripping operations in the Tomhicken section. Negotiations have been completed with the township officials of Hazle Township providing for the changing of the course of one of the township roads, in order to facilitate the proposed work.

Hazleton—The Harleigh-Brookwood Coal Co., whose Harleigh mines were drowned out recently when Harleigh Creek broke through its bed into the underground workings, has made arrangements to divert the course of the stream, build a new channel for it and pump out the flooded gangways. The company, which is controlled by the Madeira, Hill & Co. interests, lost its $200,000 breaker recently through fire, and the Lehigh Valley Coal Co. was preparing its tonnage for market when the place was filled up by the creek.

Freeland—The mining companies have been asked by the Federal authorities to state their material requirements for 1919 and six months of 1920. Shipments of nails, iron, and other mine and mill supplies are held up, and firms must depend on local jobbers at increased prices.

Shamokin—The first arrest under the Federal law, prohibiting agents from one industrial field inducing men to leave for another, was made on Aug. 13 by Federal officers when they jailed Peter Jalinski, an employment agent for West Virginia soft coal corporations. Jalinski, a former resident of Shamokin, came here and induced more than a score of miners and mine laborers to accompany him back to West Virginia upon promises of unusually high wages.

Trevorton—In keeping with its pledge to increase production, the Susquehanna Collieries Co. has reopened the Coal Run slope, which was abandoned here 30 years ago. Coal from this slope will be run underground for two miles to the Luke Fidler colliery, where it will be prepared for market.

Eckley—Miners showed their patriotic interest in coal production operating the Lehigh Valley Coal Co. colliery full-handed, even though the funerals of two of their comrades killed at work were in progress. The Lehigh Valley Coal Co. sent six miners to each service, paid their wages for the day and contributed $150 to the victims' families, for expenses.

Pottsville—The Mammoth vein, so named because of its great thickness, being 40 ft. at some places, is to be stripped by the Darkwater Coal Co. Several million tons of coal will be easily accessible and will be had at little cost. The company has obtained the surface rights to a number of pieces of real estate, upon which dwellings, erected many years ago, will be vacated and razed, after which the stripping of the earth and clay will be begun. The coal will be prepared at one of the company's breakers nearby. James B. Neale, fuel advisor to Doctor Garfield, is head of the concern.

Wilkes-Barre—Announcement has been made by the Susquehanna Collieries Co. that the annual field day of the company generally held at Shamokin will not be held this year, but that instead contests in first aid will be held by the various divisions. This will do away with any possibility of curtailment of output, but will allow the men to have their contests, which will be held in the evening.

Hansford—Notices received on Aug. 9 state that the Government has let down the bars against the importation of Mexicans for railroad and mining jobs. The measure is merely for temporary relief, but the men can be brought to help out in the anthracite region where the labor situation has hampered coal production and transportation considerably. Heretofore they could not be used in any collieries, except those in the Middle West, which mine lignite, a semi-bituminous grade.

Millersburg—With the present demands for coal it seems that the plan in vogue for years for coal-mining companies to use coal monuments in front of their offices is in discard for the present. A large piece of coal aggregating in weight about two tons, which has stood for many years in front of the offices of the Susquehanna Coal Co. has been removed to the company's breaker at Lykens and reduced to coal of marketable size. The company has recently given up its Millersburg office.

Bituminous

Irwin—The Jamison Coal and Coke Co. is sinking a shaft on the Hile farm, adjoining Pleasant Unity, and will mine the Thaw estate coal—600 acres. On the Alexander Graham farm a new town is being built and a railroad spur is being built to the mines.

Madera—The Blue Run Coal Co., which began operation here on the William Semple and Bailey lands on June 14, is shipping coal. The operation employs 14 men. Coal is conveyed to Madera on a 5-ton Republic truck and is there loaded in box cars on the Pennsylvania R. R. As soon as the side track is extended to the mines the coal will be loaded from the tipple.

Smithton—E. W. Ruth, John Parchini and Bercon, Ben McLain and Paul Jullinal, four wagon-mine operators of Smithton, have had their mines closed down permanently by the Fuel Administration because they persisted in loading coal that contained rock, slate, sulphur, fireclay, shale and other impurities.

Harmarville—With the death of two men in the Allegheny General Hospital, Pittsburgh, the total death list due to the explosion at the mine of the Consumers' Mining Co. recently has been increased to eight.

VIRGINIA

Coeburn—The Twin City Coal Corporation, recently incorporated with a capital of $90,000, has perfected its organization, and is planning for the immediate development of about 300 acres of coal properties. The works will have an initial capacity of about 150 tons daily. J. P. Lay is president.

WEST VIRGINIA

Wyatt—In connection with extensive improvement at the local plant of the Consolidated Coal Co., a large, new, two-story coal tipple is being constructed. It is said that when completed, this tipple will be one of the most modern in this section.

Wheeling—A total of about 4500 acres of coal land, ranging in price from $110 to $135 per acre, lying partly in Pennsylvania and partly in Brooke County, West Virginia, has been purchased by W. W. and J. F. Luce, of Bellvernon, Penn., from J. A. Beall, of Pittsburgh. It is the intention of the purchasers to build branches from the Pennsylvania and the Wabash railroads, and more mines, in addition to those already in operation, will be opened.

Charleston—The mine formerly operated by the Little Queen Coal Co. at this place has been purchased and is now being operated by N. J. Wood, of the Dickinson Fuel Co., of Charleston.

McComas—A new mine is being operated by the American Coal Co. at this place, under the supervision of J. Tracy Walker, superintendent, 25 houses for miners also being under construction here. This company succeeded in increasing its July output 5000 tons over its June output.

ALABAMA

Cullman—M. W. Bush, Birmingham, and associates, have acquired approximately 16,000 acres of coal lands in the Bremen basin section of Cullman, and are planning for early development operations.

Birmingham—The New Castle Coal Co. is planning to rehabilitate its old Lehman mine at New Castle, and will construct a modern tipple and equipment for the handling of coal from the opening. A Ramsay rotary dump will be installed, which will necessitate the employment of only one man in the handling of the coal on the tipple. This labor-saving device is an invention of Erskine Ramsay, one of the best-known coal operators of the country, who represents Alabama in the directorate of the National Coal Association and is also a member of the executive committee of that organization.

KENTUCKY

Hazard—The Kenmont Coal Co. is at the present time making a new 6 ft. opening in the upper vein of coal and expects to increase its output to 20 cars a day.

Lexington—The White Ash Coal Co., recently incorporated, has purchased the lease of the Mike Branch Coal Co., in Lee County. The lease contains 900 acres with two openings and full mining equipment. The production now is four cars a week and the new company intends to increase that to 15 at once.

Hawesville—The Central Kentucky Block Coal and Mineral Co., recently incorporated with a capital of $200,000, is planning for immediate work on the development of approximately 2000 acres of coal properties in the Hawesville district. It is proposed to install the necessary equipment to provide for a capacity of 500 tons daily. D. G. Duncan is secretary.

Harlan—Operators of Bell and Harlan Counties, and some operators in West Virginia, have been seriously handicapped by the failure of the Kentucky Utilities plants at Varilia, Ky., and the Pocket Field, of West Virginia, to furnish power to concerns buying power. About 75 of the mines along the Louisville & Nashville in Bell and Harlan Counties have been down on and off for three weeks or more due to failure of power, but the situation has grown worse. The power company claims failure of machinery concerns to make deliveries of repair parts, and has been asking aid of the Fuel Administration to help in getting things moving. Investigations have shown numerous delays in transportation, small parts being held by express companies unnecessarily, and some parts being practically unobtainable.

TENNESSEE

Briceville—The Cross Mountain Coal Co., which recently filed notice of an increase in its capital from $400,000 to $500,000, is now developing about 3000 acres of coal properties in the Briceville section, with daily output of approximately 600 tons.

INDIANA

Washington—The Superior Coal Co. has taken leases on 2500 acres of coal land in the Barr township oil field and will begin developing the second vein as soon as a mine can be opened. The vein is 8 ft. in thickness, as proven by numerous oil wells drilled in this section, and lies at a depth of from 250 to 300 ft. The company is also increasing the size of its mines at Cannelburg and Montgomery.

Evansville—The Commerce Coal Co. owned by capital in this city, is opening two new coal mines near Jacob's station, which will have a capacity production of 1000 tons of coal a day.

Vincennes—The eight mines of the Knox County Coal Operators' Association produced during July 323,887 tons of coal. The largest previous record for a month was 293,499 tons. This result was accomplished in face of the fact that this particular field lost 350 hours, or more than 21 per cent. of the working time, on account of the car shortage

ILLINOIS

Carlyle—The five mines of Clinto County produced 1,429,569 tons of coal in the fiscal year ending June 30. Two miners were killed and 15 injured.

Lincoln—Miners of this community who have gone into the service were honored at a service flag dedication Sunday, Aug. 1, at Latham Park. Frank Farrington, of Springfield, president of the United Mine Workers of Illinois, and L. B. Stringer, of Lincoln, were the speakers.

Belleville—St. Clair County produced in the fiscal year ending June 30, 7,916,674 tons of coal, an increase of 2,217,324 over the preceding year, according to the annual report of Thomas Wright, state mining inspector. This production involved the death of 17 miners, eight of whom were residents of Belleville. The county has 5800 miners, 53 shipping mines and 15 local mines. The latter produced 106,925 tons.

OHIO

Toronto—To show the enterprise of coal miners in supporting the Government in its urgent demand for fuel, it is interesting to note that one James Emory, of this place, minus both legs, has secured artificial limbs and is again engaged at his former occupation as a coal miner in one of the mines in the vicinity of Steubenville.

ALASKA

Anchorage—The Chickaloon Coal Co., which has been developing its property at the head of Cook Inlet for the past six months, expects to start shipping coal to the states next year. Walter Gompertz is superintendent of the property.

Cordova—Folcon Joslin, who recently obtained the first government coal land lease in the Bering coal field, states that development work is to start at once with the construction of a short railroad from the mine, which consists of 2400 acres between Shepard Creek and Lake Kushtaka, to the Copper River & Northwestern R. R., a distance of 65 miles. The government lease requires that $250,000 in development work be undertaken. The company is known as the Bering River Coal Co. F. R. Van Campen is superintendent.

WASHINGTON

Bellingham—The railroad to the Cokedale Coal Co. property in Skagit County has been completed, as will be the new power station in a few days, and as soon as this is ready to operate the coal-cleaning machinery the mine will be ready to ship.

Seattle—The Federal Fuel Administration has permitted a raise in the price of Nanoose coal to absorb a raise in price granted by the Canadian Fuel Administration to the mine operators of Vancouver Island. The lump coal is advanced 65c. per ton and nut and pea 25c. A similar raise in the price of South Wellington coal has also been permitted.

Personals

H. J. Kennard, of Beyer, Penn., formerly superintendent of the Coal Run Mining Co., of Coal Run, Penn., has resigned to take charge of the Kurtz Coal Co. mines near Sangamon, Penn.

W. B. Millgate, who has been mining inspector in District No. 11, which includes Harrison and part of Jefferson County, Ohio, has resigned to become superintendent of the Fisher mine, between Dennison and Bowerston.

Daniel E. Russell, vice president of the Delaware, Lackawanna & Western R. R. Coal Dept., has resigned, on account of ill health.

Clarence W. Watson, chairman of the Board of Directors of the Consolidation Coal Co., Charleston, W. Va., and a lieutenant colonel in the Ordnance Department of the War Department has been nominated by the Democrats of West Virginia for the United States Senate.

H. H. Elkins, who has been superintendent of the Clarkson Coal Co.'s mines at Provident and Fairpoint, Ohio, resigned recently to accept the superintendency of the Occo Coal Co's mines between Bannock and

Lafferty. No one will be appointed to fill the place vacated by Mr. Elkins, but John Davis will continue to superintend No. 1 at Provident and John Norton No. 2 at Fairpoint.

E. P. Dillon, manager of the power division, New York office of the Westinghouse Electric and Manufacturing Co., has resigned to become general manager of the Research Corporation of New York. Mr. Dillon came to the Westinghouse company in 1909, having been previously connected with various mining and electrical companies in Colorado. In 1917 he was transferred to the New York office as manager of the railway and power division. For several years he was assistant to the manager of the railway and lighting department at East Pittsburgh, being in charge of power house and apparatus work. He was transferred to the New York office as manager of the railway and power divisions in 1917.

New Incorporations

Calla, Ky.—The Progressive Coal Co. Capital, $10,000, has filed amended articles increasing capital to $30,000.

Lennut, Ky.—The No. 4 Superior Coal Co. Capital, $10,000. Incorporated by C. S. Luttrell, M. Luttrell and J. W. Reedy

Harlan, Ky.—The Shawnee Gas Coal Co. Capital, $90,000. Incorporated by C. E. Ellison, E. N. Howard and W. W. Eager.

Knoxville, Tenn.—The Cross Mountain Coal Co. has filed an amended charter increasing its capital from $400,000 to $500,000.

Central City, Ky.—The McHenry Coal Co, Capital, $210,000. J. H. Small, L. L. Stewart and A. J. Early. Incorporated to handle western Kentucky Coal

Chattanooga, Tenn.—The White Coal Co. has filed amended articles of incorporation, increasing its capital stock from $10,000 to $50,000, and plans changing name to the Christian Coal Company.

Hartford, W. Va.—The Mason Coal and Chemical Co. is planning to increase the present capacity of its plant. New mining cars will be installed and equipment purchased. A. D. Williams is president.

Bellaire, Ohio—Klee Coal Co. has been incorporated with a capital of $12,000 to mine and sell coal. The incorporators are William Goldsmith, John E. Klee, Marker Meager, Roscoe Klee, John Klee, Jr., Alva Klee and Howard Klee.

Queen Shoals, W. Va.—The Fire Block Coal Co. is planning for immediate work on the development of about 1500 acres of coal properties recently acquired in the Queen Shoals district. J. W. Miller and A. J. Saltzer, both of Charleston, head the company.

Carbon Hill, Ala.—The Rush Coal Co. has been organized and is planning for the immediate installation of machinery and equipment for the development of about 80 acres of coal properties in the Carbon Hill section. It is planned to have an initial capacity of about 35 tons daily. S. A. Threadgill is president and manager.

Clarksburg, W. Va.—A $50,000 coal company to be known as the Catherine Coal Co. has been organized to mine coal in Eagle District, Harrison County, with offices in Clarksburg. The company was incorporated by Carl L. Hornor, Robert L. Hornor, Henry W. Thacker, Walter B. Hornor and Artie M. Hornor, all of this city.

Louisville, Ky.—Among the recently filed corporation articles were those of the Panhandle Coal Co., Jackson, Ky.; capital, $60,000; incorporators, W. O. Bender, E. O. Bailey and E. I. Hawkins. Williams Oil, Gas and Coal Co., Red Bush; capital, $26,000; Leo Williams, L. T. Williams and Alfred Williams. Powell Coal Co., Whitesburg; capital $10,000; James P. Lewis, C. B. Sturgill and C. B. Powell, Laura Lee Coal Co., Williamsburg; capital, $300; Isham Lawson, Nancy Lawson and Squire Rains.

Industrial News

Louisville, Ky.—Notice of dissolution has been filed by the Dougherty & Lanning Coal Co., and its business has been taken over by the Harvey-Jellico Coal Co.

Knoxville, Tenn.—The Green Mountain Coal Co. has filed notice of an increase in its capitalization from $400,000 to $500,000, to provide for business extensions.

Erie, Penn.—The Burke Electric Co. announces that C. D. Miller is now manager of its Buffalo branch sales office at 509 Morgan Building, Pearl and Niagara Streets.

Great Lakes, Ill.—The United States Government, Navy Department, has awarded a contract to the Warner Construction Co., Chicago, Ill., for the construction of a new coal yard at the local naval station, in connection with other work, to cost $69,228.

Chicago, Ill.—The Chicago Great Western R. R. has awarded a contract to the Railroad Water and Coal Handling Co., Chicago, for the construction of a new coaling station of 100 tons capacity at Kansas City, Mo. The structure will cost about $20,000.

Charleston, W. Va.—Having increased its capital so as to be able to open a new mine, the Marsh Fork Coal Co., of which T. E. B. Siler, of this city, is president, is preparing to begin the shipment of coal from Jarrolds' Valley within the next two months.

Charleston, W. Va.—Owner of a large acreage of coal land in Clay County, the Lima Coal Co. of Lima, Ohio, has made application for a siding on the Coal & Coke Ry. at the mouth of Leatherwood Creek, near Hartland, with a view of developing its holdings.

Charleston, W. Va.—Equipment is being installed by the Big Bottom Coal Co. of which J. S. Cheyney is president, on its property on Campbells Creek, where in a few weeks the company will begin taking coal from the Lewiston seam. James Raisbeck is general manager.

St. Louis, Mo.—Walter A. Zelnicker Supply Co. has recently added to its sales force Henry Stroh. For the past ten years Mr. Stroh was connected with the Elliot Frog and Switch Co., prior to which time he was associated with the Republic Iron and Steel Co., both of East St. Louis.

Concrete, Wash.—The Superior Portland Cement Co. has started work removing its oil burners preparatory to installing coal burners, which last year were taken out for the crude oil apparatus. This is only one of the large Washington manufacturers who were compelled to make such a change as a result of the scarcity of oil.

Salt Lake, Utah—With a membership of more than 150, representing every section of the state, the Retail Coal Dealers' Association of Utah was organized recently at the Newhouse hotel. Elias S. Woodruff, of Salt Lake, was elected president, John Farr, of Ogden, vice president, and S. L. Billings, of Salt Lake, temporary secretary and treasurer.

Charleston, W. Va.—The Gauley Coal Co. is installing a complete new unit to its power plant at Greendale at an estimated cost of $20,000. In addition to the installation of motors and machines in the mine, E. G. Beddison, the superintendent in charge, is seeking a new or good second-hand Goodman shortwall mining machine and one 8- or 10-ton haulage motor.

Louisville, Ky.—Wiley B. Bryan, fuel administrator for Kentucky, recently issued an order which provides that no operator, licensed distributor or retail dealer shall sell, ship or distribute any coal for domestic purposes to any person having access to an adequate and available supply of wood, except by permission of a member of the fuel committee for the county where the delivery of such coal is to be made.

Louisville, Ky.—The Harlan Coal Co. has filed suit in the Circuit Court against the King Coal Co. for $5000 damages, alleging a breach of contract in refusing to furnish its output of coal to the Harlan company, and it further asks an injunction to prevent the defendant from selling or shipping coal to any other agents or persons during the life of the contract made Oct. 20, 1917, to last until after the war is over. The plaintiff charges that the defendant refused to accept orders sent to it.

Providence, Ky.—A number of citizens of this city have formed a company for the development of coal lands, under the firm name of the Montgomery Mining and Development Co., and have filed articles of incorporation. The company has purchased the mine and equipment of Jesse Brantley for $2000 and has already started work. It is the intention of the company to put a number of improvements in the near future. James F. Parker has been made general manager of the company.

San Francisco, Cal.—The following are the coal imports into this port for the first six months of the present year as compared with last year: From foreign ports, 75,720 tons 1918, 138,281 tons 1917; from domestic ports, 61,417 tons in 1918, 90,164 tons for the six months of 1917, or a grand total of 137,137 tons for the six months of the present year as compared to 228,445 tons for the same period last year. Coke recepits by rail for the same period were 1710 tons and 2405 tons respectively.

Toledo, Ohio—Activity at the docks of the lower lake ports still continues, stimulated by the lake shipping priority order recently issued. During the week ending Aug. 10 the Hocking Valley at its Toledo docks loaded 169,928 tons as compared with 164,602 tons the previous week, making a total of 2,281,986 tons for the season. During the same week the Toledo & Ohio Central loaded 78,000 tons as compared with 73,000 tons during the previous week, a total of 1,028,000 for the season.

Cleveland, Ohio—The Chicago Pneumatic Tool Co. announces that contract has been let and work started on the erection of an up-to-date addition to its Cleveland plant, which is planned to double the present output. It is expected that work will be completed on the building itself about Nov. 1. The necessary equipment has been ordered and it is believed will be delivered and ready for installation by the time the building is completed, so that the additional production contemplated will be available soon thereafter.

St. Louis, Mo.—The St. Clair Coal and Mining Co., which supplied the city with coal last year, has been awarded a renewal of the contract at the same price as last year—$2.30 at the mine—on all preparations except screenings, which are to be furnished at $2.05. The contract, which runs not to exceed 13 months from Sept. 1, provides for fueling all the power plants of the city. The freight from the company's mines near Belleville is 95c. per ton and the delivery cost is 75c. per ton. The requirements are about 130,000 tons.

Cincinnati, Ohio.—The Central Frog and Switch Co. was recently organized with George Ashton as president and E. R. Heitzman as secretary and treasurer. Both men were formerly associated with the Cincinnati Frog and Switch Co., Mr. Ashton serving it in the capacity of vice president and chief engineer and Mr. Heitzman as secretary and treasurer. Mr. Ashton has been affiliated with the frog and switch business for 25 years. The new company is erecting a large plant along the Norfolk & Western tracks in the Hyde Park section of the city.

Columbus, Ohio—A. W. Kuhns, who has been sales manager in charge of the Columbus office of the Peacock Coal Co., has resigned and has purchased an interest in the W. A. Woods Coal Co., of Cleveland, which has established a Columbus office with Mr. Kuhns in charge, as treasurer of the company. The Columbus office will be located in the Huntington Bank Building. It will job all Ohio mined coals. At the same time the Columbus office of the Peacock Coal Co. has been discontinued, as the product of the company has been sold for more than a year in the future.

St. Louis, Mo.—An agreement has been reached between Regional Director Bush and city officals for the use of the municipal free bridge by the government-controlled railroads. The Government will determine what rentals are to be paid by the railroads to the city for using the bridge and whether they will be permitted to continue charging the 20c. a ton differential on coal. Bush plans to have the Government expend between $250,000 and $300,000 in making connections with the bridge approaches on both sides of the river. It is intimated that he may also recommend a more elaborate system of approaches which will cost a great deal more.

Columbus, Ohio—Ohio operators have been asked by the mine supply and equipment department of the production division of the Federal Fuel Administration to make up their budget for materials and supplies that will be needed in their mines during the year 1919. It is pointed out that this is to be done in order to facilitate the filling of the orders. Efforts were made as early as June 21 to gather this information through the National Coal Association, but the results were disappointing and now the work is to be done more systematically. Operators are urged to comply with the request at once in order to keep up the coal production to the highest possible point. Detailed instructions are given for filling out blanks sent by the Fuel Administration to the operators. Under a recent ruling of the Priorities Division of the War Industries Board an Automatic Priority in Class A-6 is granted on all manufactures of materials, equipment and supplies for the operation and maintenance of coke-oven plants and mines employed in the production of fuels.

MARKET DEPARTMENT

Weekly Review

Production Decreases While Demands Increase—Bituminous Coal 14,500,000 Net Tons Behind Schedule—Car Shortage Again to the Fore—Anthracite Production Keeps Up Well—Lake Shipments a Cause for Disappointment

IN the face of ever-increasing demands for bituminous coal, production recedes steadily week by week from the 13,286,000 net tons reported in the record-breaking week ended July 13. Estimates made at the beginning of the coal year for the tonnage of fuel necessary for essential uses have proved to be too low, the latest revised figures showing that every possible effort will have to be made by the coal-mining industry if the war program is not to suffer a setback. The requirements for the Navy, for instance, were originally fixed at 3,500,000 net tons for the year. It now is estimated that Uncle Sam will need at least 8,000,000 net tons for his vessels before the end of 1919.

An idea of how fast the Navy is consuming fuel may be had from the fact that the demand in July from this source had risen to a 6,000,000-ton-a-year basis. The shipyards, too, are speeding up production to such an extent that the 10,000,000 net tons considered a liberal allowance for the Shipping Board on Apr. 1 have been increased by 3,000,000 tons. Another phenomenal increase is in the demand for bunker fuel. At the beginning of the coal year 13,500,000 tons were assigned for this purpose, with the thought that this amount would prove adequate. The estimate has now risen to 21,000,000 tons. When to the foregoing figures is added the coal needed by plants that have been enlarged, and the additional fuel required to keep a large percentage of industries operating on a 24-hour basis, it can be seen that the problem confronting the soft-coal mines is of no mean proportions.

For the week ended Aug. 10 (the latest statistics available), the output of bituminous coal is estimated at 12,274,000 net tons. This means an average production of 2,046,000 net tons a day for this period, which is 54,000 net tons below the daily output established as a minimum. To emphasize the seriousness of the situation still further—the soft-coal mines are now 14,500,000 net tons behind schedule, and it is a foregone conclusion that they will never catch up.

The causes for the fall in output seem to be divided between car shortage and labor unrest, with the greater part of the blame attaching to the former. Record production can only be achieved when the railroads manage to keep an adequate number of empty coal cars moving to the mines and the transportation of loaded cars is speeded up. This statement is substantiated by the fact that the peaks in the coal production chart result when the railroads operate at maximum efficiency. Operations in the Pittsburgh district are short of 200 cars a day, and on Aug. 16 many of the mines in that region were at a standstill for want of cars. In the Kanawha and Coal River districts of West Virginia car shortage was responsible for the loss of 1347 productive hours during the week ended Aug. 10. In Alabama, too, the lack of cars caused a decided decrease in output.

Despite reduced labor forces, the output of anthracite coal continues to keep well ahead of the quantity mined last year. Hard coal shipments during the week ended Aug. 10 totaled 2,051,933 net tons, a decrease of 6.4 per cent. compared with the week preceding. The total output of anthracite coal in July amounted to 7,084,775 tons, an amount exceeded only twice before; but what is even of more importance, virtually the entire tonnage of anthracite mined for the first quarter of the coal year—April to July—is in the hands of the consumer.

Nothing should be tolerated that will interfere with anthracite production if the public is to be supplied with coal. There is evidence that Hun propaganda is rife in the hard-coal regions—in the shape of both covert and open acts calculated to create discord in the labor ranks. The mining force should by every possible means be maintained at its present figure, whether against the draft or other depleting agencies.

Shipments of soft coal to the lakes grow more and more disappointing. It is feared that the Northwest will not get over 25,000,000 tons, instead of the 28,000,000 aimed at. The first eleven days of August saw lake shipments of bituminous—exclusive of vessel fuel—only 1,535,996 tons. The Fuel Administration schedule calls for 4,900,000 tons. July closed 1,000,000 tons behind, and it appears that August will add about 1,250,000 tons to this deficit. For the week ended Aug. 17 the estimate of shipments to the Northwest is 1,020,000 tons. The Pittsburgh district has not been able to respond to the 1600-car-a-day order, due to the unsatisfactory car supply referred to earlier in this review and a marked shortage in motive power.

COAL PRODUCTION

The production of bituminous coal during the week of Aug. 10 decreased 278,000 net tons, or 2.2 per cent. and recorded the fourth successive week of decreased output. The decrease in production during this period was equivalent to 1,000,000 net tons, or 7.6 per cent., below the record week of July 13, when production reached 13,286,000 net tons, and makes necessary an output of 14,500,000 net tons during the balance of the summer months to make up the deficit for the coal year to date. The output during the week of Aug. 10 (including lignite and coal coked) is estimated at 12,274,000 net tons as against 12,552,000 net tons during the week of Aug. 3 and 10,636,000 net tons during the current week of 1917. The average production per working day during the week of Aug. 10 is estimated at 2,046,000 net tons as compared with 2,092,000 net tons during the week preceding and 1,773,000 net tons during the week of Aug. 10, 1917. The daily average during the current week fell 54,000 net tons, or 2.6 per cent. behind the daily summer requirements established by the United States Fuel Administration.

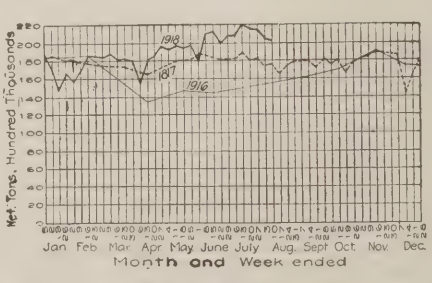
Shipments during the past week decreased from all districts with the exception of southwest Virginia, Alabama and the district including Illinois, Indiana and western Kentucky. The increase from southwest Virginia amounted to 24.3 per cent., from Alabama 11.4 per cent. and from Illinois, Indiana and western Kentucky 2.2 per cent. Material decreases during the week were as follows: Central Pennsylvania, 3.2 per cent.; western Pennsylvania, 4.8 per cent.; Cumberland-Piedmont and Somerset, 8.4 per cent.; Fairmont, 9.3 per cent.; Ohio, 6.9 per cent., and Tennessee and Kentucky, 8.8 per cent.

Anthracite production during the week of August 10 is estimated at 2,051,933 net tons, a decrease compared with the week preceding of 6.4 per cent. Shipments during the same week totaled to 36,870 carloads, decreasing 7 per cent. Total production during the coal year to date is estimated at 37,709,447 net tons, an increase over the same period of last year of 2.1 per cent.

CARLOADS OF COAL ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended: July 20	July 27	Aug. 3	Aug. 10
Bituminous shipments, 123 roads	229,770	228,231	220,940*	215,996†
Anthracite shipments, 9 roads...	40,664	40,942	39 632	36,867†

* Revised from last report. † Subject to revision.



Beehive Coke—Production of beehive coke in the United States during the week ended Aug. 10 is estimated at 602,000 net tons, a decrease compared with the week preceding of 12,000 net tons or less than 2 per cent. The average production per working day is estimated at 10,000 net tons as against 102,000 net tons during the week ended Aug. 3. Operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania report production of beehive coke during the week of Aug. 10 at 358,986 net tons, and the operation of their plants at 70.3 per cent. of their present capacity as against 76.1 per cent. during the week preceding. Production was limited during the week by yard labor shortage, slight mine disability and other causes not reported. The same operators produced 202,150 net tons of coal.

Byproduct Coke—Operating conditions in the byproduct coke industry in the United States improved slightly during the week ended Aug. 3, the plants operating at 91.5 per cent. of their present capacity as compared with 90.6 per cent. during the week preceding. Material gains occurred during the week in Kentucky, Maryland, Minnesota, New York and Ohio. Improvement was brought about in Kentucky and Maryland by repaired plants, in Minnesota by better market conditions and in New York by better labor conditions. Tennessee was the one state reporting a decrease in production. The week of Aug. 3 was the first time the operators of the country reported a market for all coke produced, the operators in Minnesota, the lone state reporting loss of time due to that factor during the past few months, finding a market for their entire production.

BUSINESS OPINIONS

Marshall Field & Co.—The feature of the wholesale dry goods business for the week was the large business done in domestic cottons. Road sales for immediate delivery showed a good increase over the corresponding week of 1917. Lines for spring of 1919 have not yet been offered. Customers were in the market in fewer numbers than last year. Collections continue good.

Bradstreet's—War orders dominate every line, and supplies for ordinary purposes are greatly curtailed. Conservatism in regular channels, whether flowing from damage to the corn crop in the southwest, from lessened demand for men's goods, from belief that prices have reached zenith point, or from restrictions placed upon so-called non-essentials, is thereby almost overshadowed. Indeed, the great majority of wholesale trade reports testify to continued good demand ruling, largely, however, on government account, exceptions to this being noted in dispatches from districts of the southwest where both cotton and corn have been hurt by drought. Retail trade is fair to good for a midsummer period, and the same is true of collections, except from the southwest.

American Wool and Cotton Reporter—That there will be enough cotton the coming year is undoubted, at least in some quarters, and it is felt that the market will later be bearish. It is predicted that those who are relying on increased facilities for shipment will be mistaken. Other factors will also come into play later. Mills are not buying cotton at the present time because they are not in the market to make goods. They are waiting for prices to be fixed. Basic prices have been announced, but there seems more or less stagnation because other prices on goods in general have not been fixed. The woolen goods market is decidedly mixed. Figures show that there ought to be much wool available for the production of ordinary fabrics, but facts or intimations given out appear to show that at least no large supply can be expected, and some believe that there will be no apportionment at all. It is not surprising, therefore, that some economical producers could make a great effort to secure Government orders up to their capacity. The question of importance is, however, what other producers will be able to do in order to keep machinery in operation.

Atlantic Seaboard

BOSTON

Further conferences in Washington show the strength of New England's case. Rumored that no curtailment is to be ordered. Great need of volume shipments continuously until Nov. 1 seems better understood. From Hampton Roads and from central Pennsylvania shipments continue on the July basis, with occasional increase for short periods. Box cars continue to come forward from the central Pennsylvania district, but already there are signs of this equipment starting west for grain. By Sept. 15 the number of box cars available will be much reduced. Steamers at Boston and Portland being unloaded more promptly. Delays begin to appear at Hampton Roads and at Baltimore. Volume of high priced coal by water has a marked effect upon buyers. Meanwhile, Government requirements increase by leaps and bounds. Slack demand for anthracite steam sizes. Reading barges may occasionally load at Port Reading.

Bituminous—Pursuant to earlier conferences in Washington Mr. Storrow and a few members of his staff were again at the capital last week, this time to show by actual figures that New England is not as well stocked as "everybody knows." It takes most persistent argument and conclusive figures to make others who are unfamiliar with conditions in New England to understand why what would be a sufficient reserve for industries in eastern Pennsylvania would by no means be adequate for this territory to enter the winter months on any safe basis. It appears that now this phase of our situation is looked upon more intelligently and the great need of building up reserves in New England is better recognized. Unless our railroads and other essentials can accumulate the next 60 days at least to the extent they did last year there is ground for much anxiety. When, from weekly reports, it is seen that any plant has more than a reasonable supply, action is at once taken to divert at the gateways all coal originally consigned to that plant all-rail, and when distributors of water coal submit the disposition of cargoes the names of such consignees are taken from the list. In this way deliveries are carefully supervised, although it is by no means an easy matter. The difficulty is that every buyer is reaching out in every direction to get coal if not at one price then at another, and to have anything approaching scientific distribution would require a small army of inspectors and others with authority to act.

Weekly deliveries from the central Pennsylvania district are now from 3800 to 4000 cars, but so far as figures can be had the movement has been at no time in excess of 4000 cars. The program on June 12 was for 4500 cars weekly and it does no harm occasionally to remind Washington that actual shipments on that order have averaged much less than 80 per cent. In other words, August receipts at the gateways continue about on the July basis and only for brief periods is there any noticeable increase. All box cars on the Pennsylvania railroad from the central Pennsylvania district are still considered free coal for distribution by the Fuel Administration. At times since the order went into full effect on July 22 the movement of box cars has reached 600 per week for New England. A better demand for coal in this equipment is now forthcoming from New York and eastern Pennsylvania and from time to time the number of cars for New England is somewhat reduced. Continued shipments of this kind can hardly be relied upon for more than a few weeks because it will soon be necessary for the railroads to send box cars west for grain. Already there are signs of this westward movement and it is freely predicted that by Sept. 15 there will be much less opportunity to get wagon coal. The more farsighted of the small consumers are gladly taking advantage of present opportunity and every car that comes forward helps that much the general New England situation.

Dumping at Hampton Roads continues also on about the July basis, although receipts at the piers have been more irregular. Steamers shifted from Baltimore to Hampton Roads have met with delays and there has been a lot of apprehension among New England buyers over demurrage charges that are likely to accrue. The lack of berth room at Boston and Portland that was the cause of detention at this end has now been cleared up by a better disposition of steamers as they arrive and from now on the delay is more likely to be at the loading piers. In this connection, the Shipping Board is now issuing semi-weekly announcements of port performance. Norfolk and Newport News, for the half week ending Aug. 12, had the best record for loading, 12 ships having been loaded and trimmed at an average of 34 hours and 42 minutes in port. Counting 21 ships unloading at Boston during the same period the average time in port was 116 hours and 30 minutes. It is expected that figures next week will show a material reduction in time required for unloading at this end.

Detention at Baltimore has also given cause for anxiety, especially during the past week. Several cases of heavy demurrage have followed and as this becomes known in the trade it grows more and more difficult to distribute the high-priced coal. Inland buyers who have had demurrage items as high as $2.50 on their coal invoices are getting increasingly shy of committing themselves on coal yet to arrive. With a few weeks' supply on hand they are more inclined to wait developments and take their chance of getting rail shipments or later by water when they think there will not be so great a risk of demurrage. This is unfortunate, for it is of greatest importance that every New England buyer take on coal today as fast as it can be shipped.

Anthracite—Receipts both by rail and water continue about as last reported. Water shipments are still seriously handicapped by submarine activities and movement is far short of 1917. It is rumored that Reading barges will occasionally load at Port Reading, N. J., rather than at Philadelphia, this being a part of a general effort to increase shipments to New England.

Broken and pea are the sizes in best supply and of late practically every cargo has had a proportion of these coals. Stove and chestnut are hard to get and apparently retailers will have to keep on accepting cargoes as they come. No shipper will today make any promises as to the assortment of sizes.

Notwithstanding all the campaign this year to induce steam users to take liberal tonnages of steam sizes of anthracite, the demand has notably fallen off. It is only natural that where consumers have been equipped to burn only bituminous they will confine their purchases to that rather than make further experiments with the different sizes of buckwheat. There is certain to be a renewed demand, however, when it is found that bituminous shipments are not forthcoming in anything like present volume.

NEW YORK

Anthracite situation in better shape and coal moving easier. Dealers complain of preparation. Church day curtails production. Long Island dealers insist upon larger shipments if famine is to be averted. Demand for bituminous equals production. More changes in tidewater pools. Navy Department wants more coal. Towing charges under investigation.

Anthracite—The situation is in better shape and the trade has taken on a brighter appearance. Coal is moving easier to this market and there is a better feeling all around. Even the public seems to be in a better humor, and it has been assured that everybody will have some coal before winter sets in. Reports show that for the week ended Aug. 16, 7069 cars of anthracite were dumped at the local docks as against 7004 cars dumped the week previous, a gain of 65 cars.

The retail dealers in this city are not all of the same opinion regarding distribution. Some of them believe that larger shipments of the domestic sizes should be permitted to come here so that they would be able to clean up on orders that have been on their books since April.

The producers have figured that nearly 9,000,000 persons have been provided with anthracite since Apr. 1 and that at the tidewater docks there was less than 113,000 tons of coal on the first of the month, which shows, they claim, that consumers are better provided for than ever before in August.

While conditions have improved in Greater New York the dealers in some of the small towns on Long Island claim that unless immediate action is taken whereby they can secure coal there will be many heatless homes this winter. The dealers complain of lack of shipments and say that they are not being given any increase over their 1916 tonnage, notwithstanding the increase in population.

The domestic coals, with the exception of egg, are moving easier and shippers report buckwheat No. 1 in better supply. Rice is in good demand while barley and culm are easy.

Local retail dealers are kept busy making deliveries but are handicapped by a shortage of help and the apparent indifference of their employees to work.

Current quotations, per gross tons f.o.b., tidewater, at the lower ports, are as follows:

Circular	Individual	Circular	Individual
Broken..$6.75	$7.50	Buck... 5.10	5.90
Egg.... 6.35	7.10	Rice.... 4.65	5.10
Stove... 6.60	7.35	Barley.. 4.15	4.30
Chestnut 6.70	7.45	Boiler.. 4.60	
Pea.....$5.20	$5.95		

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates. Prices for buckwheat, rice, barley and boiler are not fixed by the Government.

Bituminous—The demand continues brisk and with production failing to show any

substantial increase there is no surplus being accumulated at the docks. Some large consumers are more fortunate, however, and have been able to store small stocks to carry them over a few weeks or a month. With demands for more coal increasing owing to added industries, it is becoming more apparent that there is going to be a serious situation next winter unless something is done to increase production. Operators believe that there will be no further depletion in labor now that President Wilson has spoken and with an improvement in car supply they will be in a better position to maintain production.

There has been a further classification in Tidewater pools. Pools Nos. 13 and 29 have been eliminated and combined with Pool No. 18. Other changes are in contemplation. Many of the mines are being examined by the Navy Department, and this it is believed will result in many changes in the make-up of the pools.

Bunkering fuel is not in large supply in all of the pools. Some slight delay in loading is reported due to the failure of sufficient coal in the individual pool from which a vessel is being coaled, the rules providing that the coals from the various bunker pools must not be mixed. Owing to the increased shipping and the demand for bunker coals, it is believed that when the new classifications are announced by Tidewater Coal Exchange that many of the coals now classified as commercial coals will be found in the bunker coal list.

There was a decrease of 350 cars in the dumpings for the week ended Aug. 16, 6413 cars having been dumped as against 6763 cars the previous week. This market continues to be without free coals, practically all the coal coming here being spoken for before shipment.

Current quotations, based on Government prices at the mines, net ton, f.o.b. tidewater, at the lower ports, are as follows:

	Mine Gross	F. o. b. N. Y. Gross
Central Pennsylvania:		
Mine-Run, prepared or slack	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of-Mine	3.08	5.23
Prepared	3.36	5.51
Slack	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite continues quiet, but demand heavy. Some improvement in shipments. New conservation measures. Fall prices cause anxiety on part of dealers. Stove and chestnut in strongest demand. Retail labor situation serious. Steam coals all taken. Some culm activity. Bituminous shipments in fair volume. Car supply complaint continues.

Anthracite—The week has been the quietest for some time. Probably the most encouraging sign is that shipments actually do improve in a small measure, and this has been the trend for several weeks now; as a consequence the trade continues to display a measure of optimism. While it is claimed the dealers will have some trouble satisfying their trade all fall, yet there are those who profess to believe that they will be in even better position by the time cold weather arrives. They further express the opinion that the troubles of last winter will not be repeated. The announcement of the local administrator that the dealers had stored 817,988 tons in the cellars of their customers up to Aug. 1 is encouraging. This tonnage is far in excess of that delivered up to the same period last year. Deliveries so far this month have been heavy and have considerably reduced the 833,157 tons reported by Mr. Lewis' office as being undelivered up to Aug. 1. In the suburbs the improved conditions are also becoming noticeable, as more than one dealer has got his deliveries in such shape that they are actually putting some coal into the cellars of new customers, a situation that none of them expected until late in the fall.

Stove and chestnut continue to be the short sizes locally and for some reason the former particularly so. Egg is short in the suburban sections, but comparatively easy in the city yards. A number of dealers are glad to see small stocks of pea accumulating. Buckwheat is noticeably easier, a situation that is not likely to continue beyond the present month.

The dealers appear to be as much worried over the labor situation as they are over the lack of coal. Retailers with heavy tonnages due them during the balance of the current coal year express the fear that in order to handle it they will be compelled to pay prohibitive prices for help. Several interviewed say they dare not reprimand employees who fail to report for work, let alone deduct a day's pay from those who have an increasing habit of taking a day off. That the situation will be critical before winter is admitted by all.

All shippers report their collections in the best possible shape, and those dealers who bore reputations for slow pay are now paying in advance when called upon. In truth the retail business is now practically on a cash basis. This is well illustrated by the new railroad ruling compelling payment of freights before delivery. This has in no way inconvenienced the dealers, as they are so anxious to get the coal in their yards they are prepared to pay the freight long before the coal reaches the city.

The steam situation remains unchanged. All coal is quickly taken and the demand for rice seems to be even heavier than before. The florists, who have had their supplies of bituminous cut to 50 per cent. having now received that quota are endeavoring to get rice to help out, and failing in this they are accepting quite a little culm. This latter grade remains quite free locally, with no price less than $1.25. Of course, it is not a question of price with them, for if they can use the culm in a mixture they are glad to get it at almost any price. Good shipments to outside points continue, although there has again been some interruption to tide shipments.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.25	Buckwheat	$3.40	$4.45
Egg	4.50	5.85	Rice	2.90	3.80
Stove	4.75	6.10	Boiler	2.70	3.70
Nut	4.85	6.20	Barley	2.40	3.30
Pea	3.45	4.70	Culm	1.25	2.15

Bituminous—Good tonnages are being reported from both the central Pennsylvania and West Virginia districts, although there continues to be some complaint as to car supply. This is probably a matter that will never be settled to the entire satisfaction of all, for it happens that the shipper who is the most pleased one week over car supply is in the depths the following week.

BALTIMORE

More even flow of bituminous continues under diversion orders. Improvement in anthracite deliveries, but big gap is yet to be filled. Dealers, stirred by labor situation, to ask greater margin of profit.

Bituminous—Aided by diversions arranged by the National Fuel Administration, by which some temporary stoppage is effected in the flow to preferred industries which have plenty of coal now on hand, the bituminous situation is easing off temporarily. This diversion to the account of the Maryland Fuel Administrator, for delivery by his direction to canners and other industries here that were in a bad plight, has been running from 15 to 25 cars a day recently. The result has been that a much easier situation is presented. The public seems somewhat educated toward receiving poor grade coal, and while loud kicks are sometimes made to purchasing agents or the fuel administrator, the impression is gaining ground that protests are of little avail. The experience of one business house is more or less characteristic. Supplied with two cars of coal, it was found that the fuel would not get up steam in the boilers. The purchasing agent appealed to at last got a line on a car of good grade coal and ordered it sent to mix with the other coal. In the meantime the house was forced to purchase some cart loads of soft coal from a retail dealer in order to keep the fires burning in the factory.

Anthracite—Retail coal men and fuel administration forces were pleased the past week to note an increased delivery of hard coal here. For the first half of August the receipts were nearly 50,000 tons, of which probably 32,000 tons were for distribution by retailers, the rest being steam coals for war industries. As monthly receipts of hard coal here have recently been below 60,000 tons, the increase is noticeably evident. Some tall figuring is being done here, however, in view of the fact that around 350,000 tons in orders still remain undelivered on the books of coal men with orders for 100,000 more tons in prospect before the middle of October. The yard reserve here is probably less than 30,000 tons. It will take receipts of close to 300,000 tons before the middle of October to enable distribution of the two-thirds by the time winter comes on in earnest.

The retail coal dealers at a meeting here with the Government labor representative told him they could not hold their laborers at 30c. an hour for a ten-hour day when he was picking them up and sending them to shipyards at 40c. an hour. If the labor depletion is not stopped the dealers say they will not be able to deliver sufficient coal to meet public needs even if the coal is shipped here. As a remedy it is suggested that a uniform scale of 35c. an hour be adopted by the coal men, that this not be put into effect until their margin of profit is increased to cover the move under order of the Fuel Administration, and that there be an agreement among coal men not to take labor from each other.

Lake Markets

PITTSBURGH

Car shortages more pronounced. Efforts to speed production. Practically no market transactions.

R. W. Gardiner, who has been distributor of Pittsburgh district coal, has been made production manager of the district and has appointed William McPherson his chief assistant. A series of meetings is planned, with prominent speakers, to outline the plans for speeding production. Mines will be grouped and miners and their families asked to attend.

Car shortages have been greater of late and production is less satisfactory. Lake shipments are behind the schedule, and as practically the only line trade that is receiving coal is that on the preference list, there is little opportunity to increase lake shipments except by increased production. Shipments of late from the Pittsburgh district have been, roughly speaking, one third lake, one third railroad and one third line.

Byproduct ovens are not receiving as heavy shipments as formerly, in a number of instances. Such shipments have been reduced, however, only when there was accumulation, the aim being still to furnish enough to maintain operations. The byproduct ovens want a large accumulation against the winter, as it is of prime importance that they have full production, not only because the coke is needed to make pig iron but because the byproducts are essential for the manufacture of explosives. Six months ago the Government showed much more interest in the latter than in the former, but its interest in the former has now become equally great.

Occasional allocations of coal are being made, but with the steady growth of the preference list such operations are not nearly as common as formerly. Open market transactions are rare and altogether exceptional, there being no regular movement. The market remains quotable at the set limits: Slack, $2.10; mine-run, $2.35; screened, $2.65, per net ton at mine, Pittsburgh district, with 15c. additional allowed to be charged by brokers.

BUFFALO

Anthracite growing scarcer. Lake shipments not heavy. Many restrictions. Bituminous quiet. Cars rather easy. Jobbers waiting.

Bituminous—The situation does not change much. Shippers are not pleased with the ordering of coal out of this territory to more distant points, especially when the Ohio coal that used to be sold here liberally is cut out entirely and no Pittsburgh coal may come here till a certain amount—1600 cars a day—is shipped to the lakes.

The practice of selling at mine prices grows, for the shipper is not always sure that he has all the items in at any time. Quotations generally made for Buffalo are $4.65 for thin-vein Allegheny Valley, all sizes: $4.45 for Pittsburgh lump, $4.20 for mine-run or slack, and $5.85 for smithing or smokeless. All prices are f.o.b. Buffalo, net tons.

The Canadian supply is still in excess of our own, and efforts are being made to divert the coal to points farther east. Buffalo and New York State are fairly easy as to supply, though shippers do not understand how the supply keeps up, for they were of the opinion some time ago that the consumption exceeded the shipments.

Anthracite—The Fuel Administration has allotted to Buffalo 750,000 tons as the amount of this coal which can be spared. The city will be disappointed, as it had asked for 900,000 tons and hoped to get at least 800,000. Still the present allotment is considerably more than has ever been used and it may answer. It all depends on the supply of natural gas, which cannot be foreseen.

The anthracite coming this way is still quite under the average, both for home use and for shipment west. The Lake shipments are possibly adequate to the restricted territory to be covered, but are not up to average, being for the week 97,200 tons, of which 43,600 tons cleared for Duluth and Superior (consignee's option), 32,300 tons for Milwaukee, 16,900 tons for Chicago, 3300 tons for Manitowoc

and 1100 tons for Marinette. Freight rates remain at 48c. to Duluth, 50c. to Manitowoc, 55c. to Milwaukee, 60-65c. to Chicago and $1 to Marinette.

CLEVELAND

Definite orders have been issued to coal operators not to make further shipments to industrial consumers known to have fair-sized stock piles on hand. Circulars listing concerns able to run until Oct. 1 on their present stocks are being issued. The lake trade continues to fall behind the schedule, and it is feared that the end of August will see the Northwest with more than 2,000,000 fewer tons of bituminous on the docks than was planned. To provide larger tonnages for the Northwest, retail dealers here are being cut to 15 and 20 per cent. of the requirements.

Bituminous—The outlook both as regards industrial and domestic trade has taken a decided slump in the past week. Circulars are being issued by D. F. Hurd, regional director for the United States Fuel Administration, bearing the names of industrial concerns known to have ample stocks on hand. In some instances operators are directed not to ship certain concerns any more coal until after Oct. 1—in a few instances shipments have been cut off only until Sept. 10.

Investigators for the administration are said to have gone into the yards of practically every concern in Cleveland and northern Ohio and photographed the stock piles. One large steel works in Cleveland is said to have between 180,000 and 190,000 tons of bituminous on hand, a 60-day supply at the least. Another northern Ohio iron and steel interest is said to have been found with more than 300,000 tons of bituminous stored. These instances have led the administration to feel that concerns should be compelled to use their stock piles in order to permit a greater diversion of coal to the Northwest while navigation on the Great Lakes is still possible.

Domestic users are informed that once the lake season ends their supplies will become adequate. One result of this situation has been to augment the domestic demand for coke. Complaints against the car shortage on the Pennsylvania R. R. in the No. 8 district have resulted in the arrival of a fuel administration investigator here. Car supply on the Pennsylvania for the first 10 days of August was only 53 per cent. of normal. The road, it has been ascertained, has been according mines shipping railroad fuel a 100 per cent. supply, while other mines were forced to take the leavings. Pennsylvania officials here claim ignorance of any order that car supply is to be distributed evenly, whether or not the mine is putting out railroad fuel, and Pennsylvania officials at Pittsburgh will be called upon to explain, it is said. Considerable complaint is arising, too, in regard to irregular shipments.

Many concerns report they get no cars one day and twice the normal number the next. As a result, the unloading force is disrupted, and much demurrage must be paid. This tends to decrease car efficiency, which is an even more serious condition. According to the report of the secretary of the Pittsburgh Vein Association of Ohio, operators who belong to the association shipped 6277 cars in the week ended Aug. 7, of which 3617 went to the lake trade, 1235 to railroads, 1062 to Ohio, 261 to Michigan and Indiana and 102 to Canada. The 3617 carloads that went to the lake trade are little more than half of the 7200 cars required each week under the order calling for 1200 cars a day from the Pittsburgh district for the Northwest. Car supply has been good on every road except the Pennsylvania. Power supplies are failing mines in southern Ohio and serious trouble is feared. The corporation that furnishes electricity to many of the mines in the No. 8 district is said to be encountering difficulties. The shipments for the week ended Aug. 7 were made as follows: Baltimore & Ohio, 3044 cars; Pennsylvania, 1621; Wheeling & Lake Erie, 1474, and New York Central, 138.

Lake Trade—Shipments of bituminous grow more and more disappointing. Many operators fear the Northwest will not get over 25,000,000 tons, instead of the 28,000,000 aimed at. The first 11 days of August saw lake shipments of bituminous—exclusive of vessel fuel—only 1,535,996 tons. The Fuel Administration's schedule for August calls for 4,900,000 tons. July closed 1,000,000 tons behind, and it appears that August will add about 1,250,000 tons to this deficit. For the week ended Aug. 17 the estimate of shipments to the Northwest is 1,020,000 tons. The Pittsburgh district has not responded to the 1600-cars-a-day order by far.

DETROIT

Shortage of domestic coal supply remains an alarming factor of the market. Fuel Administration affords little relief. Lake movement gains.

Bituminous—Facing a contingency which may lead to serious hindering of production on war contracts by departure of workers from Detroit, local coal jobbers and representatives of large industrial plants are endeavoring—so far with little success—to increase the present movement of domestic coal into the city and obtain an addition to the inadequate allotment of 601,000 tons of anthracite allowed Detroit.

Headed by J. J. Crowley, president of the Detroit Board of Commerce, and accompanied by W. K. Prudden, Michigan Fuel Administrator, a committee of Detroit manufacturers representing concerns engaged on large contracts for the Government, spent most of last week in Washington appealing to the Fuel Administration, the War Industries Board and the Director of Railroads for action to relieve the situation.

The committee appears to have made little progress beyond receiving a promise from the Fuel Administration that a campaign would be opened at once to increase the movement to Detroit of bituminous coal suitable for domestic use. It was informed no addition to the city's allotment of anthracite could be made.

Bituminous coal now coming into Detroit in fair volume, consists for the greater part of mine-run, which is not adapted to use in the hot-air furnace heating plants and base-burner stoves, which predominate in the homes of the city. While the present supply of bituminous provides adequately for present needs of steam plants, little surplus is available for reserves.

Anthracite—No improvement in movement of anthracite has developed. Shipments received on some days fall below 20 cars, while the average is probably below 30 cars daily for the month. Manufacturers say many of their employees will go to cities where they can be assured fuel for winter needs unless the city's allotment of anthracite is increased and a larger movement stimulated.

Lake Trade—Coal is moving rather more freely to lake loading docks and the shipments to ports at the head of the lakes have been attaining a higher volume in August than in July, though many carriers are still making the upbound trip without cargo. Shipments have not yet reached the magnitude necessary to realize the shippers' program of 4,900,000 tons for the month.

COLUMBUS

The lake trade is now the principal activity in the coal industry. Some coal is being diverted for domestic and steam purposes, but the amount is not large. Production is fairly good.

The principal feature of the coal trade in Ohio, is the activity in the lake traffic. Under orders from the Federal Fuel Administration a large tonnage is being rushed to the Northwest and every effort is being made to fill the requirements in that section earlier than usual. It is hoped that the requiremnets can be filled by Oct. 1 after which the product of Ohio and West Virginia mines can be diverted to domestic and steam uses. The vessel movement is active, and little time is lost in handling either coal or ore. Reports show that the coal is being moved off the docks of the upper ports, thus avoiding congestion.

The steam trade is rather quiet, although a certain amount of screenings is being diverted to steam business, which helps to relieve the situation. Most of the larger steam users had succeeded in laying in a supply of coal to last for some time and thus are not suffering. Smaller steam users have sufficient fuel for the present. Most of the public service institutions have made arrangements for their coal supply.

The domestic trade is also quiet, although dealers are still busy making deliveries. Surplus stocks are rapidly being depleted. Practically no Pocahontas is now available and only a limited amount of West Virginia grades is arriving. In fact it is only the smaller mines that have no lake connections that are supplying the domestic trade. Retail prices are firm at the levels which have prevailed for some time. Dealers are beginning to get anxious and are making inquiries if the priority order may soon be modified.

Production has been increased slightly with a better car supply and more plentiful labor. Patriotic meetings held in many mining sections are having their effect in increasing the output. Lack of motive power on some of the railroads caused a temporary car shortage, but steps are being taken to relieve that situation. On the whole the output has been between 75 and 85 per cent. in all of the producing fields of the state.

Prices on short tons f.o.b. mines are as follows:

	Hocking Thin Vein	Hocking Thick Vein	Pomeroy	Eastern Ohio
Sized grades....	$3.05	$2.80	$3.05	$2.60
Mine-run.....	2.80	2.55	2.80	2.35
Screenings...	2.45	2.30	2.45	2.10

CINCINNATI

Continued steady and heavy demand for coal of all sorts is reported, with good conditions in all near-by fields, indicated by record-breaking loadings last month.

While in some quarters pessimism is felt and expressed over the local fuel situation, especially in view of the belief that all West Virginia coal may be diverted eastward in order to satisfy the deficiency in receipts in that section, the general situation is all that could be asked, everything considered. Demand from all quarters remains heavy, and shipments are going forward to the Lakes in large volume. Domestic consumers in this section are still in the market for their winter requirements, and dealers are insistent, in consequence, in their demand for fuel with which to take care of their customers. Considerable receipts by the river have helped out city dealers, but those in the country and near-by towns are finding some difficulty in securing coal. The same is true to a considerable extent of large industrial consumers, as to fuel storage, although so far no complaint has been heard on the score of current supplies. It is generally realized that it is the supply of coal for industrial purposes next winter which will furnish the principal difficulty of the fuel authorities, which is one reason why every effort is being made to get all other demands out of the way before winter comes, in order that the entire available supply may then be devoted to the needs of industrial consumers.

With the bulk of domestic consumption taken care of by unprecedentedly early and complete summer storage, and with the North and the Northwest well cared for by the present heavy movement of coal both by rail and the lakes, it is felt that the entire Middle West, including this city and its immediate vicinity, will face the winter season in much better shape than was the case last year, and with the reasonable expectation that the winter will not be anything like as severe as last winter.

LOUISVILLE

Production for eastern and western Kentucky field about the same, with labor still scarce and cars hard to obtain. Retailers are beginning to catch up on domestic stocking and are offering two-day deliveries at the present time. Steam demand continues fair.

The labor situation in the Kentucky fields has been somewhat better during the past two weeks, due to the exceedingly hot weather, the fact that crops are made, and that men who have been farming are glad to get back to the cooler mines. Retailers have had much trouble in keeping men and teams going during the hot weather, labor refusing to work above ground. However, this same weather has resulted in a letting up of the domestic stocking demand, as no one thinks much of cold weather with the thermometer around the century mark, as has been the case during the greater part of August. Mines expect to start losing labor to the agricultural demand in a few weeks, especially in western Kentucky, where much negro labor will start picking cotton.

In eastern Kentucky many of the wagon mines are now using boxcars for loading and are getting out a much better volume of coal, some of which is reaching the local points, but much of which is being bought up by jobbers and large miners for outside points.

BIRMINGHAM

Local market active, with steam demand apparently a little easier. Domestic trade stiff. Production off from the high record of recent date. Car shortage being felt along with failure of miners to work regularly.

Inquiries for steam are good in this market, the tonnage desired being in excess of that available by a large margin, but reports indicate that consumers are evidently in some better shape of late, as they are not pressing their demands quite so insistently as heretofore. The extremely hot weather of the past week has not weakened the ardor of the domestic user to provide a supply for the wintry blasts to come, and trade is strong in both wholesale and retail circles. More coal was stored, according to official figures, during

July than in any previous month this season.

Alabama coal men are expecting a new schedule of prices from the fuel administrator in the near future, but no intimation has been given as to changes or adjustments to be made other than that there will be a reclassification of the mines to some extent. It appears certain that some more repressive measures will have to be adopted by the fuel administration than those now in vogue to enforce better working schedules by mine workers if coal production is to be materially increased and maintained on anything approaching a maximum capacity in this district. Men lay out from work in large numbers regularly and also fail to work full shifts in many instances. Shortage of cars has crippled production to some extent in the past week or so, most all lines being short of equipment.

Coke

CONNELLSVILLE

Fuel Administration allocations. Market transactions in foundry coke. More by-product and less beehive coke.

The Fuel Administration continues to allocate furnace coke orders to such an extent that practically no offerings come upon the market. A close watch is kept upon the situation and cases of furnaces stocking coke do not as a rule continue long until the operator is given an allocation to snip the surplus coke elsewhere. Of ordinary open market transactions there are practically none in the case of furnace coke. Foundry coke, on the other hand, continues to be offered in considerable volume. On the whole foundry coke shipments are probably well above normal. The operators have plenty of 72-hour coke and it pays to ship the coke for foundry use as long as it can be sold. Frequently a brokerage is paid by the operator. Many of the foundries are no doubt stocking coke, but the total taken out of the situation is not large, as foundry coke consumption is vastly less than furnace coke consumption.

The Youngstown Sheet and Tube Co. has practically completed putting in 51 of its new byproduct ovens, with the second 51 to follow in a few weeks. Unlike the starting of the Steel Corporation's new plants at Cleveland, Lorain and Clairton, the additional byproduct production at Youngstown directly releases Connellsville coke, which as released goes to other consumers. The contracts were closed about three months ago, shipments to begin upon the completion of the new Youngstown ovens and to run to the end of the year. An interesting question is how much the starting of byproduct ovens by the Steel Corporation will reduce its coke production in the Connellsville region. Unless the corporation has been short of coke it could correspondingly decrease its Connellsville production, unless it should sell the coke released, while on the other hand, it might not be able to provide the coal for the new byproduct operations except by decreasing beehive operations. The Cleveland and Lorain plants do not necessarily use Connellsville coal but would use it if no other coal could be had. The Clairton operation was designed to use Connellsville coal exclusively, but to be shipped by water, and for the purpose some of the river mines were enlarged. While one comparison does not prove the case it is an interesting fact that there has been a decrease in Connellsville output which bears a striking resemblance to the new byproduct capacity put in operation.

The "Courier" reported maximum production by furnace ovens in the Connellsville and lower Connellsville region at 210,760 tons in the week ended July 13 and at 177,800 tons in the week ended Aug. 10, a decrease of 32,960 tons. At the same time the merchant oven production only changed from 142,710 tons to 141,210 tons, a decrease of 1500 tons. This would strongly suggest that some special influence was felt, neither car shortage nor labor shortage, as such influences would have affected merchant ovens the same as furnace ovens. The new byproduct ovens the Steel Corporation has lately put in are 180 ovens at Cleveland, which made a little coke late in May; 104 ovens at Lorain, very recently, with 104 ovens more due in about 30 days; and 128 ovens at Clairton, with four similar batteries due at intervals during the remainder of the year. The ovens started total 412, and while nominal ratings are higher, such ovens can generally be counted on for about 4200 tons a year per oven, or about 80 tons a week, so that their output is precisely 80 tons each, 32,960 tons weekly, and the decrease reported was precisely that, down to the last ton.

Owing to the activity of the Fuel Administration the furnace coke market is practically closed, but allocations go at the set price of $6. Foundry coke sells at the $7 set price, sometimes with a brokerage allowed by the operator, and crushed, over ¾-in., remains at $7.30, all prices being per net ton at ovens. Screenings from old dumps when well prepared and over ¾ in. bring $6.50 in the open market.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended Aug. 10 at 319,010 tons, a decrease of 21,970 tons.

Buffalo—The supply of coke is scant, but the local furnaces manage to get what they must have. So far the Government authorities have not thought it necessary to make any arbitrary distribution rules in the coke trade and are not commandeering it from this smelting center, but none of it is coming into the hands of jobbers, who try to content themselves with a moderate amount of breeze coke from the local by-product ovens, selling it sometimes for less than the Government price, which is $4.34 at the ovens. Iron ore receipts for the week were 330,690 gross tons, a large amount.

Middle Western

MILWAUKEE

Coal supply coming forward satisfactorily. Dealers looking for an advance in soft coal soon.

The coal supply for the Milwaukee district is coming on apace, and unless for some unforeseen reason there should be a let-up in the movement by lake, the close of navigation will find the full allotment of anthracite and bituminous coal on the docks and in process of transshipment. A close rein is kept both on the movement to interior points and on the supply to city consumers, in the interest of an equitable distribution and to avoid a repetition of some of the experiences of last winter.

Some uneasiness was caused throughout Wisconsin by the action of Federal Fuel Administrator Garfield restricting the consumption of soft coal in Illinois, but State Fuel Administrator Fitzgerald hastened to assure manufacturers that there was no danger that a similar order would be issued in regard to Wisconsin. Illinois is a soft coal consuming state, and the cheapness of this class of fuel in the past has engendered wasteful methods on the part of power plants and householders which the fuel administration now desires to rectify.

Receipts for August up to the time of making this report aggregate 26,786 tons of hard and 306,817 tons of bituminous, making the record up to that time since the opening of navigation on May 1, when the docks were absolutely cleaned up, 272,470 tons of anthracite and 1,685,169 tons of bituminous. During the months of May, June and July rail receipts amounted to 454 tons of anthracite and 60,230 tons of bituminous, against 288 tons of the former and 272,109 tons of the latter in 1917.

ST. LOUIS

An unusually quiet market on everything, with steam sizes heavy. Warm weather has depressing effect. Labor shortage severe from the mines to retail delivery. Water shortage continues. Car supply poor. Transportation continues bad.

The local market is an unusually quiet one. The extremely warm weather of the past couple of weeks had a serious effect in the retail end of the coal business, and many coal men have found themselves with half of their equipment idle on account of their men quitting for easier tasks.

In a general way, however, the retail business is easing up, excepting on Carterville coal. The domestic trade is practically taken care of on Standard sizes, there is a little Mt. Olive unfilled, and a considerable tonnage of Carterville.

Byproduct coke is hard to get and dealers are behind on that, but gas house coke is pretty well up. Figures compiled by the St. Louis Fuel Committee show that St. Louis is unquestionably the best situated city in the country today in the matter of retail storage coal, and perhaps worst off in the matter of steam storage.

Reports from the Carterville field the past week are depressing. In addition to the water shortage, which has been affecting all mines, the power furnished by the Public Service Co. in southern Illinois is permitting the mines to work about 2½ days a week. A meeting of the operators in Chicago this week was held for the purpose of taking some action relative to bringing in Keokuk power through the St. Louis gateway, and this will likely be done. It is understood that this matter has been taken up with Washington and the complaint was made that mines are forced to close daily, in periods from 10 min. to 5 hours, and in many instances the largest mines in the field have been closed for 2 or 3 days at a time.

The car shortage the present week is unusually severe, and on the Iron Mountain for four days straight there was no equipment at some mines. The movement on this road is exceptionally bad, and the Illinois Central fares but a little better.

Labor conditions in this field seem to grow worse, and it is evident that the Government must in the very near future take some steps to keep intact the mining organizations if the operators are expected to keep up anywhere near the tonnage demanded of them.

Similar conditions exist in the Duquoin field. The railroads still continue to take heavily in railroad fuel from both of those fields, in spite of all that has been said and the pleas and the protest from the general public and from those interested in seeing that this quality of coal goes where it is best suited.

The Mt. Olive field has a fairly good car supply and labor supply that is not bad and a tonnage produced that is about equal to the demand. It is the one field in the state where there seem to be no troubles that cannot be easily overcome.

The Standard field presents the same old trouble of having an overproduction of either one or the other grades. At the present time there is an overproduction of screenings and no place to move them, and there is an abundance of lump. The screening movement to Chicago is fairly good and all surplus lump and egg is going to Michigan. If it were not for this the Standard market would be glutted and mines would be idle. These prices are off, screenings being sold as low as $1.55 and $1.60, and lump about $2.35 to $2.40 for 2 in., while the 6 in. lump and egg hold up to $2.55. The car supply in this field is bad, transportation is slow, and car distribution on the Illinois Central still continues bad.

There is a water shortage here that is affecting many of the mines and some of the mines are almost down to one-fourth of their former tonnage on account of labor. In view of the fact that there is a surplus of screenings, which is used by the Union Electric Light and Power Co., the lightless night order is in effect here and is being rigidly enforced. On the surface this appears to be a farce, for unless these screenings are consumed in the home market they remain on track at the mine and prevent work, and their quality is such that they will not move it to the far off markets. The same thing applies to the skip and stop proposition for the street cars. The general public for the first time in many years is becoming somewhat vexed at local conditions. With an abundance of this steam coal, to such an extent that the railroads are blocked and the mines are almost idle on account of this surplus, St. Louis is being deprived of some of its common rights because the eastern part of the country is short of coal and the quality of the coal here does not justify its transportation east.

The Board of Education has announced that 63,000 tons of coal have been stored for the Public Schools, and its consumption is estimated at 70,000 for the 142 school buildings. Last winter St. Louis was the only large city that did not have to close its schools. There are no eastern coals coming in and a very light tonnage of Arkansas.

The circular prices for Illinois coals here are:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump...	$2.55@2.70	$2.55@2.70	$2.40@2.70
3x6-in. egg..	2.55@2.70	2.55@2.70	2.35@2.55
2x3-in. nut..	2.55@2.70	2.55@2.70	2.35@2.55
No. 2 nut....	2.55@2.70	2.55@2.70	.....
No. 3 nut....	2.55@2.70	2.55@2.70	.....
No. 4 nut....	2.55@2.70	2.55@2.70	.....
No. 5 nut....	2.05@2.20	2.05@2.20	.....
2-in. scrgs...	2.05@2.20	2.05@2.20	1.25@1.50
3-in. lump...	.....	.....	2.25@2.40
2-in. lump...	.....	.....	2.25@2.40
Steam egg...	.....	.....	2.25@2.40
Mine run....	2.35@2.50	2.35@2.50	1.85@2.00
Washed:			
No. 1.....	2.75@2.90	2.75@2.90	.....
No. 2.....	2.75@2.90	2.75@2.90	.....
No. 3.....	2.55@2.75	2.55@2.75	.....
No. 4.....	2.55@2.75	2.55@2.75	.....
No. 5.....	2.05@2.20	2.05@2.20	.....

Williamson and Franklin County rate is $1.10; Duquoin field, $1; Standard and Mt. Olice fields, 95c.

COAL AGE

Volume 14 New York, August 29, 1918 Number 9



The Lucky Thirteen

Written Expressly for Coal Age
By RUFUS T. STROHM

Mining figures sure were checkered,
Running medium to low,
Never coming near a record
Till about a month ago,
When the output curve went crawling
To a sharp and dizzy peak,
For the mining men were hauling
Thirteen million tons a week.

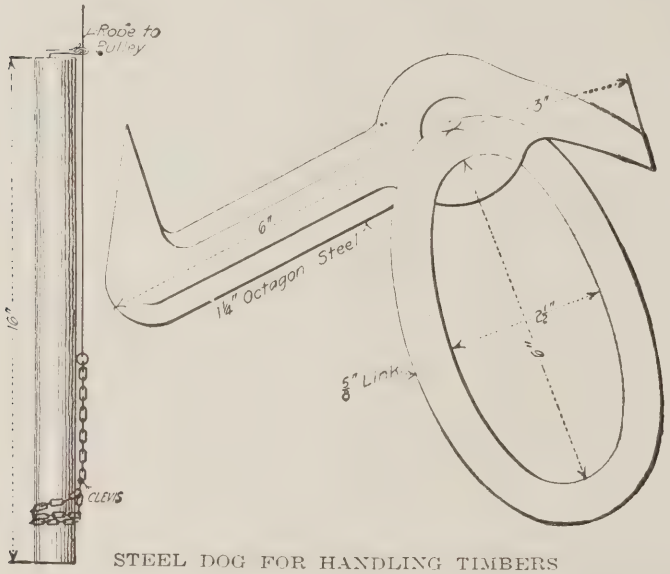
Then there came the news exciting
Of the scrap at La Chapelle,
Where our doughboys, keen for fighting,
Gave the storm troops merry hell;
And they'll keep the Fritzies going
In a scared and frazzled streak
If the mines will keep on showing
Thirteen million tons a week.

That's the figure that we're needing
If we'd keep munition plants,
Factories and shipyards speeding
To supply the boys in France;
For they'll win this bloody duel
With the Kaiser and his clique,
But we've got to have the fuel—
Thirteen million tons a week!

IDEAS AND SUGGESTIONS

Dog for Lowering Mine Timbers

Timbers when being lowered or hoisted occasionally get away, even when a chain is used to grip the piece, says the *Engineering and Mining Journal.* This is especially true if the timbers are icy or wet. At the Hecla mine at Burke, Idaho, much heavy round timber has to be either lowered or hoisted. The caps used in the timbering are green timbers of an average



STEEL DOG FOR HANDLING TIMBERS

diameter of 14 in. They run from 7 to 16 ft. long. The posts are about 8 ft. long and 10 in. in diameter. Yet these heavy timbers are handled safely and easily by the use of dogs, chains and wire rope, the motive power being an air hoist.

The chain is attached to the end of the cable. Instead of having a ring at the end, this chain, which is longer than usual, has a strong clevis. When timber is being hoisted the chain is wrapped round the stick and fastened to itself by means of this clevis. When timbers are being lowered the clevis is used as a means of fastening a ring to the chain, this ring having several timber dogs which are themselves secured by short chains. In lowering timbers, reliance is placed entirely upon the dogs, several being sunk into the stick if it is large.

The timber dog illustrated above is made of 1¼-in. steel, and one end is turned up and pointed after the usual manner. The other end is bent down. When the workman desires to remove the point of the dog from the timber he hits the dog on this downward bend and the dog is released.

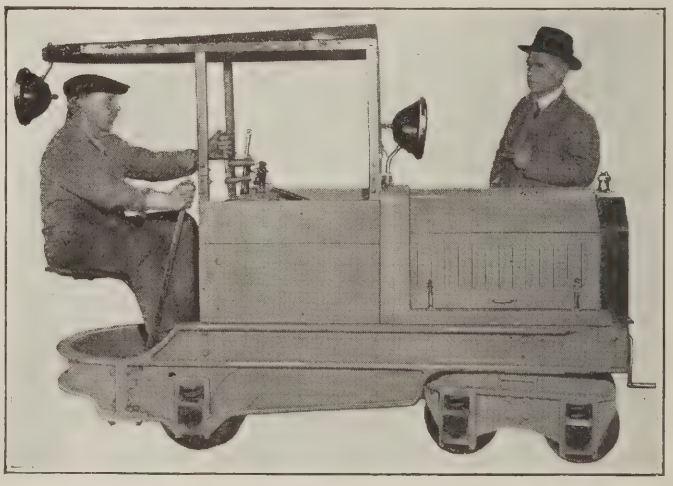
About two-thirds of the way from the point of the dog the drill steel is flattened and a hole about 1 in. in diameter is punched through it. A long narrow link made of ⅝-in. steel and large enough to slip easily back and forth over the rope and chain is then put through and welded.

In hoisting timber, the dog is fastened loosely to the cable by means of this link. First the chain is wrapped several times around the timber near the bottom and fastened to itself by the clevis. Then the dog is slipped up along the cable until it can be sunk into the top end of the stick. When the top of the timber has been hoisted level with the landing floor in a stope, a picaroon is applied and the dog at the top knocked loose. Then, as the timber is hoisted further, the top end skids out on the floor, and the stick is guided by means of the picaroon to the place where it is to be used.

In lowering the timbers, a ring to which four dogs are fastened by short chains is used. If the timber to be lowered happens to be large, it is lowered singly and with three dogs. If the timbers are small, several are lowered at one time, a dog being sunk into each near the top. Whether the timbers are lowered singly or several at the same time, they are fastened only at the top, so that as soon as the floor is reached they can be landed easily by the use of a picaroon applied at the lower end, the workman walking out into the stope with the timber. Thus when lowering as well as hoisting timber, the bulk of the weight is kept on the cable, and the work of landing a heavy piece is reduced to a minimum.

This Ford Handles Mine Cars

The illustration shows one more use to which the universal Ford motor has been put and its adaptability for underground haulage problems. The locomotive was built by the McFarlane-Eggers Machinery Co., of Denver, and is now operating in the Royal Flush mines, of



FORD MOTOR USED FOR HAULING

Columbine, Colo. Details of the body are apparent from the illustration. The locomotive has a four-wheel fore truck which is pivoted to the frame. The frame consists of three iron castings, on which the well-known bonnet and a wooden cab and seat have been mounted.

The locomotive shown operates over an 18-in. gage track and will negotiate an 8-ft. radius curve. It is 30

in. wide, 7½ ft. long and weighs 2500 lb.; and the overall height at the cab is only 4 ft. The locomotive travels at a speed of 10 miles an hour and will draw from six to eight one-ton cars. This adaptation of the Ford motor will undoubtedly solve many problems in small outlying districts heretofore handicapped by the necessity of choosing between costly hand tramming over long distances or expensive and unwarranted haulage installations.

An Old Man Fastening

By J. A. Lucas
Ozone Park, N. Y.

A simple method of fastening an old man to large cylinders or boilers, where no holes for clamping are available, is shown in Fig. 1. *A* represents a boiler shell or tank, to which is attached an angle frame or knee *B*, carrying the angle piece *C* (which may be adjusted for vertical height on *B* by means of the bolt shown) forming a fulcrum for the feed sleeve *D*. The chain *E* passes around to secure the angle frame *B* to it. It is tightened by means of the device shown in Figs. 2 and 3. In using the clamping device shown in Fig. 2 the chain has to go around the cylinder only once. Its operation is self-explanatory. The clamping device shown in Fig. 3 necessitates the chain to pass around twice; in use the loose chain is placed in the yoke *F*, which in turn is slipped on the square-head screw of the jack *G*. The chain is then tightened by means of the jack. Such devices as the one here described permit the use of the old man upon surfaces where the ordinary means of attachment, such as bolts and clamps, cannot be employed.

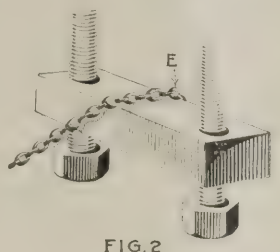


FIG. 2

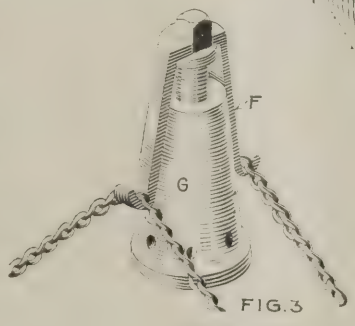


FIG. 3

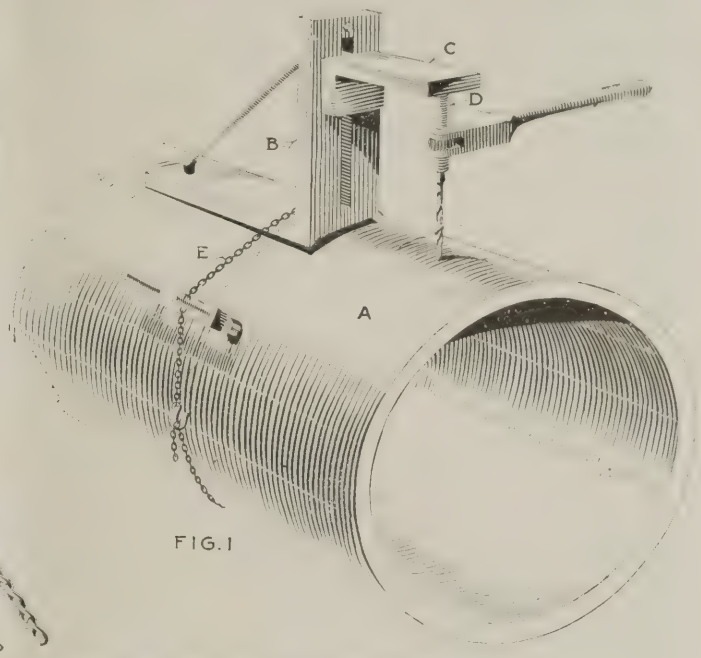


FIG. 1

FIGS. 1 TO 3. DETAILS OF THE OLD MAN FASTENING

Electric Locomotives and Trucks

The electric locomotive has already made a well-established place for itself in the coal-mining industry. It appears in two general forms—the trolley locomotive and the storage battery machine. Each of these has its place of peculiar advantage, and the manufacturers of electric locomotives have a fund of interesting ideas and data on tap as to where and how one may give the best service, and where the other may be more satisfactory.

Broadly speaking the question of selection hinges upon local conditions and requirements. The generally accepted logic is that the trolley locomotive is more economical in power consumption while the battery locomotive is adaptable to service where it is not practical to handle a trolley machine, especially in new openings and drifts before the work has progressed far enough to warrant the equipment of a trolley line. Also it is often argued that the service rendered in what might be termed pioneer progress of new work by the battery locomotive outweighs any disadvantage in power cost.

The electric locomotive of the battery type, like its cousin the electric truck, has had the experience of being viewed with favor, then seeing the favor suddenly swing around and center upon the remarkable and startling progress of the gasoline motor. This applies both to commercial trucking and pleasure vehicles. Now we are seemingly swinging around in the circle to where favorable attention is focusing once more upon the electric storage battery, both for locomotive work and for trucks.

Taking into due consideration the fluctuations in the value of coal at the mines, experience has demonstrated that electricity can be produced in proper power plants at the coal mines in commercial quantity more economically than by waterfalls. All of this leads in a roundabout way to the subject of electric locomotives and trucks. Coal producers not only quite commonly have a direct interest in the operation of some electric locomotives in their own plants, but they have a broad interest in the development of power units generally for the production of electricity. To state it another way, a wider and more extensive use of electric trucks and pleasure cars would mean quite a considerable increase over the amount of fuel that is now being consumed in the production of electricity for power and other industrial purposes.

Moreover, it is interesting to note that considerable progress in the way of improvements have been made in electric storage batteries. Perhaps it would be too much to say that we are on the eve of a return of wide favor to electric cars and trucks. At the same time, however, we know that gasoline is comparatively high priced and the adaptation of the gasoline engine to perform individual and home requirements has so extended the demand for gasoline that already some concern is manifested about the future supply.

Longwall Mining at La Salle, Illinois

By GEORGE W. HARRIS
Editorial Staff, "Coal Age"

THE La Salle mining field of Illinois is full of association and interest to many coal men, both operators and miners. The name La Salle will catch the eye of coal men the country over, for in this old longwall region many received their training. Some of the old-timers still remain in positions of trust—both as officials and as miners of coal. It was at Spring Valley, in this field, that John Mitchell spent his early days.

Among the prominent mining companies in the La Salle field is the La Salle County Carbon Coal Co., with four plants—La Salle, at the town of the same name; Union, at Peru; No. 1, at Johnsville, and No. 5 at Cedar Point. This company operates the oldest mine and the newest mine in this longwall field. The La Salle mine was opened up by a shaft in 1856, when the No. 5 seam was worked by room-and-pillar until 1880. At the later date the shaft was sunk to the No. 2 seam, which has been continuously worked by longwall. It has the distinction of being the first mine in the district to be worked by longwall.

In 1868 the No. 1 mine of the La Salle company was opened up at Johnsville, which is two miles south of La Salle. The Union mine at Peru was started in 1874, and the No. 5 plant was developed in 1906 at Cedar Point, which is five miles southwest of La Salle. This latter mine was the latest longwall operation to be developed in the field. These plants are near the Illinois River, on the Rock Island R.R., and in the northern central part of the state. In fact, the region constitutes the northern limit of the Illinois coal fields. The La Salle anticlinal is to the east of the properties of the La Salle County Carbon Coal Company.

The coal seams are somewhat disturbed, as the pitch of the beds is about 40 to 50 deg. at the anticlinal instead of practically flat, as is the case elsewhere. Coal is disposed to be rather shelly where disturbed, and the top also changes. At this point the anticlinal tips to the west. The modification in the method of mining on this heavy pitch is described in the June 17, 1916, issue of *Coal Age*, under the title of "Steep-Seam Longwall in Illinois," by C. A. Herbert.

Ideal Longwall Conditions

The No. 2 seam worked at all the mines of the La Salle company averages about 40 in. in thickness. It is uniform throughout the district and lies at a depth of 350 to 550 ft. below the surface. The roof is a grey shale, or soapstone; the floor is a fireclay, several feet in thickness, below which is sandstone. The immediate roof and floor furnish abundant material for packwalls. Practically no gas or water are found in these mines. In fact, water is piped down the La Salle shaft for use in watering the entries and haulageways, which otherwise would be dry and dusty.

Until a few years ago all the mines in the first district were pick mines. The La Salle company was a pioneer as regards the use of electricity underground. Three or four years ago the first electric hoist in the region was installed at the Union mine. It was also one of the first longwall mines in the field to put in trolley haulage. Of the four mines of this company, La Salle and Union mine coal by machines. At the time of their installation there was considerable opposition to their use and great adverse comment to this change in the generally accepted method of mining in the locality.

A few facts of general interest might be noted about each of the four plants of the La Salle County Carbon Coal Co. The history of the La Salle mine has been an eventful one. The surface works burned down three times at this operation. There are three Sullivan longwall mining machines and one 5-ton Goodman electric locomotive at the La Salle mine. The gathering of coal is done by ten mules. The capacity of the plant is about 700 tons daily, but 400 tons is the present output. There are 142 inside men at the La Salle mine, 106 being miners or loaders.

Machine Longwall Mining

At the Union colliery there are five Sullivan longwall mining machines and one 5-ton Goodman electric locomotive. Gathering is done by mules. The success of the method and the type of mining machine used is attested by the fact that additional machines are to be installed at this plant. There are 171 inside men employed here. The capacity of the Union mine is the same as that at the La Salle operation.

No. 1 and No. 5 are pick mines; the former employs 207 men and has a capacity of 950 tons daily (650 at present); the latter has 252 inside men, with a present capacity of 800 tons (the mine would be capable of producing 2500 tons daily if labor and cars were available). At No. 1 colliery the haulage is done by two Goodman electric locomotives; and mining machines will be installed in the fall. All the mines are working at only about 60 per cent. of their rated capacity. An article on "Longwall Mining in Northern Illinois," by E. T. Dent, appeared in the July 17, 1917, issue of *Coal Age*, in which was illustrated the No. 5 tipple of the La Salle company. It is an up-to-date steel structure.

Electric power for use at the plants of the La Salle company is purchased of the Illinois Traction System, current being delivered at 2200 volts alternating current. For mining machines, alternating current of 240 volts is used, and 250 volts direct current for haulage. At the Union mine there is a motor set underground to produce direct current for haulage. At the La Salle mine the motor generator-set is on the surface. At this latter plant mining machines using direct current were installed at first, these being changed later for those of the alternating-current type.

A "canny" Scot, who had spent a lifetime in longwall mines in his native country and in this, the land of his adoption, was asked what are ideal longwall conditions. He replied: One foot or so of fireclay under the coal; 3 to 3½ ft. of coal—better to be fairly strong; shale or similar material as top rock—furnishing easy brushing and good material for walls. The shale top might be

10 ft. or more thick to advantage. On inquiry as to what should be done in case of a hard sandstone top, he answered: Shoot down the top or get packing material from the bottom. Such conditions are typical of many districts in Scotland, he added. How nearly the ideal longwall conditions noted correspond to those existing in the La Salle region.

The accompanying illustration, Fig. 1, shows actual mining conditions at the La Salle company's No. 5 mine. In all old mines development included a three-compartment shaft; two compartments were used for hoisting and constituted the downcast; the third compartment was boarded off from the others and was the upcast. This method is open to objection as regards efficient ventilation, in that the division board partition seldom remains tight. A more serious objection, in case of a bad accident in the shaft or an explosion in the workings reaching the shaft, is that the ventilation might be destroyed and great difficulty be experienced in restoring it within a reasonable length of time. In modern mines the hoist shaft is the upcast and the second or escape shaft is the downcast. The No. 5 mine of the La Salle company is an example of this latter arrangement. The other three mines are older and have three-compartment shafts.

There are two principal methods of proceeding when the shaft reaches the coal bed which is to be mined; one is to leave a sufficient coal pillar to protect the shaft and the other is to remove all coal and let the packs, or packwalls, settle at once. The advantages of driving narrow work to the boundaries, then starting the face and working back to the shaft, are well known. This method requires considerable deadwork before returns are realized, and necessitates large capitalization. The other method, or longwall advancing, is generally employed, for obvious reasons.

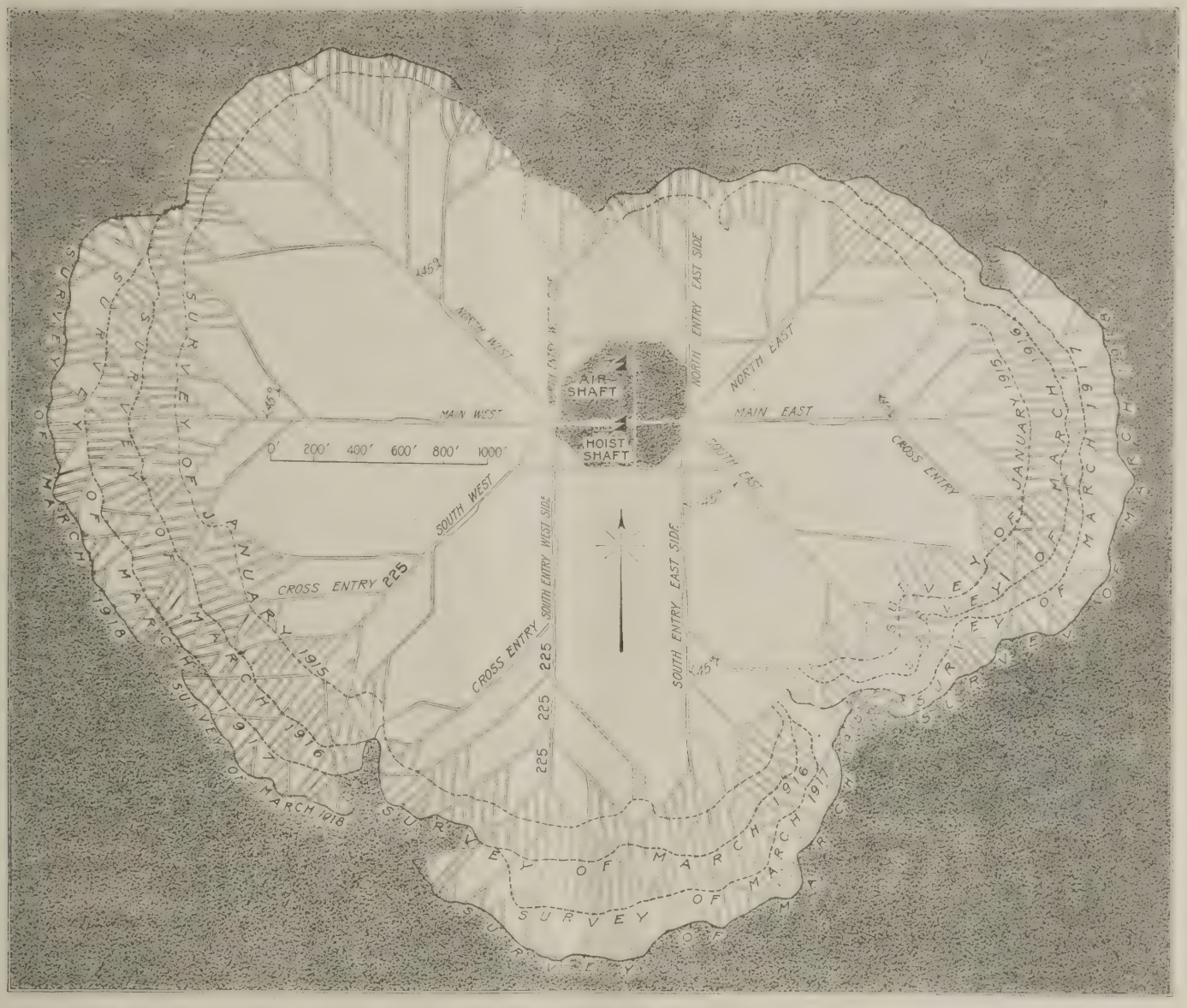


FIG. 1. MAP OF LONGWALL MINE AT PLANT NO. 5 OF LA SALLE COUNTY CARBON COAL CO., NEAR LA SALLE, ILLINOIS

As regards opening up a longwall mine, the shaft may be thrown out of plumb if the right conditions of mining are not carried out, whether with or without coal pillars at the foot of the shaft. When all the coal is removed around the shaft bottom, settlement of packs must be gradual and sudden slipping of large masses of rock be avoided if the shaft is to be kept in alignment. However, when the top rock comes to rest permanently, then the job is finished and the expense and worry about the shaft protection ordinarily are over. The advocates

of this method are willing to take chances of shaft trouble in the beginning in order to have immunity from all such annoyance in the future. The claim is made that with either method of opening the mine the shaft may be endangered at this time. At the escape shaft at No. 1 mine all coal was extracted around the bottom at the beginning.

Other great advantages claimed for removing the coal around the shaft are that the expense of timbering the bottom is reduced and that roof weight begins sooner to ride on the working face. Those operators who leave coal for shaft protection admit these advantages, but claim the great uncertainty of being able to control subsidence, which may seriously affect the shaft as the coal is being removed.

If the coal is to be left in at the shaft bottom, it is necessary to judge about right as to what constitutes sufficient protection for the shaft. The depth of the seam below the surface, the nature of the rock immediately over and under the bed, as well as higher up, are important considerations; also the thickness of the seam and its crushing strength. A number of well



FIG. 2. OFFICES OF LA SALLE COMPANY

known formulas are available for reference as to what size shaft pillar should be left.

It is a matter of record among a number of authorities on this subject that given a shaft 300 ft. deep and a 6-ft. seam, the size of a pillar varies from 70 to 300 ft. square, according to which formula is used. No hard and fast rule can be given for determining the size of the shaft pillar in any particular case. But the rules of those who have carefully investigated the size of pillar required within certain practical limits, and suited to different conditions of roof strata, are useful. Local practice often reflects the experience of years, and it is generally safe to consider such guides in planning new work.

The greatest difficulty in starting longwall operations is in leaving the shaft pillar and establishing the longwall face. A common method in the La Salle field is to drive main entries from the hoisting shaft through the shaft pillar. Then the shaft pillar is usually blocked out by driving entries around it. In many cases these latter entries are driven wide enough to permit of good wooden cogs and packwalls being put in, so that the coal of the shaft pillar may not spall off and the entries be kept open. Great care must be taken in leaving the pillar to pack the ground solid.

The shape of the property to be developed largely determines the layout of a longwall mine. Ordinarily, development proceeds with the shaft pillar as the center of the prospective mine with main entries leading off in eight principal directions, consecutive entries having an angle of 45 deg. between them. From these entries rooms are turned at an angle of 45 deg. and spaced so as to give a distance apart of about 42 ft. at the face. As the distance of the face from the shaft increases, cross-entries are driven from the main entries and new rooms may be opened up from the former. Engineering skill finds an opportunity in longwall mining as well as in room-and-pillar work. This applies to planning a mine and in following up the progress of the working face.

Having blocked out the shaft pillar and laid out the mine for best development, mining is commenced on the approved lines, looking to the establishment of the working face. A critical time in longwall mining occurs when the first roof break takes place, or at the time when it is expected. As in pillar work in room-and-pillar mining, roof pressure is an important consideration. The nature of the top largely influences operations. With a thick sandstone or limestone roof, large openings are frequently made by the removal of pillars without falls of top occurring at first. Sometimes all props in the robbed-out area are removed, and heavy shots are necessary to bring about a good break in the top. Once established, robbing generally proceeds with no unusual difficulties in all well regulated mines.

Contrary to room-and-pillar practice, in longwall mining the roof pressure is essential to break down the coal—roof pressure should be the only permissible explosive in the coal itself at the longwall face. In opening up the longwall mine the first roof break may not occur until the face has advanced 100 ft. or more from the shaft pillar. When the top is moving properly, it bends at the face and settles down on the packwalls and gob (space between the packs); cracks generally appear at regular intervals and parallel with the face. Especially in machine mines a space of about 3 ft. is required at the face in which to operate the mining machines. The top usually cracks at the edge of the coal and often breaks just beyond the props set 3 ft. back. With proper packing the distance between breaks should correspond to the width of the coal brought down.

The longwall face being established, the operations of the mine proceed regularly if the packwalls are kept up in good shape and the face in line. The mine should be so laid out that development is symmetrical, the face forming approximately a circle with the hoisting shaft as the center. Sometimes the face takes the shape of an ellipse rather than a circle. The main entries and branches are projected so as to constitute a comprehensive haulage system as the mine develops. When packwalls are first made they are often spaced 10 to 12 ft. apart, lining the roads, to allow for the bulging when the roof weight settles on them, which causes narrowing of the roadways. The rooms are laid out so as to reach the face practically perpendicularly, and to block it off in about 42 ft. sections. A track is laid to the face of each room. As the rooms reach a length too great for profitable operation, cross-entries are turned off and new rooms are started from these entries—everything

proceeding on the 45-deg. system. It is important to have longwall rooms at right angles to the face, as the top rock settles better and the brushing of the top is easier.

Fortunate is the operator, during these days of the necessity for high production and with scarcity of labor, who has mechanical equipment adapted to his needs. The La Salle company was the first to install mining machines in the northern Illinois longwall field, and plans to add to the number on hand in the near future. The La Salle and Union plants of this company are machine mines and haul coal by motor.

The coal is undercut by Sullivan longwall machines, at the mines noted, to a depth of 4 ft. Each machine covers about 1000 to 1500 ft. of face, and after finishing this cut is moved back to the point of beginning. In some mines each machine continues on around the whole face; this plan avoids moving the machine back again, a loader will use it at the center, opposite a haulageway or room, to make a start on the coal while waiting for the top to work it. After the coal is loaded out props are set 3 ft. from the face and 1 ft. from the last break in the top; rock is then packed in at roadways up to these props. In machine mining the packing is done by day labor; in pick mining the miner contracts to brush the top and build packwalls. In pick mining, at the face the top is brushed 24 in. high, the width of the roadway (as per state contract), so there is about 6 ft. headway at haulageways. Finally, on account of settlement, 2 ft more of top is brushed to secure the necessary height. Usually back-brushing in the entries is sent out of the mine. In machine mining three to four feet of brushing is shot down and put in packwalls. This makes a larger and better pack and does away with back brushing to a large extent.

The best top breaks are about vertical. If the top is



FIG. 3. TIPPLE AT HISTORICAL LA SALLE MINE OF LA SALLE COUNTY CARBON COAL COMPANY

but it is a serious disadvantage when one machine in the lot is held up for one reason or another.

In the La Salle field there are more or less sulphur bands of irregular occurrence throughout the seam, especially in that portion of the bed next to the bottom. When a mining machine strikes a sulphur band, or ball, the bits are quickly incapacitated for further service; the hard sulphur either dulls them or in some cases breaks off the point. For this reason, a machine often undercuts an average of only 10 to 12 ft. of face with one set of bits. A machine gang includes a runner, a bit setter and a timberman. The latter follows the machine and sprags or blocks the coal by placing wedges in the kerf or undercut about every 6 ft. of face.

After the coal is undercut, the loader waits a certain length of time for the coal to break on account of the roof pressure. Meanwhile he snubs the coal or enlarges the kerf, so that the coal may fall better. Otherwise it might drop in a mass. Seldom should powder be used in loosening coal in longwall work. Occasionally not settling right, it is likely to break back at an angle over the coal; the weight then is largely taken off the coal, and it does not work right. For various reasons a portion of a longwall face may be retarded and the regularity of the line of the face be destroyed. Closed places often lead to loss of coal. In longwall work the best results depend on all miners or loaders coming to work regularly, so that one part does not lag behind other sections. Oftentimes two roads come together in such a way that a piece of coal is left between them. In any case where the weight comes on a body of coal insufficient to support it, the coal is crushed and lost. Or, if the top breaks over it, rarely is it recovered. The waste rock should fill the gob (the space between packs) sufficiently to allow the roof to come down gradually without breaking off short at the face or packs, but should not fill the gob so completely that it carries too much of the roof and does not throw enough weight on the face of the coal.

In the case of seams containing much sulphur, trouble

is often caused when coal is left in the gob. The sulphur adds to the danger of fire by spontaneous combustion. A gob fire is principally objectionable on account of its heating the air, and the fumes and smoke drive out the miners in the portion of the mine reached by the affected air current. The longwall mine has every opportunity for efficient ventilation, the air current sweeping along the entire working face where it is most needed. Some air always leaks through old packwalls; the crevices are not visible, but the hissing of air at leaks is sometimes noticeable. The air currents from different splits meet in a number of instances at a point along the face at the end of return airways, but no difficulty is experienced from baffling unless the air current on one side is very much stronger than that on the other. The modern acetylene mine-lamp contributes not only to the purity of the air, but to the safety of the miner as well. There is no smoke to pollute the air and also obscure dangers by an impenetrable cloud. The La Salle company uses a carbide lamp, made by the Shanklin Manufacturing Co., of Springfield, Illinois.

Accompanying this article are two illustrations (Figs. 2 and 3) of the surface plant at the La Salle operation. The general office of the company is shown in Fig. 3. Among the officials of the La Salle County Carbon Coal Co. at La Salle are: C. C. Swift, general manager; Adam Currie, mine superintendent, and J. D. Walsh, top superintendent. *Coal Age* is indebted to the courtesy of these officials for information about their operations.

Raising Two 350-Hp. Boilers

By M. C. Scheble
Sabinas, Coahuila, Mexico

The accompanying photographs show the method recently used for hoisting into position two large Wickes boilers that are being installed to utilize waste heat from 60 beehive coke ovens in northern Mexico.

The boilers are each of 350 hp. and designed for a working pressure of 225 lb. The bare boilers, as shown, are about 35 ft. in length and the drums are 84 in. in diameter. The weight of the boilers, without fittings, is 52,500 lb. each, and this total weight had to be suspended, momentarily, to get the boilers into position to be lowered to the final location.

To handle these boilers a frame was constructed 49 ft. in height. The legs were made of 12x14-in. all-heart timbers with heavy butt splices. The headpiece was made of two 12-in. 40-lb. I-beams.

Two sets of rope blocks were constructed. The upper blocks had six 18-in. sheave wheels and the two lower blocks five similar wheels. Two "snatch blocks" were securely fastened to "deadmen" set in concrete to the rear of the boiler settings, and two snatch blocks were also similarly placed near the edge of the railroad track in front of the boilers.

Three-quarter-inch, 6 x 7 haulage cable was threaded through the blocks and the two ends brought to the railroad track, passed through the snatch blocks there and fastened securely to two 55-ton locomotives. The boilers

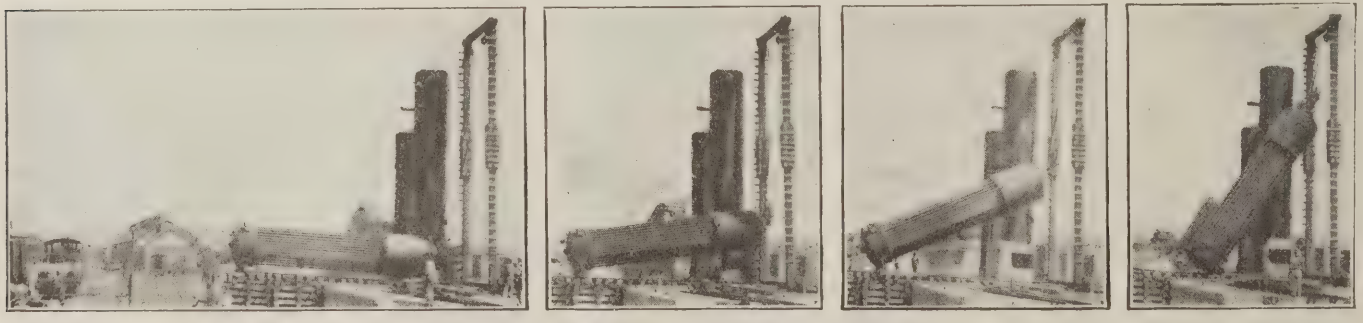


FIG. 5. BOILER IN PLACE ON FOUNDATION

were placed in the position shown in Fig. 1, the lower end being supported on four 56-lb. rails which were well greased.

When all was made ready the two locomotives moved in opposite directions and the boilers were hoisted slowly into position. The whole operation of hoisting the boiler shown in the pictures consumed 1 hour 30 minutes. The other boiler was set in position in 2 hours 20 minutes.

The lower, or rear, end of the boilers was prevented from moving forward too rapidly by means of blocks and cable, the latter being fed out from a small hand winch. The method as used proved safe and successful.



FIGS. 1 TO 4. PROGRESS MADE IN HOISTING BOILER FROM HORIZONTAL TO VERTICAL POSITION

The Coal Problem Under War Conditions*

By H. H. STOEK
Professor of Mining Engineering, University of Illinois

UNDER war conditions the middle man practically has been eliminated and the cost problem has assumed an entirely new aspect. Previously the product supplied a ruinously competitive and glutted market in many cases. Now there is a scramble for fuel in all parts of the country; it is only by the nicest adjustment of conditions affecting production, transportation and distribution of coal that the domestic consumer and essential industry can be supplied. In commenting on this situation, a representative of the Fuel Administration touches on increased production, the cost of coal, better utilization of fuel and the storage of coal. Some pertinent and helpful suggestions are made.

IT IS natural for every one participating in the production of war materials to think that the part of the war game in which he is a direct player is of paramount importance. Hence, the farmer, the gunmaker, the manufacturer of explosives and the railroad man each thinks he is the indispensable one; but, granting full credit to all of these and every other industry, no one can controvert the claim of the coal man that his industry is fundamental to the success of most, if not all of the other war industries. Without coal the railroads could not run, the munition plants would have to stop and the shipyards would go out of business, and no matter how large an army we might be able to raise and train, it would be impossible to equip, maintain and transport it to Europe if the coal supply were cut off.

Germany recognized the importance of coal in her initial drive toward Paris, and by over-running Belgium and northwestern France she not only protected her own coal and iron industry of western and northwestern Germany, but took from France and Belgium their coal resources and added them to the resources of Germany, thus striking a double blow at our allies.

Factors Preventing Maximum Coal Output

A detailed study of the effect of the war on the coal resources of Europe as it affects this country would be of interest, but space will not permit such a discussion in the present paper, which is confined to a few of the problems most closely connected with war conditions. The mines of the country have thus far been able to maintain an output up to the limit that the railroads could transport, and in all of the Government reports giving the reasons for the shortage the principal cause has always been the lack of cars and the lesser causes have been the shortage of labor, strikes and mine disability. In the reports for the week ending Apr. 27, 1918, the production was 74.7 per cent. of the full-time output, giving a deficit of 25.3 per cent. distributed as follows: Car shortage, 14.4; labor shortage and strikes, 4.4; mine disability, 2.8; no market, 1.2; all other causes, 2.5.

This is a creditable showing on the part of the mines up to the present time, but what of the future? The supply of new labor from southeastern Europe has been cut off, and men are being withdrawn from the mines for military service. It is becoming increasingly difficult for the mines to obtain equipment, hence operating conditions cannot improve materially; and this means more concentrated effort on the part of everyone connected with the mines if the output is to be kept up or increased to supply the natural and abnormal demands of war times.

No industry has ever been so completely revolutionized in so short a period of time as has the coal industry during the past year, and, even assuming that all of the changes made and proposed will be ultimately beneficial, no industry of the magnitude of the coal business can so completely readjust itself to new conditions without facing a number of problems that would naturally reduce production, at least temporarily.

Many Problems to Be Considered

Problem No. 1 from the standpoint of the miner and the operator would therefore seem to be to provide an increased production with a probably constantly decreasing labor supply, with material and supplies difficult to obtain and with agencies for distribution entirely different from those under which the industry has been operated for years.

Problem No. 2 might be stated as follows: What does a ton of coal cost? Prior to the war attention was being directed to this matter in various parts of the country by a number of different coal associations in an effort to furnish the Federal Trade Commission with certain information regarding the actual cost of producing coal. Throughout the country an effort was being made to get the detailed costs in a much more comprehensive way than had ever before been done.

Presumably the selling price of a ton of coal bears a fairly definite relation to its cost of production, but at the present time no one knows the exact basis upon which selling prices are determined. The cost of a ton of coal next to the cost of a loaf of bread appeals more definitely to every citizen than any other item of his daily life. Clothes are important and a necessity, but last winter's suit can be brushed up and worn again. Not so with last winter's coal pile; it is not only a definitely diminishing asset, but once gone is a permanently diminished asset which must be replaced by every householder, to some extent at least, no matter what the price may be. The coal bill, like death and taxes, is always with us. The per capita production of coal in the United States at the present time is approximately six tons per person, which means that every person in the United States must lay down at the mine mouth $12 to $18 per annum.

Every citizen is of course indirectly interested in copper and iron, but so indirectly that he does not realize the difference between copper at 15c. and at 35c., or between iron rails at $30 a ton and $90 a ton; but

*Paper read before the Illinois Mining Institute at Peoria, Ill., on May 23, 1918.

the increase in the price of coal to the domestic user of $2 to $3 per ton makes this problem one of very general and vital interest. A definite problem at the present time is therefore to determine what is the actual cost of producing coal and what is a just price for the consumer to pay.

No consumer can rightly object to paying a full, honest price for an article, which price includes a fair profit to the producer, but he has a right to object to overcharge or being made to pay for items in the cost account that do not rightfully belong there. For instance, if a certain retailer bases his profits on a number of bad debts that are excessive and due to his own careless methods of bookkeeping, and not upon a fair average of bad debts that must be included in any business, the purchaser has a right to object to thus being taxed for a part of his neighbor's bill. It is undoubtedly true that the coal producers are entitled to a much better return upon their business than that received prior to the beginning of 1917, but the sky-rocket prices of the first half of 1917 brought their own downfall.

Will Better Understand Production Costs

One definite outcome of the operation of coal mines under war conditions will unquestionably be a better knowledge on the part of the coal men themselves as to what it actually costs to produce coal. Greater publicity also will be given to these costs, and the general public will learn what constitutes a fair price and in this way two very harmful pre-war ideas should be done away with: First, the too prevalent idea of the coal producer and coal dealer that the general public has no right to know what it costs him to do business and that he is at liberty to charge just what he pleases and all that the traffic will bear; and second, the general public should give up the idea that has been all too prevalent that every coal producer and coal dealer is making money at an abnormal rate. The detailed study of costs now being made also means a closer study of ways of operating and an increased efficiency in the operation of mines.

Problem No. 3 may be stated as the better utilization of the coal product of the country. It is difficult for the American people to realize that in a country having practically unlimited coal resources it is necessary for them to be careful in the use of coal. Two years ago, if a person had said that it would be necessary to curtail the output in the ceramic industries and to compel the florists to operate half-time for lack of coal, he would have been laughed at; but these things have happened, and before another winter is over no one can prophesy what may be necessary in the way of suspension in order that the absolutely necessary war industries may be kept going.

The reason for the scarcity is easy to see, and it is an easy matter to blame it on the railroads, but while the railroads may be to blame for not delivering the coal, the user of the coal can not be excused for wasting a large part of the material delivered to him.

David Hyers, a well-known mechanical engineer of New York City, last winter estimated that 117,000,000 tons of coal could be saved by more efficient management of boiler furnaces. In this way a saving of about a billion dollars could be made, or enough to pay the interest on a Liberty Loan several times greater than any yet contemplated. It would require two million freight cars to move the coal that might thus be saved, and by such a saving the difficulty of the railroads might be done away with. The stopping of this waste has become not only an economic necessity, but it is a patriotic duty as well. Not only is the power plant an uneconomic user, but every householder and every form of industry must share the responsibility. So ingrained is the idea in every American that he is at liberty to waste all of the resources of the country that he wishes, that it will take some hard knocks to shake him out of this self-complacent attitude; and it looks very much as if some of these knocks are coming in the near future, unless the same result can be obtained by education, information and voluntary effort.

Problem No. 4 may be stated as the storing of coal for future necessities and the utilization of varieties of coal to which we have been unaccustomed in the past. Whether or not we like the zoning system we have it and must govern ourselves accordingly and in many cases must learn how to use different coal from those grades which we have been accustomed to use for many years. This, of course, does not affect most of the mining regions, but in cities like Chicago it is a material problem; for in that city approximately 100,000 flat buildings have been heated by furnaces designed to use smokeless coals and operated under a smokeless ordinance to which there is a penalty attached for allowing smoke to escape into the air. Suddenly the supply of smokeless coal is shut off, and as the same appliance must be used the fireman must be taught how to burn the new fuel. While this may temporarily cause an inconvenience to people in Chicago, it must ultimately benefit the coal industry of Illinois because it has been demonstrated that Illinois coal can be efficiently burned under city conditions such as prevail in Chicago; and when the people have been accustomed to it and the market firmly established, there will be no excuse to going back to coals produced outside the state.

Question of Gas from Coal

A similar problem is the production of gas from our local coals. This question had been studied carefully for some years prior to the war, and investigations are still under way looking to a more general use of Illinois coal in gas production as well as in coke ovens. This phase of the coal problem will unquestionably be of benefit to the coal industry.

When people become convinced of the fact that they can store Illinois coal in large quantities by properly handling it, they will look upon it as merely a form of insurance and will be perfectly willing to lay up in summer and spring a sufficient quantity to tide them over the congested period in the winter when it is difficult to operate both railroads and mines, and in this way both mines and railroads should be benefited by more regular operation during the summer and spring months. If the following suggestions are observed Illinois coal can be safely stored: 1. It is practicable, advisable and advantageous to store bituminous coal not only during war times but also under normal conditions, either at the mines, near the point where it is to be used or at some intermediate point. It is well to

store coal as near the point of consumption as possible to avoid rehandling. The reasons for storing coal are: (a) To insure the fuel consumer of a supply of coal at all times. (b) To take advantage of lower freight rates, or of lower prices of coal at certain seasons of the year. (c) To permit the railroads to utilize their cars and equipment to the best advantage. (d) To permit the mines to be operated more steadily.

What Coals May Be Stored

As to the kinds and sizes of coal that can be stored: (a) Although it is undoubtedly true that some coals may be stored with greater safety than others, the danger from spontaneous combustion is due more to improper piling of coal than it is to the kind of coal stored. (b) Most varieties of bituminous coal can be stored in the air if of proper size and if free from fine coal and dust. The coal must be so handled that dust and small coal are not produced in excessive amounts during the storing because spontaneous combustion is due mainly to the oxidation of the coal surface. All varieties of bituminous coal can be stored under water, which excludes the air and prevents spontaneous combustion. The danger of spontaneous combustion in storing the coal is very greatly reduced if not entirely eliminated by storing only lump coal from which the dust and fine coal have been removed. Of two coals the least friable should be chosen for storage purposes because less dust and fine coal will be produced in its handling. (c) Fine coal or slack has sometimes been successfully stored (1) by preventing air currents through the coal pile by means of a closely sealed wall built around the pile; (2) by closely packing the fine coal: Such a coal pile must be watched for heating. Piles of slack must be closely watched for rise of temperature and means provided for promptly moving the pile if heating develops. The only absolutely safe way to store slack or fine coal is under water. (3) Many varieties of mine-run coal can not be stored safely because of fine coal and dust mixed with the lumps. (4) Coal exposed to the air for some time may become "seasoned" and thus may be less liable to spontaneous combustion due to the oxidation of the surface of lumps of coal but opinions are by no means unanimous upon this point. (5) It is believed by many that damp coal stored on a damp base is peculiarly liable to spontaneous combustion, but the evidence on this point is by no means conclusive. It is safer not to dampen coal as it is being stored or after it is placed in storage.

3. As to the effect of sulphur on spontaneous combustion: It has been shown by experimentation that the sulphur contained in coal in the form of pyrites is not the chief source of spontaneous combustion, as was formerly supposed; however, the oxidation of the sulphur in the coal may assist in breaking up the lumps of coal and thus increase the amount of fine coal, which is particularly liable to rapid oxidation. Even this latter opinion is not unanimously indorsed. In spite of experimental data showing that sulphur is not the determining element in spontaneous combustion the opinion is widespread that, if possible, it is well to choose a coal with low sulphur content for storage purposes.

4. Regarding the method of piling coal: (a) To prevent spontaneous combustion either coal should be so piled that air can circulate through it freely and thus carry off the heat due to oxidation of the carbon, or else it should be so closely piled that air can not enter the pile at all, and thus the fine coal will not be oxidized. (b) Stratification or segregation of fine and lump coal should be avoided since an open stratum or a chimney of coarse lumps of coal gives a passage for air to enter and come in contact with fine coal and thus oxidizing and starting combustion. (c) If space permits, low piles are preferable, as the coal is thus more exposed to the air and better cooled than in high piles; also, in case of heating it can be more readily and quickly moved. A disadvantage in high piles is the greater difficulty of moving the coal quickly, if necessary. The idea that a high pile causes heating at the bottom is erroneous, since as many fires take place near the top as near the bottom and near the outside as near the interior of the pile. If possible the coal pile should be divided by alley ways so as to facilitate rapid loading out of the coal in case of necessity so that an entire coal pile may not be endangered by a local fire. (d) Much of the attempted ventilation of coal piles in the United States has been inadequately done by the use of only an occasional ventilation pipe which has been not much more than a place in which to insert a thermometer for reading temperatures. The practice of placing ventilating pipes close together has been used in Canada and is reported to have been effective. (e) Water is an effective agent in quenching fire in a coal pile if it can be applied in sufficient quantities to thoroughly cool and put out the fire, but a small amount is ineffective. Unless there is an ample supply of water to thoroughly quench the fire and cool the pile, it is dangerous to add any water to a coal pile. (f) Coal of different varieties should not be mixed in storage if this can be helped, for one coal that has a greater susceptibility to spontaneous combustion than the other may jeopardize the safety of other coals that are not so liable to spontaneous combustion.

Some Practical Storage Suggestions

5. The effect of storage on the value of coal: (a) The heating value of a coal as expressed in B.t.u. is decreased very little by storage, but the opinion is widespread that storage coal burns less freely when fired in a furnace. Experiments indicate that much of this can be overcome by keeping a thinner bed of coal on the grate than is kept with fresh coal and by regulating the draft. (b) The coking properties of most coals seem to be decreased as a result of storage. (c) The value of coal for making illuminating gas is not decreased as a result of storage. (d) The deterioration of coal stored under water is negligible and such coal absorbs little extra moisture. If only part of a coal is submerged, the part exposed to the air is still liable to spontaneous combustion.

6. Additional precautions: (a) The best preventative of loss in coal storage is to regularly inspect the pile and if heating occurs (up to 150 deg. F.) to keep close watch on the pile, and if the heating increases to 175 or 180 deg. to remove the coal as promptly as possible from the spot affected and thoroughly cool it before piling it again. (b) Storage appliances and arrangements should be so designated as to make it

possible to load out the coal quickly if necessary, and the coal should not be stored in large piles unless provision is made for loading it out quickly. (c) Pieces of wood, greasy waste or other easily combustible material mixed in a coal pile may form a starting point for a fire, and every effort should be made to keep such material from the coal as it is being put in storage. (d) It is important that coal in storage should be kept from such external sources of heating as steam piles, because the susceptibility of coal to spontaneous combustion increases rapidly with an increase in temperature.

These are but some of the problems due to war conditions, and while there may be some temporary embarrassment and inconvenience resulting from them, I am personally convinced that as a result of the war the coal industry will be benefited. On account of the prominence given to the subject of coal and the widespread discussion of it, the coal industry is even now better known and more talked of than any other industry in the country. P. T. Barnum once said that he did not care what people said about him so long as they said something, for in that way they thought of P. T. Barnum. So it will be with the coal industry. If people think about it enough, they must ultimately know something about it and have a more intelligent understanding of the coal problem than they have had in the past and thus be more sympathetic to the miner and operator and not antagonistic as they have always been.

In the second place, the producer of coal by being compelled to analyze his operating conditions should be better able to produce coal efficiently and relatively more cheaply, although I do not believe that coal will ever recede to the low prices at which it was formerly mined and sold. No business of the magnitude of the coal business has ever been so disorganized prior to war conditions as was the coal business, but one of the very things sought to be accomplished for years has come to pass; namely, the formation of a National Coal Association, which had been tried many times in the past but always failed due to the fear of the Sherman law. People have become so accustomed to thinking in billions that combinations in the future will not nearly have the same frightfulness that has been true in the past. Under war conditions and sometimes under compulsion, labor and capital have come closer together and each side has learned many of the inner secrets of the other, so that there should be less distrust in the future than there has been in the past. Frightful, therefore, as is the war, I believe its effect on the coal industry will be a beneficial one.

New Bulletin for Large Coal Users

At this time, when fuel engineers and manufacturers are deeply interested in the conservation of fuel in order that those industries essential to winning the war may not be handicapped, they will welcome a publication just issued by the Bureau of Mines of the Department of the Interior, giving thousands of analyses of coals from many hundred mines in the United States, for these analyses enable the users of coal to realize the amount of heat they are buying.

Bulletin 123 "Analyses of Mine and Car Samples of Coal Collected in the Fiscal Years 1913 to 1916," is a continuation of the sampling and analyzing of the coals of the country begun by the Federal Government in 1904. It is the third of the series, Bulletin 22, "Analyses of Coals in the United States," which can now only be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 85c., being the first. The second bulletin of the series, Bulletin 85, "Analyses of Mine and Car Samples of Coal Collected in the Fiscal Years 1911 to 1913," is still available for distribution by the Bureau of Mines.

The present bulletin presents analyses and descriptions of samples collected during the fiscal years 1913 to 1916. In order that the material in this bulletin may be used to supplement that presented in Bulletins 22 and 85, the same plan of geographical classification has been followed, the analyses and descriptions of the samples being grouped in alphabetical order according to the state, county and town near which the mines or prospects sampled are situated.

The three bulletins, which do not conflict, constitute an extensive analyses of the coals of the United States and should prove of great value to those who purchase large quantities of coal. The day has passed when the industries buy coal as coal. They now buy heat units and know what they are buying. Bulletin 123 is of no particular interest to the domestic consumer of coal. It is for the industries that require large quantities of coal and to whom the cost of coal now is an increasingly large factor in the conduct of their works.

Copies of Bulletin 123 may be obtained free of charge by addressing the Director of the Bureau of Mines, Washington, D. C., as long as the present edition remains.

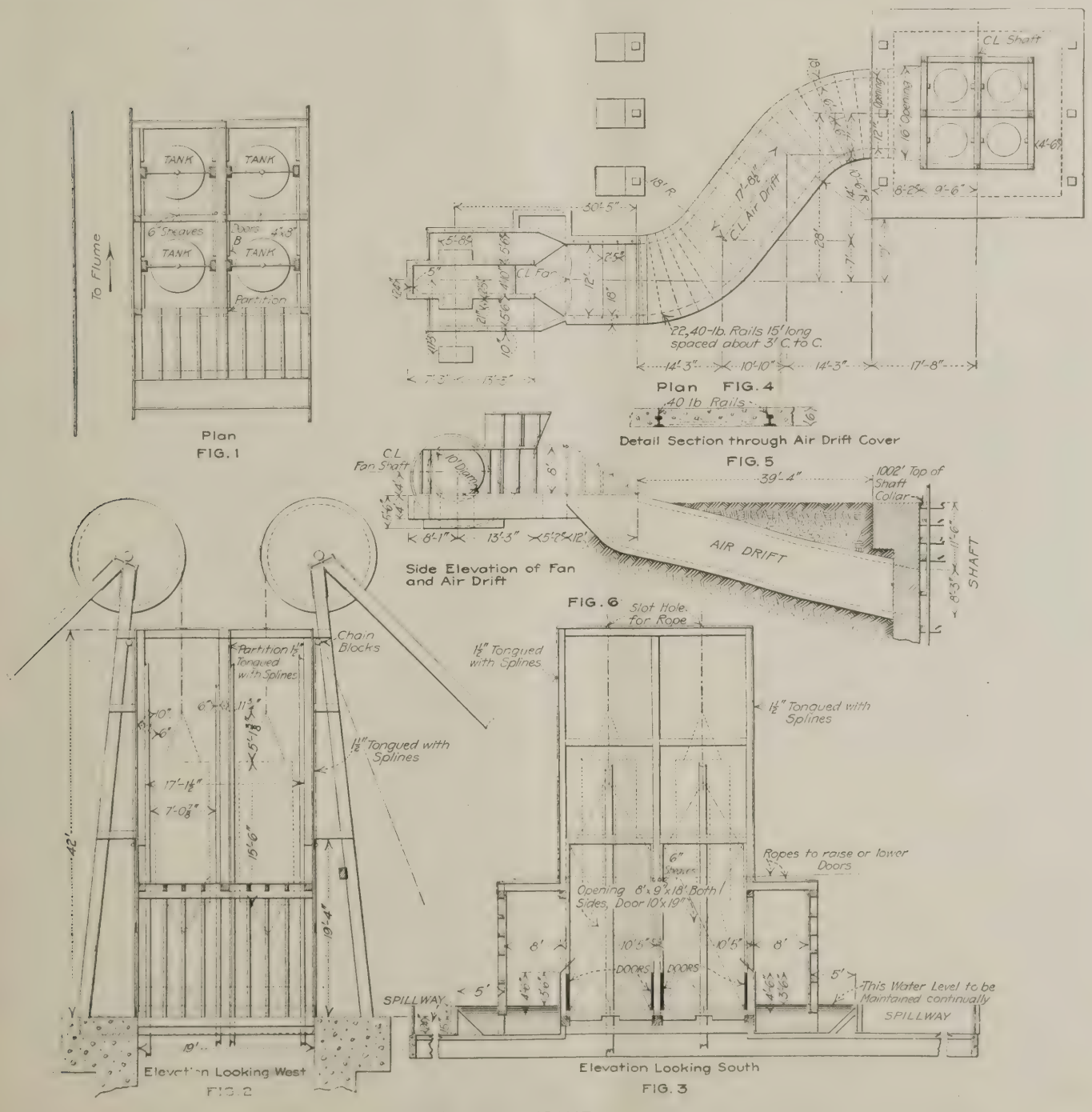
Legal Department

KENTUCKY MINE PROP LAW — In affirming judgment against defendant mining company for death of a miner caused by a fall of slate at a place where he and his buddy were engaged in drawing pillars, the following points were decided by the Kentucky Court of Appeals, in the case of Kirk vs. Borderland Coal Co., 203 Southwestern Reporter, 534. The Kentucky statute, providing that "every workman in need of props, cap pieces and timbers shall notify the mine foreman or an assistant mine foreman, or any other person delegated by the mine foreman, of the fact at least one day in advance, giving the number, size and length," etc., applies only to those miners who are charged with the duty of propping. The custom of a mine may be proved for the purpose of showing upon whom the duty of propping devolved. Even if the company's rules purport to require every miner to do his own propping, waiver of the rule in general practice may be proved. When a coal operator designates employees to do necessary propping, such employees become representatives of the operator for that purpose and their negligence is actionable negligence of the operator, if it results in injury to other miners. Where a miner is assured by one in authority that a given place of work is safe, the miner may continue at work there without assuming the risk of being injured through the existence of some dangerous condition negligently permitted by his employer to exist. Such assurance may be given in implied, as well as express, terms. Hence statement by a timberman to a miner, "All right, so long," may be found to have been an assurance to the miner that a place which it was the timberman's duty to prop, if propping was reasonably necessary, was safe.

Shaft for Water Hoisting and Ventilation

ABOUT halfway between Lansford and Tamaqua, Penn., on Locust Mountain, there is a unique installation at shaft No. 10 of the Greenwood colliery of the Lehigh Coal and Navigation Co. It is known locally as a "water seal"—a scheme which permits of the same shaft being used both for ventilation and water hoisting. The combining of the two functions—ventilation and hoisting of materials such as water, coal, etc.—has been practiced on the continent of Europe for some time, but as far as known the first application in the United States is at the Greenwood shaft of the Lehigh Coal and Navigation Co. The Greenwood colliery is in the Panther Creek Valley, about three miles west of Lansford. The workings are on the north side of the valley, mainly in the south dip seams. It is interesting to note the development at this old operation. It was first opened up in 1860 by a water-level tunnel which cut the Primrose bed and the Mammoth seam in two places.

In the early days of mining in the Panther Creek Valley, the coal was started on its way to market over planes and gravity roads, and thence by water transportation to its destination. The coal from the Greenwood tunnel in 1860 was transported to Coaldale to the foot of No. 2 plane; it was hoisted up this plane and then run by gravity one mile east to the foot of No. 1



FIGS. 1 TO 6. DETAILS OF WATER SEAL AND FAN AT SHAFT NO. 10, GREENWOOD COLLIERY

plane; after being hoisted up this latter plane to Summit Hill, the coal was run by gravity on a railroad to Mauch Chunk, where it was loaded into boats and shipped to market via the Lehigh Canal. In the '60's railroad transportation was not carried on by means of 100,000-lb. capacity steel hopper cars equipped with Westinghouse air brakes. The little 5-ton wooden "jimmies" with their hand brakes were the terror of railroad officials. It often seemed as though they did not wait for even a legitimate excuse to leave the rails, and wrecks were common occurrences.

The gravity road from Summit Hill to the Lehigh Canal and the planes used to transport the empties back to Summit Hill have long outlived their usefulness as part of a coal-transportation system, but as the switchback of today contribute to the pleasure of tourists. The old method of transportation gave way in 1872 to

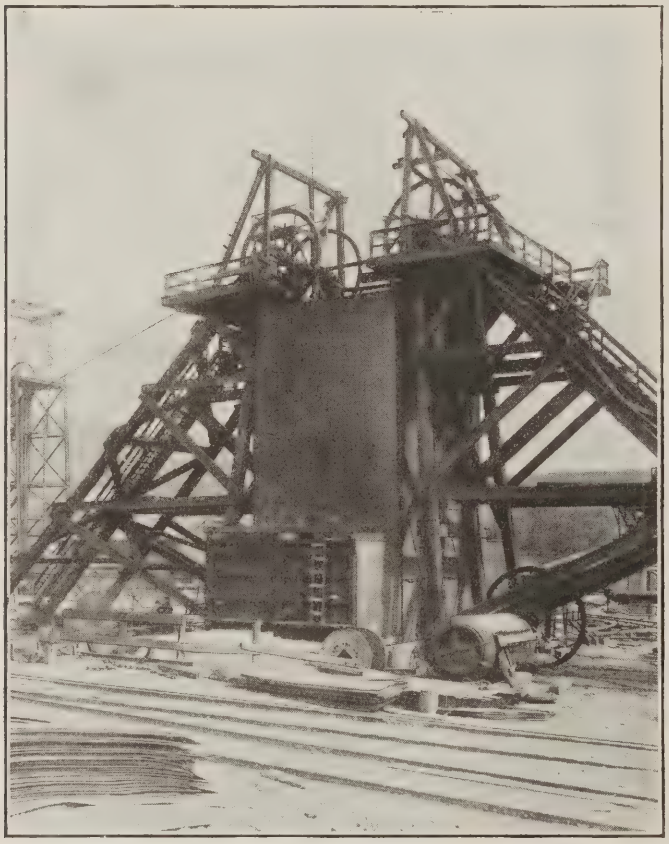


FIG. 7. HEADFRAME AND WATER SEAL AT SHAFT NO. 10

the one in vogue at the present time; the Locust Mountain was tunnelled by the Lehigh Coal and Navigation Co. at Lansford, and thenceforth coal from the Panther Creek Valley went to market by rail via the Nesquehoning Valley to Mauch Chunk, where it reached the main line of the railroad, since leased to the Central Railroad of New Jersey.

Continuing the description of the development of the Greenwood colliery, in 1870 a slope was sunk 250 ft. in the Mammoth seam from the water level; in 1880 the slope was extended 250 ft. for a new lift. A coal shaft was sunk in 1905 to develop a new level below the slope workings; and two years ago another shaft was sunk to open up a new level under the old shaft level. When the slope was sunk in 1870, engines, boilers and a fan were placed on the mountain back of the outcrop of the Mammoth seam.

In 1904 a new breaker was built at the Greenwood mines; a boiler house was erected having in mind utilizing the steam from this plant for power for the breaker and for a proposed water shaft which was started the following year. The boiler house on the mountain was now abandoned and a 2200-ft. steam line was established to operate the engines and fan at the Mammoth outcrop. The water shaft, which was sunk in 1905 to a depth of 620 ft., has four compartments; four water tanks are operated in the shaft by two pairs of engines, one pair on either side of the shaft, as indicated in Fig. 7.

In 1914 the slope workings were robbed out, the slope was abandoned and the engines were utilized to sink a new shaft. Various complications connected with the old ventilating system at the Greenwood colliery made it necessary to revise the method of ventilation and erect a new fan. After considerable discussion it was decided to utilize the water shaft and make it do double duty for air and water rather than to sink a new air shaft at a cost of $60,000. The available area of the water shaft is 256 sq.ft. As 3000-gal. tanks were to be used of a diameter of 5 ft. 10¼ in., the horizontal area of the four tanks would amount to 107.5 sq.ft. Thus, after subtracting the area of the four tanks, 148.5 sq.ft. horizontal shaft area would be left available for ventilation. Then it was a question whether the tanks, when in operation, would have any detrimental effect on the air current. On account of the large area available it was decided that they would not seriously interfere with the ventilation. Since the fan has been in operation a test showed that this conclusion was justified.

The Greenwood colliery is a prominent operation in the Panther Creek Valley, and its name lends selling power to the coal of the Lehigh Coal and Navigation Co. "Summit," "Greenwood" and "Old Company's Lehigh" are well-known trade names. The boiler plant at this mine stands out prominently on the mountain side. Its 16 stacks indicate its size and bespeak the power required to carry on the various operations connected with the mining and preparation of the Greenwood coal. This boiler plant is shown at the right of Fig. 8. The headframe of the water hoists is in the center, and the new fan and its engine house are prominent in the foreground. The top of the Greenwood breaker shows immediately to the left of the boiler-house stacks.

Like many effective operations, the idea embodied in the water seal and also its construction is extremely simple. The principal problem in the case in question was to make a water seal which would permit of delivering water through it from the 3000-gal. tanks without disturbing the ventilation. The solution of this problem as worked out by the Lehigh Coal and Navigation Co. has proved to be a complete success, and the construction details are given in the accompanying illustrations.

In Fig. 3 is shown a cross-section through the shaft and the water seals, one on either side of the shaft. To permit of handling the tanks without disturbing the ventilation, the shaft was practically extended by a casing 42 ft. above the headframe foundations. This casing is built of 1½-in. boards tongued with splines (similar to tongued and grooved). Excess height is

provided in this casing to allow for ample space in which to handle the tanks at the discharging stage of their operation. In the cross-section (Fig. 3) the water tanks are shown dotted in their discharging position.

When the water leaves the 3000-gal. steel tanks it flows into the wooden tanks at the side of the shaft, overflows from them to a spillway and is carried off by a flume to a near-by reservoir. One end of these wooden tanks is included in an extension of the shaft casing, part of which drops about 1 ft. below the ordinary level of the water, thus acting as a seal or lock to the air in the shaft but permitting of free passage of water underneath. The hood over the shaft end of this wooden tank is shown in Fig. 7. In this illustration the water is welling out over the outside end of the wooden tank as a steel tank is discharging into the inside portion. It is an interesting sight.

Other features connected with the casing over the shaft include arrangements for opening it to remove the steel tanks for repairs or to do other necessary work in the casing while the fan is running. On both sides of the casing are 10 x 19-ft. vertical doors through which the tanks may be removed. When these outside doors are to be opened the top of the shaft is first closed by dropping another set of doors which prevent disturbance to ventilation. A vertical partition in the center of the shaft top casing permits of one hoist being operated while the other is being repaired.

Closely associated with the water hoists at shaft No. 10 is the fan and the method of ventilating the Greenwood workings through the same shaft. At the time plans were being considered for unwatering and ventilating this mine, a ventilating system was projected which showed the proposed workings of the entire mine, noting sizes of all airways, gangways, overcasts, etc. The resistance was calculated for the conditions which would exist when the development work had reached the point where the maximum resistance would be encountered. The number of men that would be employed in the mine was estimated, also the number of splits, and the number of men that would probably be employed on each split.

Thus in this manner it was ascertained that conditions would require a fan with a capacity of about 200,000 cu.ft. of air per minute. The Jeffrey Manufacturing Co., of Columbus, Ohio, furnished a fan which met the necessary requirements. Its normal capacity was 200,000 cu.ft. per minute at 170 r.p.m. and 125 brake-horsepower. The reversing mechanism of the steel fan included steel reversing doors for the chimney, hinged to its front and provided with the usual operating parts. The casing was also provided with all necessary side drift reversing doors. The fan was constructed of $\frac{3}{16}$-in. steel plate and a steel chimney with 110 sq.ft. area. The fan gives the following results according to the various speeds of the operating engine:



FIG. 8. HEADFRAME AND WATER SEAL ALSO OTHER PLANT AT GREENWOOD COLLIERY

R.p.m.	Volume, Cu.ft.	Gage, In.	Brake-Horsepower
170	200,000	3.00	125
128	150,000	1.70	54
86	100,000	0.75	16
44	50,000	0.20	4

An interesting test was made in connection with shaft No. 10 with which this fan is connected. Meas-

urements of air were taken when water was being hoisted up the shaft and again when the tanks were not in motion. When hoisting water, the area of the main airway inside equals 11.5 × 7 = 80.5 sq.ft. The velocity of the air equals 1705 ft. per minute, which gives 137,252 cu.ft. per minute. When not hoisting water, the velocity of the air equals 1770. These conditions give 142,485 cu.ft. per minute. The water gage at the fan was 2.8 in. and the speed of the engine 86 r.p.m. Thus it is seen that the operation of the tanks in the shaft does not have a very detrimental effect on the air currents, due chiefly to the large shaft area. Normally the fan is run exhaust, as the workings in parts of the Greenwood mines are very gassy.

A general view of the fan and its engine house is given in Fig. 8; the details of construction of the fan and drift are shown in Figs. 4, 5 and 6. In locating the fan it was placed on the north side of and 28 ft. west of the center line of the shaft, so as not to interfere with the piers for the shaft headframe. Connection with the shaft was made by a concrete conduit 12 ft. wide and 8 ft. high, giving an area of 96 ft. The fan house was constructed of hollow tile plastered with cement. The roof was made of protected corrugated steel. Thus fireproof construction was used throughout.

It would be interesting to see how the air-lock scheme would work out when applied to a shaft through which coal is hoisted and which is also used for ventilation. It has been worked out in practice in Europe and might readily be accomplished by having the top of the shaft housed in similar to the method at the Greenwood colliery. Instead of having the mine car discharge inside the housing the cage could pass through an air lock and the coal be dumped outside. This air lock might be equipped with two sets of doors, capable of being automatically opened and closed by the cage in its passage through the lock. When one set of doors is open the other should be closed.

Naturally, a scheme of the kind outlined would likely only find application in special cases similar to the proposition which confronted the Lehigh Coal and Navigation Co. at its No. 10 shaft. In the case in question a considerable saving was effected by using a shaft already sunk for both ventilation and water hoisting. In planning a new operation, where two openings to a mine are required by law, it is questionable whether the air-lock scheme would often be advocated. In a number of drift mines in bituminous regions, especially before development is well under way, a similar plan is frequently used, for a time at least. In this case the fan may be placed at the mine mouth of a double-entry system; the air travels in in one entry and out the other. The return airway is used as a haulageway until within a thousand feet or so of the mine mouth, when a change is made to the intake. A trip of cars in passing out of the mine goes through an air lock, thus not interfering with the ventilation.

George W. Wickersham, former Attorney General of the United States, says: "Business as usual means waste as usual."

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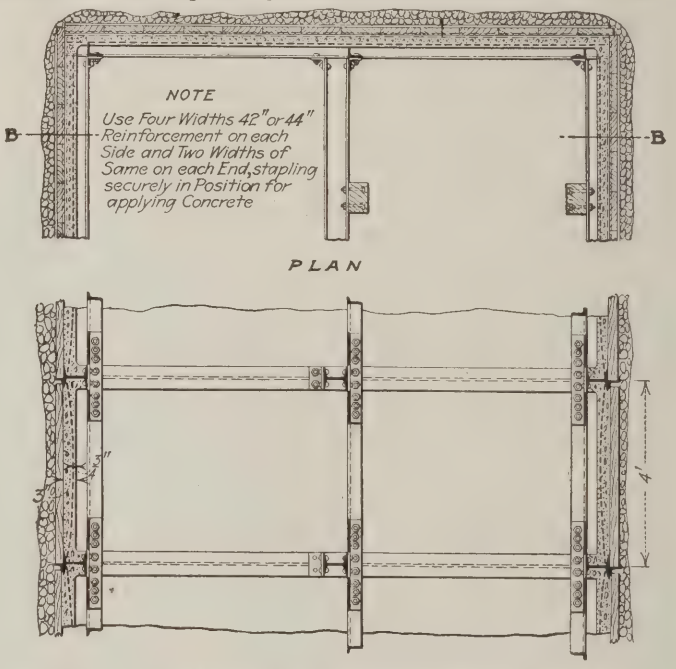
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Relined a Mine Shaft with Cement Gun

During the past four years, ten mine shafts on the Iron Ridge in Minnesota have been relined with precast concrete lumber. In many others monolith concrete has been used. Recently the cement gun has been employed to reline the Penobscot pump shaft of the Oliver Iron Mining Co., at Hibbing. This shaft, lined with steel sets and 2-in. wood plank, was sunk in 1911. It was finished in 1912, reaching a depth of 231 ft. All the water from the Hull-Rust pit, one of the largest open-pit mines in the world, is pumped out through this shaft. Originally the pumps handled 1000 gal. a minute, but now the discharge is only 400 gal. in the same time.

The shaft is about 11½ x 6 ft., with two compartments 5½ x 6 ft. The steel sets are made up of 6-in. beams of H-section and the buntons are 6-in. I-beams. The sets are spaced on 4-ft. centers.

The work of repair, which is to be described, was started at the top and proceeded at the rate of two sets



METHOD OF FASTENING REINFORCEMENT STEEL—SECTION B-B

per day, a daily advance of 8 ft. Concrete was placed over the wood lining in two layers, each 2 in. thick. Sollars or temporary platforms were put in every 15 to 20 ft. in order to prevent the sand from the cement gun from dropping down the shaft, and also to prevent accidents from falling materials. The shaft ladders were removed as the work proceeded, in order to give the men sufficient operating room. The sets were concreted in order, except those at which the sollars had been placed. After the concrete had hardened in the sets above and below the sollar sets, the sollar was removed and the set on which it rested was concreted.

Before, however, the cement-gun work was started, reinforcing was placed all the way down the shaft. This was wire mesh, cut into lengths of 4 ft., so that when placed between the sets it would curve out, forming tension reinforcement near the interior face. To hold the reinforcement in place hook spikes made from ¾-in. rods were driven into the timbers, close to the sets. The sand and cement as mixed in the cement gun was fed to the nozzle through a 1¼-in. hose. Wear on the

rubber connections from the gun to the delivery hose made it necessary to replace these connections several times. Otherwise no repairs were needed. Six men were employed besides the foreman, who gave only a part of his time to this job. Three men measured the sand and cement, mixed the materials and carried the mixture to the cement gun. One man attended to the gun and two men were down in the shaft handling the nozzle. While one was busy with the nozzle the other would be trimming. Sand was obtained from a bed in an open-pit mine and brought to the job in 7-yd. wooden dump cars, being screened through ¼-in. mesh and dried with steam coils.

Though the workmen had no experience to begin with, they were of an intelligent laboring class and were able to do the work satisfactorily after a little training. For a 10-hour day the ordinary work of six men was three sets or 12 ft., applying a layer of one coat 2 in. thick. The best results were obtained when the sand was thoroughly dried and mixed with the cement before being placed in the cement gun, and batches of 1 to 1½ cu.ft. were handled by the gun much more satisfactorily than larger batches. With these precautions the flow to the hose could easily be regulated, making it possible to place the concrete smoothly on the walls of the shaft.

Sand was heated in a specially built drier seven coils wide and seven coils high and 12 ft. long, made of 1½-in. pipe. It would sift down through these coils and be perfectly dry when it reached the bottom. A double ¼-in. mesh screen, placed on a slant, was used directly above the coils. Experience with this improvised drier showed that it would have been more efficient if the pipes had been shorter. Steam was obtained from the stationary plant at Penobscot mine, while the air used in operating the gun was furnished by a Westinghouse air pump, furnishing about 220 cu.ft. a minute, carrying 70 lb. pressure. At the nozzle the air pressure was from 20 to 22 lb., and water pressure 100 pounds.

In experimenting it was found that if the sand and cement were placed in the gun separately and then mixed, there was much waste material from the rebound when the concrete was shot on the wall. After the dried sand and cement were mixed before being put into the gun, this waste material decreased materially.

Sollars were put in every three or four sets and were cleaned every day. They were made of 2-in. plank and extended 4 in. on either side of the compartment and so could not slide out of place. At the end of each day's work the hoses, nozzles and gun were completely cleaned.

After the shaft was lined the water gave no further trouble, and the mine officials were so well pleased that they decided to use the cement gun in pointing up joints in the Philbin shaft where precast lumber has been used for the lining. Before treatment water was seeping into the shaft below the 75-ft. level, but this was stopped by a single coat of cement-gun concrete.—*Engineering News-Record.*

Liquid fuel has a simple molecular structure, and the ease with which the light oils are changed to vapor make these oils readily adaptable to many purposes for which gas is used.

Record July Shipments of Anthracite

The shipments of anthracite for July, as reported to the Anthracite Bureau of Information at Philadelphia, show gratifying increases both over June of this year and over July, 1917. The record for last month was 7,084,775 gross tons, against 6,867,669 tons in June, and 6,724,252 tons in July of last year, the increases being respectively 217,106 tons and 360,523 tons. The shipments in July were the largest ever made in that month in the history of the industry, and have been exceeded only twice—in March of this year when they amounted to 7,276,777 tons, and in October, 1917, when they were 7,110,950 tons. The total shipments for the first four months of the present coal year—April to July, inclusive—have amounted to 27,208,073 tons against 26,283,113 tons for the same period of 1917.

Not the least gratifying showing in the returns for last month is a substantial increase in the output of domestic sizes, which in the earlier months of the year had shown a relative decline. The shipments of domestic sizes, including pea coal, in July were 4,634,651 tons, an increase of 135,675 tons over the preceding month. In fact, more than 60 per cent. of the total increase was in the domestic sizes of coal. The shipments by railroads were as follows:

	July, 1918	July, 1917	Coal Year, 1918	Coal Year, 1917
P. & R. Ry.	1,420,624	1,256,316	5,356,093	4,943,301
L. V. R.R.	1,319,731	1,254,647	5,176,042	4,866,238
C. R.R. of N. J.	641,547	603,704	2,359,412	2,379,374
D. L. & W. R.R.	1,034,561	1,052,944	4,095,620	4,122,123
D. & H. Co.	820,530	758,695	3,191,764	2,990,805
Penna. R.R.	504,630	510,941	1,929,121	1,942,344
Erie R.R.	824,242	768,245	3,037,121	3,026,896
N. Y. O. & W. Ry.	167,656	168,915	717,326	675,445
L. & N. E. R.R.	351,254	349,845	1,345,574	1,336,587
	7,084,775	6,724,252	27,208,073	26,283,113

Molecular Consistency of Gases

According to the kinetic theory, gases consist of freely moving molecules. The contacts or collisions among molecules of different nature produce chemical action. Therefore for complete combustion to take place in the mixture of gases, each molecule of the combustible must come in contact with the number of oxygen molecules required to burn it. The concentration or number of molecules of combustible gas and oxygen in a unit volume will influence the number of collisions taking place. According to the law of mass action, the velocity of a chemical reaction in the combustion process is proportional to the products of the concentrations of the oxygen and the combustible substances; that is, if one molecule of substance A reacts with one molecule of substance B the velocity of the reaction at any moment is proportional to the product of the number of molecules of A and B present in unit volume. If several molecules of one substance are taking part in the reaction, the concentration of that substance must be raised to the corresponding power. Thus if one molecule of substance A reacts with two molecules of substance C the velocity of the reaction will be proportional to the number of molecules of substance A in unit volume multiplied by the square of the number of molecules of substance C in unit volume. Thus it can be said that the velocity of a chemical reaction increases when the concentration of the reacting substances increases.

DEPARTMENT OF HUMAN INTEREST

Eye Hazard in Coal Mining

The bulletin of the Pennsylvania Department of Labor and Industry, Vol. IV, Series of 1917, No. 7, gives the following information regarding eye accidents in the anthracite and bituminous coal industries of Pennsylvania. The classification forms are prepared for ordinary industrial accidents, consequently some of the subdivisions seem awkward to a mining engineer:

Cause of Accident	Eyes Lost		Other Compensable Accidents		Non-compensable Accidents	
	Anthracite	Bituminous	Anthracite	Bituminous	Anthracite	Bituminous
Machinery						
Boiler, steam pipes, etc.						1
Transmission apparatus					1	
Adjusting machine or work						1
Operating and feeding						1
Oiling					1	
Cleaning					1	
Repairing				1	1	1
Breaking of machine or work				1	2	2
Flying objects	1	1	7	7	74	89
Explosives, electricity, fires, hot and corrosive substances						
Corrosive substances			4	3	15	16
Electricity	1		1	2	9	28
Explosives	11	10	19	16	9	7
Hot substances and flames			2	4	21	21
Conflagration						1
Falling objects						
Rock and earth	3	4	50	76	119	251
Dropped by other persons					2	
Falling from trucks and vehicles						1
All others			3	7	13	12
Fall of persons						
From ladder						1
From scaffolds or platforms			1	1	1	
From vehicles						1
From other elevations					1	
Into openings other than excavations					2	1
On level			2	2	14	5
Handling of tools and objects						
Tools in hands of injured persons	1	3	2	14	21	32
Tools in hands of fellow workmen		2		2	3	4
Handling sharp objects			1			
Loading and unloading			1		8	6
Carrying and lifting objects (not loading or unloading)				1	2	7
All others			1	2	9	12
Power vehicles on track						
Coupling or uncoupling cars					1	1
Defective equipment						1
Fell from, over or into			1		1	3
Loading or unloading material			3		11	6
Struck by car or engine			1	1	1	
Struck by overhead or side obstruction				2	2	2
Collisions				2	1	4
Derailments and replacing cars				2		8
Miscellaneous						
Stepping on nails				1		1
Running into or striking against objects			4	4	21	17
Poisonous substances		2		2		1
Flying objects (not from machines, etc.)	39	41	257	279	751	956
Animals	1	2	4	7	12	6
Intentional violence		1		1	3	3
All others		1	2	3	5	4
Total	57	67	366	443	1,138	1,514

Looking over these figures we soon see that the larger number of accidents are from falling objects (rock and earth) and from flying objects (not from machines, etc.). The number of these accidents seems to suggest the use of goggles by miners. There were 7 eyes lost, 126 compensable accidents and 370 noncompensable accidents from falling rock and earth, while there were 80 eyes lost, 536 compensable accidents and 1707 noncompensable accidents from flying objects (not from machines).

In view of the small number of men engaged in machine shops around the mines the number injured shows that the hazards are great. The three causes "tools in hand of injured persons," "tools in hand of fellow workman" and "handling sharp objects" explain 6 lost eyes, 19 compensable accidents and 60 noncompensable. Those eye accidents to miners and shop workers which may be avoided by the use of goggles can roughly be computed by adding together the accidents, compensable and noncompensable, from falling rock and earth, from flying objects (not from machines) and from tools. The number of eyes lost thus totaled was 93 out of 124. The compensable accidents amounted to 680 accidents out of 809 accidents to the eyes. The noncompensable accidents account for 2137 out of 2652. Thus the eye hazard would be almost entirely avoided if protection for the eyes were provided for these two classes of men.

The following estimate has been made by F. H. Trego, of the Mine Safety Appliances Co., of the losses due to the eye hazard in the Pennsylvania anthracite mines during 1916, based on these figures:

57 lost eyes at $1,675 per eye	$95,475
366 compensable eye accidents including medical attention at $75 per accident	27,450
1138 noncompensable eye accidents, including time lost and medical attention at $18.93 per accident	21,542
Total	$144,467

The loss from the eye hazard at the bituminous mines of Pennsylvania during 1916 is figured as follows:

67 lost eyes at $1,675 per eye	$112,225
443 compensable eye accidents, including lost time and medical attention at $75 per accident	33,225
1948 noncompensable eye accidents, including lost time and medical attention at $22.16	43,168
Total	$184,410

The figures for lost time and medical attention in noncompensable accidents are based on the average experience for all noncompensable accidents of the year 1916 in the State of Pennsylvania. According to this method of calculation the number of days lost in the Pennsylvania anthracite mines for noncompensable eye accidents would be 6475 or 5.69 days per accident; in the Pennsylvania bituminous mines it would be 12,311, or 6.32 days per accident, if the severity of noncompensable eye accidents is equal to the severity of all noncompensable accidents at Pennsylvania mines of like character.

Buried Under Rock and Yet Lives

By E. H. Graham

It happened within the past month. He was an inspector who, desiring to get a quick fall of roof in a worked-out place, seized an ax and began chopping one of the few remaining timbers. The miners, having recovered the pillar, had removed all the timbers that could be recovered with perfect safety. They warned

our friend that he was in danger, that what he was attempting was unnecessary as the roof would break the remaining timbers in a short time and thus give the desired fall, but impatient and overconfident he chopped away until a piece of slate became dislodged and caught him, pinning him to the ground by his foot so that he could not extricate himself.

The one witness tried hard to release the victim, but the piece of slate was too heavy for him, so he ran for assistance. During his absence and before the rescue party could arrive, the thing expected by the miners happened—the roof fell, more than 15 tons of it, carrying with it the remaining timbers. When the rescue party arrived, they saw a mass of rock and slate 6 ft. in height, but no inspector. The work of search was immediately begun and after four hours of the hardest and fastest kind of work they came upon the body, which they discovered had been entirely entombed by the mass of rock and slate.

And here a miracle—the supposed victim was not injured at all. Providence is kind at times, even to the foolish.

When the roof fell two of the large timbers, which came with it, fell one on either side of the prostrate inspector, and by some unaccountable combination of circumstances large pieces of slate and rock supported by these timbers took the weight of the entire fall, leaving the man unhurt. This accident without doubt illustrates just what has been the cause many times of fatal roof falls; only in those cases the man did not escape, and so no one has been able to tell just how the accident occurred.

Recovering timbers from worked-out places need not of necessity be a dangerous undertaking, if only experienced men do the work, and they do it with a liberal factor of safety. In the case cited all the timbers that could be safely removed had been recovered. The accident was due to the impatience of the inspector in his desire to hurry the fall.

Occasion may arise when it is desirable to cause a fall without waiting for nature to do its work. If so, a half stick of Monobel lashed to the timber will break it, or better still a hole can be drilled at an angle near the foot of a prop so as to terminate under it. By loading and firing this shot, the prop will be safely dislodged. This accident could have been avoided by either of these means. The miracle by which our friend escaped gave us valuable information, and from this recital of it all should profit

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Patriotism and Cold Cash—The coal miners of the Colorado Fuel and Iron Co. have subscribed for $300,000 of War Savings Stamps and $67,000 to the Second War Fund of the American Red Cross. At Frederick alone, $30,000 worth of stamps were subscribed for. The Liberty Loan campaign also was most successful in interesting the mine workers. At Sopris the senior Red Cross organization has furnished 476 garments for refugees and the Italian women have started a knitting class.

COLORADO will soon have to give up the use of the word "camp" and call its mining villages "towns," so old-world are its activities and permanent its homes. One illustration shows a colored Red Cross chapter in session at Lester, and another a flag-raising at Cameron. Both "camps" are owned by the Colorado Fuel and Iron Company.





Courtesy of C. F. & I. Bulletin.

Who's Who In Coal Mining

Joseph Gardner Bradley

If there is one trait which Joseph Gardner Bradley, chairman of the executive committee of the West Virginia Coal Association and incidentally president of the Elk River Coal and Lumber Co., possesses to an eminent degree it is his broad-mindedness—his ability, if you please, to see both sides of a question—and to realize the viewpoint of others. In short, his is a mind which perceives actualities. It will thus be easy for the reader to form some conception of how fortunate the West Virginia Coal Association was in securing a man of his caliber for its guiding genius although,



JOSEPH GARDNER BRADLEY
President of the Elk River Coal and Lumber Co. and Chairman of the Executive Committee of the West Virginia Coal Association

parenthetically speaking, Mr. Bradley is so innately modest that he would promptly enter a disclaimer to the statement that he was the guiding genius of anything, for the Association president is not a man who obtrudes himself anywhere yet whose personality and achievement have made him a recognized figure in West Virginia both in the public and industrial life of the state.

Mr. Bradley is not a native of West Virginia, but no man could have become more closely identified with the state in his 15 years of residence there, during which period he has entered actively into the life of the state, than J. G. Bradley. Antecedents do not always make the man, but if he is of the right material the character, mentality and ideals inherited from his progenitors are at least a foundation upon which to build, and it is at least interesting to trace a man's origin to see what he has made of his opportunity.

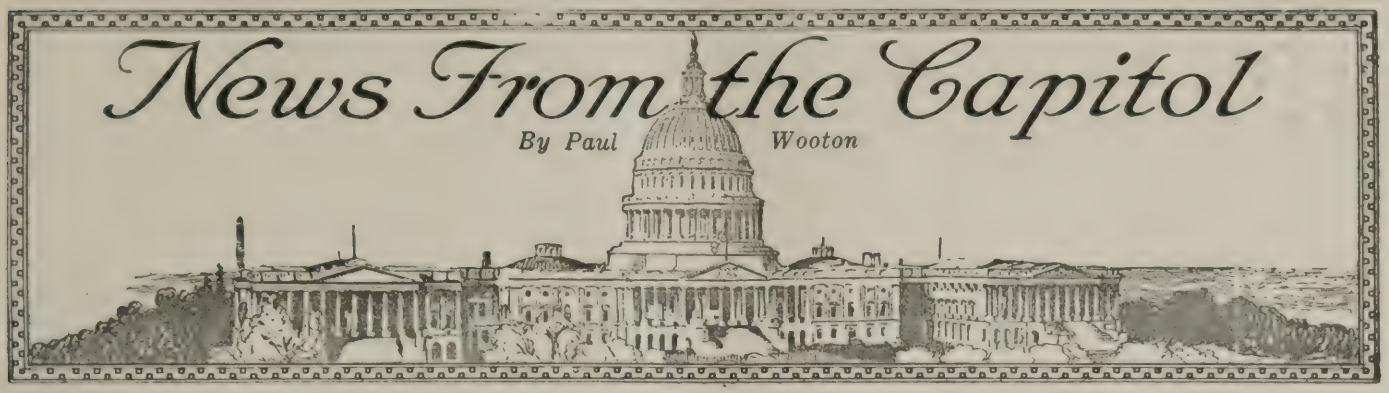
Joseph Gardner Bradley is a grandson of the late Joseph P. Bradley, Associate Justice of the United States Supreme Court, and of J. Donald Cameron, who was elected to succeed hs father, Simon Cameron, as a United States Senator from Pennsylvania.

A "September morn" in 1881 witnessed the advent of Joseph Bradley into this world at Newark, N. J., and it was at Mrs. Craven's School and the Newark Academy that he received his early education, later attending St. Mark's School at Southboro, Mass., in preparation for Harvard College where, after finishing his college course, he attended the Harvard Law School. To friends, however, Mr. Bradley has at times expressed the belief that his real education began 15 years ago on Buffalo Creek, West Virginia, and that his real education has been obtained there. If such be the case he has taken many degrees from the School of Experience, for he entered the employ of the Buffalo Creek & Gauley R. R. at Dundon, Clay County, West Virginia, as right-of-way agent. It was not long before he was promoted to be superintendent and in turn secretary and treasurer of that company, and then general manager, treasurer and president of the Elk River Coal and Lumber Co., which owns the Buffalo Creek & Gauley R. R. and 75,000 acres of coal and timber lands in Clay and Nicholas Counties, on which it has developed one of the best known fields of low sulphur gas coal. This it markets through offices in Columbus, Ohio, and Philadelphia, Penn., as "Dundon Coal," its coal operations being located at Widen, West Virginia, and its timber operations at Swandale, West Virginia.

Mr. Bradley has never failed to respond to any calls made upon him for public service and has given his time freely and willingly to such service, particularly since the United States entered the war, so much so in fact that the only home this hard-worked West Virginian has is on railroad trains. He has not sought office, but he was elected as a delegate from West Virginia to the Republican National Convention at Chicago in 1916.

Mr. Bradley had occasion not long ago to say in speaking of the aims of the West Virginia Coal Association: "It is interested in promoting close coöperation with the over-burdened State Department of Mines; in decreasing the hazards of the industry; in stabilizing it; in improving sanitation; promoting welfare work and seeing that it receives fair play. The West Virginia Coal Association has justified its existence in the past, and as time goes on and it continues to render service to both the industry and the community, new fields will open for its activities, for the day of collective industrial activity is rapidly approaching us; the markets of the world become open to the United States as they have never, save in theory, been before."

It is interesting to note that at the surface of the fuel bed the combustible gases represent 35 to 65 per cent. of the total heat value of the coal. This means that under ordinary operation of the side-feed furnace about one half of the total heat in the coal is developed in the fuel bed, the other half being developed in the combustion space. Among other factors, it depends upon the size of the combustion space how much of the 50 per cent. of heat left in the combustible rising from the fuel is developed.—*Bureau of Mines Bulletin No. 135.*



Storage Policy of Fuel Administration

Maximum limits of storage for bituminous coal have been ordered by the Fuel Administration as follows:

	Steam Coal			Byproduct and Gas Coal		
	Public Utilities, Days	Preferred Industries, Days	Non-Preferred Industries, Days	Byproduct and Gas Plants, Days	Preferred Industries, Days	Non-Preferred Industries, Days
Maine	120	90	30	120	90	0
Massachusetts, Vermont, New Hampshire, Northern New York	90	60	30	90	60	0
Connecticut, Rhode Island, Southern New York, New Jersey, Delaware, Eastern Pennsylvania	30	30	15	45	30	0
Maryland, District of Columbia, Virginia, North Carolina, South Carolina, Georgia, Florida, Western Ohio	30	30	15	45	30	0
Western Pennsylvania, Western Virginia, Eastern Kentucky, Eastern Ohio	30	20	15	45	30	0
Lower Michigan	90	45	20	60	60	0
Illinois, Indiana, Missouri	...	..	..	60	60	0
Wisconsin, Minnesota, North Dakota, South Dakota, Upper Michigan	...		..	90	90	0

The policy of the Fuel Administration in the matter of storage was explained by Dr. Garfield as follows: "Coal in excess of that required for current operations shall be delivered to plants not on the Preference List of the War Industries Board only when it is not in demand for use before Apr. 1, 1919, by consumers on said list; namely, railroads, the Federal Government, states, counties, public utilities, retail dealers or manufacturing plants on the Preference List. In carrying out this policy, allowance shall be made for differences in distance from the mines and for differences in transportation conditions which may require more or less storage at the beginning of winter to insure uninterrupted operation until the following spring."

The committee which determined upon the storage periods was constituted as follows: Federal Fuel Administrators; W. B. Bryan, of Kentucky; Harry F. Bryd, of Virginia; Joseph H. Frantz, of Ohio; W. N. Fitzgerald, of Wisconsin, and James J. Storrow, of New England; together with J. D. A. Morrow, Director General of Distribution, and A. M. Ogle, Director of States Distribution. The committee submitted the following report:

It is understood that these limits are mandatory and each Fuel Administrator is expected to see that the different classes of consumers are not allowed to exceed these limits. At the same time, it is understood that particular cases may require special treatment by a State Fuel Administrator, either by way of granting more stocks of coal than are indicated by these limits, or by restricting them to a less supply than indicated by these limits.

Where a State Administrator decides that the maximum limit should be exceeded in a special case for some special reason, he shall have authority to grant a revocable increase in writing for a specific added number of days. The administrator shall report each such specific case in writing immediately to the United States Fuel Administration at Washington, which may in writing disapprove the extension granted by him. Otherwise, it shall stand subject to action of the State Fuel Administrator.

Any company or concern which is permitted under the zoning regulations now or hereafter in force, to obtain coal from Illinois, Indiana, western Kentucky, or from mines west of the Mississippi River, may retain such reserve stock of coal as it shall have on the effective date hereof, on condition that such company or concern shall thereafter use screenings or mine-run only, for its current necessities, and shall obtain such screenings or mine-run for current use only from such last mentioned fields.

Production Bureau of Fuel Administration Ready to Co-operate with Mine Owners

The Production Bureau of the Fuel Administration is equipped to look after the interests of the operators in reference to the draft, voluntary enlistment, solicitations from private labor agencies and their advertisements, and to help them to get labor through the Government labor agencies. Julian B. Huff is in charge of this work.

The bureau is also prepared to handle quickly and efficiently any matters which should come up before the Priorities Board. It is desirous of being of help to the operators in obtaining necessary material. R. A. Rainey and D. D. Bush are in charge of this work. It is also investigating and taking whatsoever steps seem wise in reference to picnics, fairs, carnivals and various other celebrations which would probably result in a loss of tonnage. A. C. Dodson is in charge of this work.

The bureau is also in position to furnish literature of various kinds in connection with coal production and to supply speakers. This matter of propaganda is in charge of W. E. E. Koepler. Questions of car supply and any general matters should be taken up with George C. Foedisch. C. E. Stuart is looking after central power plants from which the operators are purchasing power.

In coöperation with the National Coal Association, the Production Bureau of the Fuel Administration is taking a census of the requirements of the industry for the next eighteen months. In this way it is hoped to secure definite information as to the amount of supplies which the mines will require. With this information at hand, it will be possible to take steps to prevent an

under supply of any needed material. Owing to the shortage of steel every effort is being made to prevent any overproduction. For instance, only a sufficient number of mine rails will be rolled to meet actual needs. With greater difficulty being experienced each day in meeting the nation's steel requirements, every precaution will be taken to prevent the tying up of this much needed product in supplies not immediately needed.

At present there is a shortage in a number of steel products, due to erroneous estimates of the amounts needed. It is believed the census will enable a much more intelligent handling of the matter in the future.

Kentucky Prices Now Fixed

Kentucky coal fields have been divided into five districts by the Fuel Administration, and prices, without the wage increase, prescribed as follows: District No. 1—$1.90, $2.15, $1.80; District No. 2—$2.10, $2.35, $1.85; District No. 3—$2.55, $2.80, $2.30; District No. 4—$2.20, $2.45, $1.95; District No. 5—$2.20, $2.45, $1.95. These prices are for mine-run, prepared sizes and screenings.

Exceptions are made in the following cases: Blue Gem Coal Co., $3.35, $3.80 and $2.40; Wallan-Jellico Coal Co., $3.25, $3.50 and $2.50; Elkhorn City Coal Co. and Guthrie Coal Co., $2.55, $2.80 and $2.30.

Contingent Fee Covenant Not Applicable to Coal Industry

Since rules and regulations have been promulgated governing the distribution of coal and coke which bring sales agents under rigid control, the Attorney General has ruled that the contingent fee covenant which the President has ordered inserted in all Government contracts is not applicable to the coal industry. Dr. Garfield submitted the following questions in regard to the matter:

1. Where coal is purchased by a jobber from an operator at a price below the mine price fixed by the President or the United States Fuel Administrator, can such jobber sell such coal to the United States Government at the mine price so fixed? Of course, in the case of such a sale the jobber would be the "contractor" and not the operator, and it would appear that the profit realized by the jobber might not be construed as compensation paid by the operator to the jobber for the procurement of the contract.

2. Is the above provision intended to prevent an operator from employing a sales agent on sales of coal to the Government where such sales agent receives as compensation for his services either a fixed price per ton or a percentage of the selling price? In the determination of this question it should be borne in mind that many coal operators do not maintain their own sales departments but employ established distributors of coal to act as sales agents under term contracts, on which such sales agents undertake to sell the output or a given quantity of the operator's coal for a fixed or percentage compensation.

3. Is the above covenant to be construed to prevent any agency of the Government from employing a distributor of coal as purchasing agent and paying such agent the commission allowed by Rule 3 of the Rules and Regulations in reference to licenses contained in Publication 22, inclosed herewith?

4. Are contracts between coal operators and railroads to be construed as Government contracts so as to require the insertion therein of the covenant quoted above? In answering this question the fact should be considered that a very large percentage of coal purchased by railroads in the past has been purchased (a) at the Government price through jobbers, who in turn purchase from the operators below the Government price; (b) at the Government price from sales agents, who receive their compensation from the operators; (c) at the Government price through purchasing agents employed by the railroad and paid by the railroad the purchasing agent's commission permitted by the above-mentioned Rule 2.

The Attorney General's ruling is contained in a letter dated Aug. 19, which reads as follows:

I have before me your letter of July 20 on the subject of the covenant against contingent fee operators which the President has directed to be inserted in all Government contracts. You ask how far the requirement of the insertion of this covenant is to be observed in certain circumstances arising in the coal industry, and what its effect will be if so inserted. I have no hesitation in saying that the circumstances set forth in your first, third and fourth paragraphs are within neither the letter nor the spirit of the covenant.

In the second paragraph you ask, "Is the above provision intended to prevent an operator from employing a sales agent on sales of coal to the Government where such sales agent receives as compensation for his services either a fixed price per ton or a percentage of the selling price?"

The letter of the covenant and the President's request is broad enough unquestionably to include such a situation, but it is clear, when the attendant circumstances are considered, that the situation is not within the spirit either of the President's order or of the covenant. Rules and regulations have been promulgated relative to licenses for the distribution of coal and coke by which the compensation to be paid to sales agents is rigidly controlled. Manifestly, it was not the intention of the President in requesting the insertion of this covenant to modify the policy or affect these rules and regulations. The situation in the coal industry is, therefore, outside the mischief which the covenant was intended to cure, and unquestionably outside the President's intent.

It is my opinion, therefore, that the covenant has no relation to any of the situations set forth in your letter.

Prices Announced for Alabama Coal

Prices covering operations in Alabama have been announced by the Fuel Administration. The determination of these prices has required arduous work and has been established on seams rather than by districts. The prices for run-of-mine, prepared sizes and screenings respectively are as follows: Big Seam group, $2, $2.30 and $1.95; Cahaba group, $3, $3.30 and $2.65; Pratt group, $2.40, $2.60 and $2; Helena and Harkness seams, $2.45, $2.75 and $2.25; Climax seam, $4.15, $4.40 and $2.05. The prices do not include the 45c. which may be added by those conforming to the Washington wage agreement.

Assistant Fuel Administrator Appointed for New York State

Delos W. Cooke, fuel administrator for New York State, has announced the appointment of Mercer P. Moseley as assistant fuel administrator. Mr. Moseley, who was born in Pamplin, Va., 37 years ago, is vice president of the American Exchange National Bank. He was at one time president and publisher of the *New York Commercial*. Mr. Moseley is a member of the Bankers' Club, Richmond County Country Club and a trustee of the Staten Island Hospital.

The offices of Mr. Cooke will be removed about Sept. 1 from 61 Broadway to Fifth Avenue and 21st Street.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The continued fall in the tonnage week by week has been extremely disconcerting, the only glint of satisfaction being that it occurred in like measure last year and then came to an end before the close of September. If the parallelism between this year and last continues we may look for the maintenance of the present tonnage till the winter arrives.

But this is not enough to save the desperate coal situation. We must do more than maintain our lead on last year, and a careful investigation of the reason for failure must be made. In the summation for Aug. 10 the car shortage is credited with 9.8 per cent., labor shortage and strikes with 4.0 per cent., mine disability with 4.2 per cent., no market with 0.4 per cent. and all other causes with 1.9 per cent.

The railroad inabilities hardly find place in a labor review. Yet in passing it will be permissible to condemn an economy which did not find funds for the complete revitalization of the railroads. On the railroads depend the manufacture of steel, and, consequently, the necessities of the railroads come ahead of the muntion needs. Transportation is a basal industry in a more real sense than the steel industry, and any material it needs to develop it from a a condition of inability to one of adequacy should be preferentially provided.

Reasons for Excessive Mine Disability

An important shortage, however, arises, as has been shown, from mine disability. The United States Geological Survey does not analyze this deficiency. It is not clear whether it arises from lack of material or from lack of men to keep things in repair or from an unwillingness of day hands to work overtime. When it is hard to obtain men after hours it is necessary to shut down the plant and make repairs which at other times could be made at night. But there may be another cause for disability. We are arriving at a period of the year when the streams are low and shortages of water occur, making the running of boilers difficult. Low water also results in increasing the acidity of the streams because it increases the percentage of mine effluent to total stream flow. This often causes the boilers to give trouble, whereas in high water the boilers run without much care.

The mine disability in northern and central Ohio ran up to 13.1 per cent. in the week ending Aug. 10; in Illinois it was 7.4 per cent, in Indiana 6.8 per cent and Iowa 5.6 per cent. A shortage of orders has appeared in Kansas and Missouri, Oklahoma and Arkansas, on the Western and Pacific coast, Iowa and the Rocky Mountain region. The lack of orders is most keenly felt in the Rocky Mountain district where the shortage is 6 per cent. of capacity.

Will End Bonuses and Leave Wages Alone

Dr. Garfield has not been convinced by the presentation made by the United Mine Workers in favor of increased wages. Where bonuses are being paid he is of the opinion that the price of coal should be cut till the practice is eliminated. He has no intention of raising wages elsewhere to bring them up to the bonus level.

Much bitterness has arisen from the temperance agitation. The *United Mine Workers Journal* says: "The fact that the coal miners of America are producing more coal than ever before in the history of the industry, and doing this with a greatly reduced force of miners, is the best answer to the charge of the National Coal Association that liquor drinking by miners is retarding coal production."

Of course, it does not prove anything of the sort. It only proves that some men are doing more than they did before and that the mines are working more steadily. Despite the showing quoted drunkennness may be more or less frequent and general. There is reason to believe that the quality of the liquor drunk is lower than it has been in the past. From all appearances where the miners are mostly natives, the war is having a steadying effect. An all-American mine is less apt to be troubled by drunkenness than one with a large number of foreigners. It is in the American strongholds like Kentucky, Virginia, and Rimersburg, Penn., that the men are working on holidays and giving their money to the Red Cross. Men who deliberately give up their holidays give of their best every day of the week.

Rimersburg Works for Red Cross on Labor Day

At Rimersburg, a little village on the Sligo branch of the Allegheny Valley, Clarion County, the miners have resolved to work on Labor Day, Sept. 2, for the American Red Cross, to which organization their wages will be paid. The officials of the Acme Gas Coal Co., the Lehner Coal Co., and the Halmer Coal Co. have agreed to turn over to the same orginzation 50 per cent. of their pay rolls for Labor Day. That should give the mine workers an incentive to put out a good tonnage.

It is different near Pittsburgh. There, it was questionable for a time whether one day would satisfy the mine workers. They wanted to have their annual meeting at Kennywood Park on Aug. 31 and to celebrate Labor Day on Sept. 2 into the bargain. The park was leased, badges were ordered and advertising printed, but finally it was arranged to hold the meeting concurrently with Labor Day. Had the miners insisted on observing Saturday, Aug. 31, they would have laid themselves open to a fine of $1 apiece, and there was every disposition on the part of the operators and federal authorities to impose it. The union leaders were against the double celebration. Some operators were asking that the electric power be shut off the park on the Saturday of the miners' celebration. There was much excitement and anxiety, but after all the patriotism of the mine workers and their sense of obligation under their contract had the upper hand.

Hard Coalers Seeking Bituminous Wage Rates

In the anthracite region many of the drivers are convinced that they should make the same wage as the men of their occupations in the bituminous mines. The drivers of the Susquehanna Collieries Co. at Williamstown colliery, near Lykens, Penn., decided Aug. 17 that they would not go to work until their pay of $3.11 a day was increased by $1.89 to the $5 rate in force in soft coal mines

On Aug. 19 the 1400 mine workers who were thrown out of work decided to cast in their lot with the drivers and not to return to work till their demands were granted. The "outside" men are not making a demand but, of course, they are not working. They recognize that their position is the same as that of the drivers, and they intend to strike as soon as the drivers "get theirs." As there are 300 of them the mine will inevitably be laid idle, when, of course, there will be some others who will be seeking a readjustment.

On Aug. 14 twenty mine workers at the Smith colliery of the Wilkes-Barre Anthracite Co. refused to pay union dues, and the other mine workers refused to work with them. The strike only lasted a day, the men leaving the matter to the district officers.

A commission has shown that Alberta mine workers have to pay 25c. per day more for living expenses now than in April and consequently, as they have a sliding scale which is based on the cost of living, they will receive an increase in wage of 25c. per day to date from Aug. 1.

Williamson Miners Say "Work or Fight"

The members of the United Mine Workers of America in Williamson County, a leading coal producer in southern Illinois, have agreed that at each mine two men, one selected by the company and one selected by the mine workers, shall form a committee to keep a record of the miners who leave the mine early in the afternoon and of those who, without sufficient excuse, do not "show up for work." This is an action of the mine workers themselves. Every man must "work or fight," and the men of Williamson County are of opinion that it means something more than "have a working place or fight." They take it as it was meant—literally and without a quibble. They feel that the miner should put in the 8-hour maximum in the mines and produce all the coal he can in that time.

Even Engineers' Regiment Rejects Miners

Capt. William E. Mitchell, in charge of the Central Illinois recruiting district, with headquarters at Peoria, has sent out orders that hereafter no men connected in any way with the coal-mining industry are to be permitted to enlist. Recruiting officers are also directed not to enlist men who have recently resigned positions in the industry. Each case of a man who claims to have severed his connection with a coal company, with no intention of resuming such occupation, is to be carefully investigated by communication with the former employer and if it appears that the applicant has left such employment without consent of the employer, he is to be rejected. If a man has been employed in or about a coal mine he is not necessarily barred, but mine workers are not to be permitted to enlist if they have quit such employment with that intention. Information has also been received that no more miners are to be enlisted even in the Twenty-seventh Engineers, all the recruits in which up to this time have been miners with not less than three years' experience.

Miners Fine Man for Speaking German

Disorders in the name of loyalty continue to occur sporadically in the Illinois fields, despite President Wilson's appeal for an abatement of mob violence during the war. Charles A. Karch, until recently district attorney at East St. Louis, went to Campbell Hill, in Jackson County, the other day, to act as attorney for William Schatte, charged with speaking German to his father in front of his home. The mayor of Campbell Hill had recently issued a proclamation forbidding German speech, following a visit of a delegation of miners from Willisville, five miles distant, who threatened to clean up the town.

State's Attorney Otis Glenn of Murphysboro prosecuted the case, although there was no charge that a state law had been violated. A delegation of about 200 miners from Willisville attended the trial. According to Karch, Glenn, in his address, said that there ought to be a riot if Schatte was not convicted. The justice fined Schatte $50. Karch, anticipating such a result and desiring to get the case into a court of record, produced a bondsman and began preparing an appeal. The miners gathered outside and sent in word that neither Karch nor his client should leave the building until the fine was paid. Glenn and an army officer made speeches asking for order, but Karch considered it prudent to have his client pay the fine. Karch will call the attention of the Federal authorities to the occurrence.

District Attorney E. C. Knotts of Springfield, Ill., has ordered the officials of Madison County to take action against the members of a mob which recently compelled Alois Otradowitz, an Austrian, to kiss the flag and leave the town. The State's Attorney has promised to call a special grand jury. Evidence against the mob members has been gathered by Julius Rosin, chief of the United States Bureau of Investigation. Harry Fishback, vice-president of the United Mine Workers of Illinois, has been coöperating with the Federal officials. It was in this county, at Collinsville, that Robert P. Prager was lynched.

Farrington Sidesteps Prohibition

Frank Farrington, president of the United Mine Workers of America in the Illinois district, wants it understood that he does not concur with the National Coal Association in its advocacy of nation-wide prohibition for the duration of the war. In a telegram to Fuel Administrator Garfield he says: "Press dispatches implying that I had conferred with President Wilson, with you, and with the National Coal Association, and that I had urged nation-wide prohibition, and statements that I am in favor of the project of a so-called industrial army are untrue. I deny that the production of coal in Illinois is materially reduced by the indulgence in intoxicants of the miners of this state, and I protest against such an implication as being an unwarranted indictment against their intelligence, dignity and patriotism.

"The contributions of the miners to the Red Cross, their purchases of Liberty Bonds and Thrift Stamps, and also their active and effective suppression of seditious conduct and disloyal utterances in the mining communities throughout the state, and their insistence that all men subject to military duty go to the front, give assurance that they will measure up to any requirements made known to them by the Government. We hold the Illinois miners are just as patriotic as are the men employed in the shipbuilding industry, munition plants and other industries engaged in the manufacture of war supplies, and if a line of contact is established between representatives of the Government and the men who mine the coal such as will enable them to know what is required of them, their sense of duty is such that they will meet every obligation.

"The proposed plan for an industrial army with badges and service stripes will not appeal to the manly sense of patriotism manifested by our men. A campaign of education based on direct statements to the miners by the President of the United States and the Fuel Administrator, conveying to the men the truth that their industry in the mines is as vital to the nation and as honorable as military service is all that is necessary and is much more expedient than the proposed project. I pledge for myself and my executive board members that we will carry such a message into every mining community in Illinois."

Secretary Nesbitt of the Illinois district joins with Frank Farrington saying: "When the Coal Operators' Association attempts to lay the blame of coal shortage to the miners because of the effects of booze then they are doing the very thing that may disturb the harmony that has existed in the coal industry for the past months. They are stroking the fur the wrong way as usual and if coal production is not kept up to the maximum the coal operators will be to blame."

Thomas T. Brewster, president of the Coal Operators' Association of the Fifth and Ninth Districts of Illinois, has wired to Administrator Garfield that he concurs in Farrington's telegram. He states that he expressed substantially the same views to Mr. Neale during a conference in Washington last week. While Brewster sends the telegram in the name of the association, it is certain that he does not fairly represent the views of the members of the association or of the Illinois operators generally.

Aside from their personal views on the question of prohibition they are practically unanimous in the opinion that saloons are a decided detriment to coal production.

John Henderson, of St. Louis, Mo., president of the West Virginia Coal Co., of Marion, Ill., says he fully approves the action of the association. "I am not a prohibitionist," he says, "but saloons, whether at the mines or a hundred miles away, hurt coal production. The coal states, at least, should be dry. I believe the operators are unanimous on this question. There is no argument in favor of the saloon in connection with the mining industry that I can conceive of. Saloons are a detriment not only to the mines but to any class of work."

The Trades and Labor Assembly of Belleville, Ill., at its last meeting, adopted a resolution in opposition to nation-wide prohibition and in protest against Administrator Garfield's order that no more coal is to be supplied to breweries after their present supply of raw material has been used. Belleville is a brewery center.

Would Have Extra Pay for Overtime Work

Anxious to hasten a favorable decision on the wage demands which their leaders have placed in the hands of the Government, the employees of the G. B. Markle Coal Co. have refused to work more than 8 hours daily, thus violating the express provisions of their contract, which reads: "If, because of breakdowns, repairs or the requirements of transportation or other causes essential to efficient operation, it is found necessary to extend the normal workday of any employee, or any class of employees, the operator may do so, at his option, paying for overtime a proportionate rate per hour as determined from the rates established under Section I hereof."

Despite this clear requirement, no breakdowns are repaired at the G. B. Markle mines after the 8-hour limit and none, the men say, will be repaired till time and a half is given for overtime and double time for Sunday. The Oakdale local is foremost in agitating for this new provision. Many men had been working overtime and they still desire to do so but they are threatened with expulsion from the union if they do not consent to violate the rule which the union itself approved in representative session. These day workers found the additional pay of no little service in meeting the payments on their Liberty Bonds, but now they are deprived of that source of income. However, loss of tonnage resultant on the delay in repair work is more harmful than the delay in payment for Liberty Bonds. Repairs can be effected more readily in the overtime hours than when the mine is running, and, in fact, many repairs can be made only at such hours.

Nationalities in Clearfield District

The number of miners in the Clearfield, or Central Pennsylvania, or No. 2 union district of the bituminous regions of Pennsylvania, increased in 1917 over 1916, the gain being in Americans. The American influx not only made up for the small loss incurred in the number of foreign mine workers, which totaled 342 men, but it increased also the number of mine workers by 4,772; for as will be seen the total number of American mine workers increased by 5114.

Order	Nationality	1916	1917	+ Increase or — Decrease
1	American	20,555	25,669	+5,114
2	Italian and Tyrolean	9,386	9,039	— 347
3	Slavonian	8,779	7,985	— 794
4	Polish	6,561	5,669	— 892
5	Austrian	3,121	4,527	+1,406
6	Hungarian, or Magyar	3,752	3,913	+ 161
7	Russian	1,953	2,199	+ 246
8	English	1,845	1,491	— 354
9	Swedish	1,232	1,362	+ 130
10	Scotch	1,161	1,118	— 43
11	Irish	963	1,030	+ 67
12	German	1,262	1,021	— 241
13	Croatian or Horwat	707	726	+ 19
14	Lithuanian	625	718	+ 93
15	Welsh	462	522	+ 60
16	French	261	324	+ 63
17	Greek	335	305	— 30
18	Belgian	253	289	+ 36
19	Rumanian	25	81	+ 56
20	Finnish	94	60	— 34
21	Canadian	7	49	+ 42
22	Danish	55	38	— 17
23	Spanish	.....	36	+ 36
24	Montenegrin	4	31	+ 27
25	Bohemian	80	27	— 53
26	Syrian	14	15	+ 1
27	Mexican	.....	11	+ 11
28	Serbian	.....	6	+ 6
29	Swiss	.....	3	+ 3
	Total	63,492	68,264	+ 4,772

The gross increase is 7.51 per cent. We have arranged the nationalities in the order in which they stood in 1917. The representations of some so-called "enemy alien countries" have decreased and others have increased. The Germans have decreased considerably; the Austrians and the Hungarians have increased, as have also the Croatians and Horwats. The neutral countries have increased in numbers somewhat, Russia (neutral only part of 1917) leading with 246, Sweden with 130, Lithuania (neutral only part of 1917) with 93, Rumania (neutral only part of 1917) with 56, Spain with 36, Mexico with 11, and Switzerland with 3.

Finland (also neutral only part of 1917) is an exception, for it was represented by 34 less men than in 916. These men doubtless went back to take part in the fights succeeding the declaration of Finnish independence. Denmark, strange to say, lost 17 men. The people of allied nationalities, and with them we include the Czecho-Slovaks, Poles and Syrians, have in most cases decreased in numbers owing to recruiting. The Polish loss led with 892. The Slavonian loss was 794; the English, 354; the Italian, 347; the Bohemian, 53; the Scotch, 43; and the Greek, 30. The British and Italian losses would have been greater, but large drafts in earlier years made a large draft in 1917 unlikely.

Some of the allied nations had increased representation. Principal among these were the Irish, 67; French, 63; Welsh, 60; Canadian, 42; Belgian, 36; Montenegrin, 27; Serbian, 6, and Syrian, 1.

The figures on which the table is based were prepared by Charles O'Neill, production manager of the district in question and secretary of the Central Pennsylvania Bituminous Coal Producers' Association.

Missouri Men Again Ask "To Be Shown"

The patriotic tour arranged by the miners and the Southwestern Interstate Coal Operators' Association, to stimulate production, has not been an unqualified success. Reports indicate that there was a decline in production, an increase in number of days of layoff, and an increase in grievances, in many districts, immediately following the tour. Commissioner W. L. A. Johnson, other commissioners, the officers of the miners' district associations, and a maimed soldier back from the front, spoke in all at 25 meetings in the mining towns of Missouri, Kansas and Arkansas, Mr. Johnson personally attending about a dozen of the meetings.

The representatives of the operators pledged such management of the mines that the largest opportunity for production would be provided, and asked that miners work as nearly as possible eight hours every day. Miners' representatives pledged a maximum of work. The soldier urged support of the boys at the front. While the spirit of loyalty may have been aroused, one incidental result of the tour was the inspiration to make a closer inspection of the conditions in the mine so as to clear the way for possible complaints by the miners.

In Missouri, especially, a flood of suggestions came to state fuel administration headquarters, and to other parties, as to how the mines could be made to produce more largely, by the addition of this or that equipment, or by such and such changes. Lieutenant Governor Crossley, fuel administrator, held a meeting of representatives of operators and miners, at which many of these suggestions were discussed. The meeting got nowhere; it was explained that one of the main factors in the patriotic effort now being made is the better use of present equipment to gain a larger production—that industry must increase its help to win the war, and not put any more burdens on manufacturing, transportation or financing.

Indiana's First President To Be Honored

Edward Stewart, the president of the United Mine Workers of America, in the State of Indiana, and William Mitchell, the secretary for the same organization in that state, with W. B. Van Horn, international board member, have had a long search at the cemeteries in the vicinity of Harrisburg, Ill., for the grave of Gardner Knight, the first president of the United Mine Workers of Indiana. He left that state in 1906 and located at Collinsville, Ill., and shortly after moved to Harrisburg. On May 25, 1907, he was working with his "buddy" when the latter stepped out of the room. On returning the "buddy" found the dead body of Knight. Apparently he had dropped dead. The Indiana mine workers have located the body in the City Cemetery of Harrisburg and will erect a monument in honor of this, their first, president.

EDITORIALS

Schemes Which Cripple War Work

FADDISTS are always busy, but at no time were they ever more completely at home than during this world war. The Government is taking over all kinds of utilities and starting all manner of new projects, and the faddists now have a chance to urge their plans on politicians and visionaries who are spending other people's money and not their own, and who are therefore not personally interested in the outcome.

Some of the schemes, however, are good enough in their way. The one proposed by Representative Thetus W. Sims of Tennessee in his bill presented Aug. 19 in the House has something to commend it. This journal and many others long ago expressed the belief that the soft-coal companies should deliver either power or gas to the public and not bituminous coal.

Railroads use altogether too much coal in the work of delivery. The estimate of Dr. Garfield for the bituminous coal likely to be used by the railroads during the present coal year 1918-1919 was (as we showed last week) 26.53 per cent. of the whole bituminous coal cutput. But that figure should be written somewhat differently; it is 27.05 per cent. of the coal delivered to the railroad, for it is the net percentage which really counts. Of course, only a portion of the entire railroad freightage is coal. It is said to be 16 per cent. of the whole. As coal travels in bulk—in full car-load and even in full train-load lots—it is probable that the fuel consumed in coal freightage is less than the coal used in the freightage of an equal weight of miscellaneous material. Overlooking that fact, the percentage of coal used in coal freightage would be 4.33 per cent. of the net amount of coal which leaves the mining towns in which it is produced. This percentage is roughly 26,560,000 tons.

Clearly, it is well worth the saving and should be saved. The year when the world has a war on its hands, however, is not the time to go to work to save it; for the labor of putting the saving into operation is too great and the time needed for completing any new plan of distribution too long. It would be far better to build up the railroads to a point of greater efficiency. More railroad cars, sidings and terminals, and more storage yards at mines are needed.

Representative Sims wants the Government to buy power plants, to build others at the mouths of coal mines and to assist in financing such operations. Refuse coal is to be used and the power supplied to factories by electric current. Some believe that with electrification of the railroads we could save two-thirds of the coal now used in railroad operation. Whether that is true remains to be seen, but it is certain that it should not be done till the war is at an end.

Yet as a war measure the mine-to-factory plan is not nearly so chimerical as are the water-power schemes. The Muscle Shoals water-power plan so enthusiastically hailed when the war commenced has already been laid on the shelf till after the war, and the ammonia and cyanamid will be made for the present solely by steam power. Electrification of the railroads must similarly be delayed.

A reconstruction period from a mechanical point of view is quite likely to follow the war, and remarkable changes will occur. The faddists want the Government to attempt them now, knowing that it will be hard to get private capital to plunge in heavily after the war in face of the immense risks to be run and in face of the fact that, no matter how much the public profits, the dividend of the power-plant builder is likely to be strictly limited by Federal and state regulation.

Often it seems that the Government must ultimately do the work. A gamble in which the gambler runs a good chance to gain 5 per cent. and a better chance to lose 100 per cent. is a gamble that does not commend itself to anyone. The tendency is all toward Government ownership, not because it is efficient or desirable, but because with regulated profits business ventures are either as good as investments in Government bonds or complete failures. Of course, as soon as the profit from a Government bond is the best profit available, the tendency will be toward buying Government bonds instead of investing in so-called securities that are allowed to yield at best no more than bonds and are quite apt to be complete failures.

If new developments when made under private ownership are to be so scrupulously regulated, they will have to be made by the Government if they are made at all. We shall be willing individually to invest in the extension and continuance of *recognized* industries which afford a certainty of a given annual income, but such risky innovations as are likely to be regulated we will put up to Uncle Sam. Perhaps he will save money for the public on some of them and the public will stand the losses made in the others. He will probably learn after a while that to have a balanced account he must have some big gains to replace his big losses. He must run some business at a vast profit so as to find the wherewithal to repay the losses on the Panama Canal and like unprofitable developments.

But to return to the main proposition, such mammoth schemes of dubious value must not be allowed to cripple war work. The immediate needs stand first. Labor may have to be used for the temporary alleviations of the transportation shortage. That labor may possibly be partly wasted, but there will be less waste than takes place every day on the battlefield; and the sooner the war is over the sooner we can cut out these and all other wastes.

We shall do ill to stagnate our industries and to defeat our national purposes by attempting during the war any basal and tedious reconstruction of old and tried methods, however faulty; for if we do so, we run the risk of repeating the mistake of the earlier authorities

in charge of our aircraft production, who in indecision and in futile experimentation wasted full sixteen months of incalculably valuable time.

Our methods are not the best that can be devised, and they never will be. We shall have reached an undesirable stage in development when we no longer see vistas of promise ahead as the result of diligent reconstruction. Science progresses like nature, by the death of the older forms. The decay of old models and methods serves to form the humus for new developments. As life builds on life, so invention builds on invention.

But we can readily destroy more rapidly than we can rebuild. We can be too enthusiastic in our renovations and at no time is there greater danger of such foolishness than during a war, which reveals the condition while removing or greatly restricting the opportunity to correct it.

After-the-War Wage Arrangements

IN AN open market, and with runaway production, wages determine prices. So the margin between price of product and cost of production will be unchanged by a change in wages. It may be plus or minus. All will depend on the fierceness of competition and the degree of intelligence of the competitors.

As wages under normal conditions determine prices, it is no advantage for operators to lower wages. Wages should therefore not be lowered after the war. In a certain key district, say the Pittsburgh region, wages should be fixed to increase with cost of living, but not to decrease with it should it decrease. The cost of living should be determined every six months by a competent authority and adjustment made to accord. In other regions than the key region, the increases, if any, in the rate of mining in cents per ton granted in the key region should be imitated exactly in cents per ton so as to preserve the industrial equilibrium.

Where the price of powder to the miner has remained fixed regardless of the price to the operator, it should remain unchanged after the war. When the price of powder goes down the operator will be entitled to the saving in cost thus made possible. He has continuously met the loss due to the rise in price and no one should begrudge him the adjustment, especially as it will affect all about equally and therefore will not promise a profit to any one; for where all gain, the price reflects that fact.

House rents should be lifted to a profitable figure at the next adjustment. The cost of rent should be figured in with the cost of living at the higher rent provided and the wage adjusted to conform with the cost of living thus determined unless the change would result in a reduction of wage which is not to be considered.

Men who cannot read and write English should be required to give one hour's attendance without pay three days a week at a school for teaching the English language. A fee should be charged for this training high enough to provide for a really competent teacher and for adequate equipment.

When wages are next raised the increase determined as being fair should be doubled and that larger increase applied only to the half year which includes the winter season, so as to make the demand for coal more equal. Any further increase to contract men which cost of living may ultimately provide should be in the form of day wages and not contract wages. This will form an incentive and award to the operator who gives his men an opportunity to do a good day's labor and to see that every man does a full day's work.

Most of these changes have been advocated before at different times. They are good plans whenever they may be put in operation, after the war or later. Working under them the miner will feel that his interests are safeguarded, that the principles of justice rule and not the caprice of the operator, and it will be clear to him that if he strikes for more pay he strikes not against the operator, but for an unfair proportion of the national output. It will be plain that his strike is directed not against his immediate employer but against his remote employer, the other working men known in general as the public.

Strikes, like war, must ultimately be cast into the discard. The fundamentals of wage agreements should somehow be written. We need a Grotius to write the laws of industrial peace, perhaps for one industry only, but later for all industries. Must all justice—justice to employer and justice to employee—be battled for? Can not the fair thing be written in perennial brass so that it may not be doubted? Of course, a few matters will for a while be debatable. We shall have higher justice as we have higher mathematics. But the simple, basal rules may we not now write, read and follow and so avoid those frequent jars which destroy the poise of our industrial life. But to secure these fundamentals we all need economic education. We need above all to let the workman cut his eye teeth. Induce the workingman to accumulate stock or a property and he will have a clearer light on the necessities of capital.

Shall We Seek More or Better Mines?

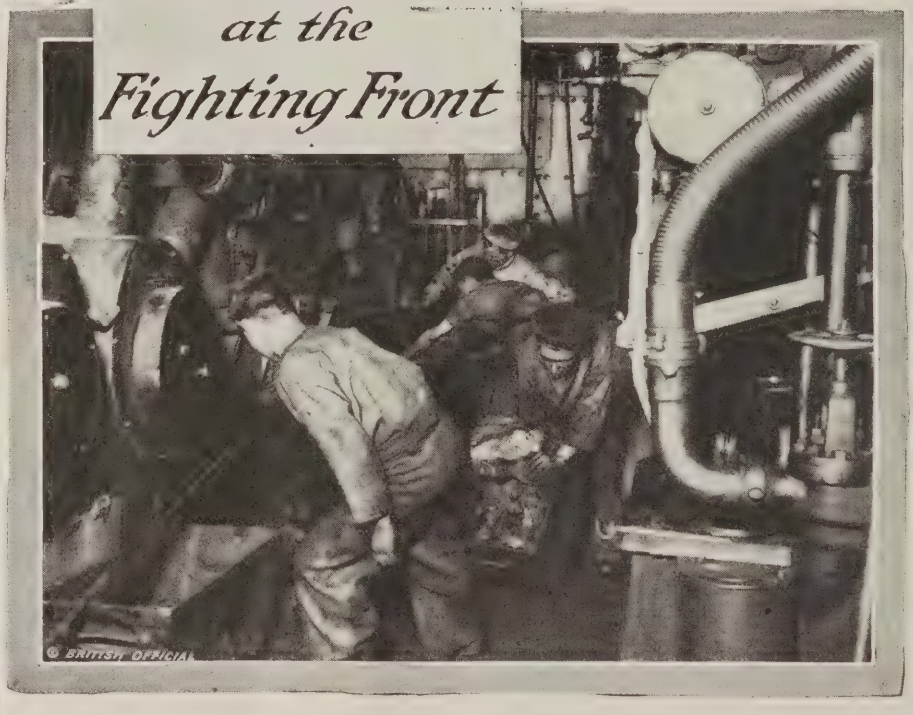
SEVERAL of the small operators, some of them new to that capacity, just barely start operation before they are importuned to go into another venture. They are not out of debt on the plant they are running; they do not have it in good working order; they lack the needful equipment—but the new venture looks good. Instead of riding one sound and speedy horse, therefore, they drag along on two sorry nags neither of which is a credit to the owner. This manner of playing operator does not pay. After the war ends and the usual set back comes, these men with their badly equipped mines will find it impossible to operate them profitably. If they had stood by the one mine, nursed it, watched it, equipped it, it would have done more than the two mines will do and a year after the war there will be plenty of opportunity to load up at sales and foreclosures with plants of the overventuresome.

But we do not need to rely on self-interest alone, which might in cases be hard to prove, for it can be shown that it is not a patriotic act to leave a half-opened mine to lag and do uncertain, irregular work in order that we may open another mine without any greater prospect of efficient and orderly operation. A good mine put in by the financially competent is another proposition. The reference is to the smaller mines, which are differentiated from wagon mines by the possession of, or the aspiration for, a railroad switch.





Here's Where Your Coal is at the Fighting Front





Coal passers and stokers who use our coal in the narrow passageways of a battleship, toiling before blazing hot fires, have a far more burdensome existence than those who mine and handle the coal in the cool atmosphere of the ordinary American coal mine.

DISCUSSION BY READERS

Dealing with Slackers in Mines

Letter No. 1—I have been deeply impressed, recently, in reading certain references to the loyalty of the French coal miners, who are face to face with the severe conditions imposed on them by reason of the war in their own country. I read these comments, in the French newspapers sent to me, with great interest, and cannot help but contrast the situation there with that in this country. The American miner, for the most part, feels his responsibility for the winning of the war. Never before has he had the same opportunity to make such big wages. Nevertheless, there are many slackers among them.

Numerous suggestions have been made by *Coal Age* writers, in discussing the relation of the miner to the war and the mining situation in general. In order to increase the production of coal, some have suggested longer working hours. I agree, however, with those who contend that a longer working day will not increase the output of the mine. The trouble is not in the number of hours the miner works. He can produce all the coal that is required if the cars are on hand to load. The shortage of cars is the one great difficulty to be overcome.

Next to the question of car supply is that of holding miners regularly in their places. There would be no slackers if American miners believed, as do the French, that there is as much heroism in digging coal as in fighting at the front. In our efforts to eliminate slackers from the mine, we must impress upon them the truth of heroic service beneath the ground.

What Conscription of Mines Should Mean

While I believe in the conscription of miners, it would be of a different kind from that imposed by the draft law. My idea of the conscription of the miner would leave him free to perform his daily tasks according to his usual custom, with the exception that his work would be under the strict discipline of the Government, with a view of increasing the tonnage per man, and making the production of coal equal to the demand.

This conscription would be somewhat along the lines of the employment of a government inspector, as suggested by Thomas Hogarth, June 29, p. 1208. Another has suggested the wearing of a "service button"; and still another, keeping tab on the work of all miners by "a system of index cards" that would show where and how long the man had worked and with what satisfaction to the company.

In this regard, my idea would be that mine superintendents and foremen should act under the authority of the Government and report those miners who are slack in the performance of their work, for investigation by the government inspector. As someone has said, a soldier disobedient to orders is punished, and I agree that a suitable punishment should be inflicted on idle mine workers, including such as do not work industriously and show the best that is in them.

All workers of this class are *slackers* and, in retarding the production of coal, they retard all industrial work by their failure to produce to the extent of their ability. At present, no penalty is imposed or any fine exacted, and there is no way of reaching this class of slackers in the mines. They cannot be fined and yet they obstruct the work continually.

There is no question, in my mind, but that the miners can produce all the coal required if they will do their utmost. It is possible for the organization of miners to impose the obligation of steady work on their own members and thereby avoid any action by the Government; but, in any event, let us all stay on the job with the same faithfulness as displayed by our brothers in France.

GASTON LIBIEZ.

Cedar Point, Ill.

Justice to the Miner

Letter No. 1—Out of fairness to the many honest mine workers, who form a large majority of the miners employed in the anthracite region, I feel impelled to offer a few comments regarding the position in which these workers have been placed by reason of many misleading statements recently published.

Only last week, an article headed "Hun Propaganda Trying to Injure Anthracite Industry" received wide circulation in the daily papers. The article referred to a meeting of mine workers that was held in Wilkes-Barre, Aug. 6, when a resolution was passed drawing the attention of the coal operators to the increasingly hard living conditions of their employees. Referring to this resolution, the article denied that the conditions of the miners were hard, stating that such claims were false. The claims, however, are based on facts that cannot be denied.

How War Affects Conditions Underground

Such is the urgency of the work underground that not only is the miner often compelled to work under dangerous conditions for the lack of needed supplies, but, in addition to mining and loading his own coal, he must often finish out his day's labor by carrying rails, track ties, props and brattice boards from one place to another. These facts are proof that the statements referred to were correct and that the conditions under which the miners are forced to labor are increasingly hard.

While I am not in accord with the meeting, as it was held, I feel justified in defending the many men who attended with an honest purpose to secure a fair deal. The loyalty of the anthracite miners cannot be disputed. They have made home secrifices to buy Liberty Bonds, and subscribed liberally to the Red-Cross drives. Many of them are working 35 and 45 shifts a month, because of the urgent demand of the country for coal.

While it is undoubtedly true that there were some present at the meeting, Aug. 6, whose loyalty would not bear the searchlight of criticism, the large majority of the men who attended met to arrange in regard to the best way of presenting their case for the consideration of the Federal Fuel Administration. The fact of the matter is that, not only are the ranks of the miners being depleted by the draft and by voluntary enlistments, but the wages that can be earned in other war industries have been advanced in much greater proportion than those of the coal miner.

Mining Wages Lower Than What Can Be Earned in Other Industries

The wages paid mine workers are such as not only to offer no attraction for labor to enter the mines, but call for much sacrifice on the part of many loyal miners who are feeling the injustice accorded them by reason of the urgency of the country's need. Miners are made to feel the injustice of their position all the more because of the slander of the daily press, which is calculated to fill the public minds with the thought that the average coal miner is a "slacker," whereas no industrial worker is more loyal than the miner.

In closing, let me say that such untruthful statements in the public press cannot fail to lead I. W. W. organizers to think that the anthracite fields promise a good harvest for them, and cause them to increase their efforts to strengthen themselves in this region. The principles of that organization are un-American and it is the duty of every true and loyal worker to keep all such out of the mines. J. P. G.

Wilkes-Barre, Penn.

Letter No. 2—Referring to the announcement in *Coal Age*, July 25, p. 196, that the coal production for the week ending July 13 was almost 13,250,000 tons, allow me to state that the report of the Fuel Administration at Washington, after mentioning this record production for the week, followed their statement with the remark that "If the miners keep the output of coal up to that figure, there will be no danger of shortage next winter," which is not true if the car supply fails.

In justice to the miner, it is only fair to say that this remark reflects on the great body of miners, as it conveys the impression that the entire responsibility for the production of coal rests on the toilers in the mines. The wording of this official bulletin from Washington allows of but one conclusion, which is that the coal output depends solely on the miner, which is not only wrong in fact but an imputation that questions the patriotism of this body of faithful workers. The flow of coal from the mines does not depend exclusively, or even largely, on the miner.

Railroads Responsible for Coal Shortage

The public should know, as all practical mining men know, that the coal supply for industrial and domestic purposes, now and next winter, is and will be determined by the ability of the Railroad Administration to supply the needed cars for its shipment to market. A shortage of cars on the siding always means an idle mine and hundreds of idle miners who are unable to perform their daily tasks.

In the discussion of this question, too much has been said in regard to the responsibility resting on the miner, and too little emphasis has been placed on the greater responsibility resting on the Railroad Administration, whose task it is to supply the needed cars. It is a mistake to attempt to conceal this most vital fact bearing on the production of coal.

Let me say, here, that there would not have been a coal famine last winter had it not been for the shortage of railroad cars at the mines. It may be true that the administration is not wholly to blame for this failure of car supply, which may arise from weather conditions, or their inability to build the necessary equipment; but that is no reason why the responsibility for coal shortage should be laid on the backs of the willing miners.

There is but one way to insure a constant and adequate output of coal, and that is to give the miners plenty of cars in the mines and on the railroad tracks so that there will be no delay in loading coal either at the working face or on the tracks for shipment. Give the miners the cars, and they will attend to getting out the coal. Let the Government do its part and the miners will not be found wanting. Fairness to all demands that the Government assume its share of responsibility for each week's production of coal.

Mammoth, Penn. PATRIOT.

Letter No. 3—The numerous references to the miner that one reads today, including some statements that reflect on his loyalty in the present crisis, have put these thoughts running in my head, after reading the verses of Rufus T. Strohm, *Coal Age*, Aug. 1, p. 201.

I always read the verses in Coal Age *as they come,*
And Mr. Strohm has sent some stirring lines;
But what he said about us has almost struck me dumb,
For I've spent some little time around the mines.
Of course we have some slackers, like every other trade,
But that should not condemn us as a whole;
For we know we are responsible for every gun that's made
And we shall not lose the war for lack of coal.

He surely does not know us and more knowledge he should seek,
For his lack of information must be plain;
When he says the miner's time card shows but thirty hours a week
I feel that on our name he casts a stain.
Each day about at daybreak, we go down into the pit,
Just guided by the glimmer of a lamp,
And work our full eight hours, before it's time to quit
And turn our faces to the homeward tramp.

No one can now accuse us—if we're given half a chance—
Of doing anything to blush with shame;
For, if we are not fighting with the boys across in France,
We know that we are with them in the game.
We do not seek for glory, but still we do not feel
Like taking kicks we really don't deserve;
We only ask fair treatment, a square and honest deal,
For what we've shown of loyalty and nerve.

No matter how we're treated or what the papers say,
We still intend to do our little bit,
For every shot that's fired by the boys in France, today,
Is provided by the miners in the pit;
Yet we'll give them all the glory and let them have the praise
For what they're doing and for what they've done,
But we'll claim a little credit, in these stern and trying days,
For doing all we can to whip the Hun.

McIntyre, Penn. THOMAS HOGARTH.

(Revised by Michael Bernard.

Americanizing the Foreigner

Letter No. 2—It was with keen appreciation that I read the letter of "Observer," *Coal Age*, July 25, p. 189, as his remarks regarding the manner of dealing with the foreign-born had a trend of optimism seldom manifest in a discussion of that subject by men who have grown up around the mines.

While it is quite true that the writer of that letter offers no suggestion that can be put into effect immediately, yet his underlying thoughts contain a germ of reason that, if fostered, may be turned to good account.

Attitude of the Average Mine Official

The average mine official will, in nine cases out of ten, throw up his hands and say that there is no hope of Americanizing the foreign-born miner. We have all heard men holding high positions, in coal-mining companies, argue that they have tried all possible methods without success. Their belief is firm that the foreign miner will not forsake his native habits and accept the refinements of civilization. Almost without exception, mine officials of American birth claim to have labored in vain to redeem the foreigner.

It is to be much regretted that men are so willing to give up a difficult task What would the world be today had electricians not continued to grapple with problems that long seemed beyond their reach? Everything is possible of accomplishment if we use our brains and stay on the job, and the question of Americanizing the foreigner is no exception to the rule. The man who is willing to let well enough alone is not the man to whom we can look for help in solving this problem. He is a quitter and no quitter ever reached the goal.

Problem Must Be Carefully Studied To Reach Parents through Their Children

The subject is one that must be studied from every angle. Mining men have discussed the question at their meetings, but have never gotten so far as to appoint a committee to study the matter and report. In larger cities where the foreign element predominates, considerable progress has been made by reaching the adult classes through the children, who are taught by capable instructors. This suggests that the schools, in our mining towns, may prove the best avenues of approach when we would reach the miner.

Let the teachers be instructed by mine officials to maintain a high standard of order and cleanliness in the schools. Too often it happens, however, that the school teacher in a mining town or camp is given no opportunity to accomplish possible good, because of a lack of facilities, which those in authority have failed to supply. In many cases, no playgrounds are available, and no effort is made to render the schoolroom and its surroundings attractive.

Again, reason suggests that the adult foreigner cannot be reached as readily through Americans as through people of their own kind who have become Americanized and are in the employ of the company. By living and mingling with their own, this class of workers can exert a greater influence in accomplishing their ends and, by degrees, inject into their friends American ideals and customs.

While, as has been suggested, most foreigners do not appreciate the luxury of a bath as do Americans, yet it is not impossible to teach them the value of water in the improvement of their appearance if not of their health. A teacher by insisting on the children coming to school in clean frocks and with hands and faces washed and hair neatly combed, will do much to cleanse the home and purify the atmosphere where the children live, and ultimately redeem the older members of the family.

Efforts in Other Directions

Much can be done in the way of distributing posters, written in the native language of the people and telling of the services of the company doctor and the aims and purposes of the company officials in maintaining a clean and attractive town. All this, however, will surely fail of accomplishing the desired good when saloons are permitted in the place, and proper steps are not taken to keep the streets and yards free from garbage and other waste.

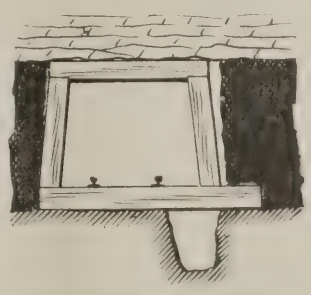
I am convinced that this subject can be dealt with successfully, and hope that it will be discussed from every viewpoint. Only by this means can good results be obtained. Optimist.

———, Ill.

Blasting a Ditch in a Mine

Letter No. 2—Replying to the inquiry of Geo. Smith, *Coal Age*, June 15, p. 1128, regarding the blasting of a ditch under the mudsills supporting the timber frames in a mine entry, I assume that the 10 x 10-in. timber frames are set 4 ft., center to center, and the 4 x 10-in. mudsills supporting them are laid crosswise of the entry. Under these conditions, if the ditch is to run along the side of the road it would leave the leg of each timber frame, on that side of the road, unsupported.

My suggestion is, in this case, to start the work by using a longer mudsill and hitching one end of this sill into the rib on the side of the entry where the ditch is to be blasted, as shown in the accompanying figure. Like J. W. P., who has discussed this question, Aug. 15, p. 326, I cannot understand why mudsills were used on this hard bottom. However, mudsills will be necessary to give support to the timber frames when the ditch is dug close to the rib, as illustrated in the figure. Let me suggest here that a heavier mudsill should be used than one 4 in. deep, as that would hardly support the pressure on the timbers above the ditch.



DITCHING AN ENTRY

The work of putting in the longer mudsills and resetting the timber frames must be done gradually by placing these halfway between the present frames and sills. The blasting of the ditch, if carefully performed, will probably not disturb the new timbers seriously. It occurs to me, however, that it might be better to drain this section of the mine by blasting a ditch in the parallel entry or air-course, and cutting through the rib for that purpose, if necessary.

I agree with J. W. P. that a ditch is always to be preferred to a siphon wherever it is practicable to make the necessary excavation. My experience has been that siphons are not generally satisfactory, especially where the conditions are such that their regular working is somewhat disturbed. W. H. NOONE.

Thomas, W. Va.

Letter No. 3—Regarding the blasting of a ditch on a slope road where the timber frames rest on mudsills and the bottom is hard, my plan would be to do this work at odd times when the mine is idle, or at night when the track can be lifted and the mudsills taken out, after setting temporary timbers to support the collars while the legs are being reset on the hard bottom.

It does not seem to me that mudsills are at all required in this case and should be discarded. As the timber frames are reset, the ditch can be blasted to the required depth, without disturbing them further. The proposition does not appear to present any serious difficulty.

After the ditch has been blasted to the proper depth the entire length or distance, I would lay tiling in the bottom and fill it over, only leaving holes at suitable distances apart that would allow the drain to be cleaned of any sediment or obstruction that might accumulate. I have seen such a ditch laid and it worked successfully. The road was only 5½ ft. wide and a six-wheel, H. K. Porter steam engine was used to haul the coal on a 24-in. gage track. I prefer the ditch to the siphon suggested. R. W. LIGHTBURN.

Perryopolis, Penn.

Loading Coal at the Face

Letter No. 2—The question of what weight of coal a miner can load in a day is one that is particularly appropriate at the present time, if for no other reason than the rivalry that it may arouse among practical miners to exert their best efforts to excell their fellows in the number of cars they load.

No doubt some miners who are prone to take things leisurely when working at the face will say that the claim set forth in the poster page of *Coal Age*, July 6, p. 29, where a man was said to load an average of 23 tons a day of 8 hours during the month of May, exceeds what is possible. By way of opening the eyes of such disclaimers and in fairness to the man who made this record, I want to say that my personal experience tells me that what would be called "a good miner" can enter his place at the regular time of starting, say 6 a.m. and be home again at 2 p.m., after having loaded from ten to twelve 50-bu. wagons or boxes, and not feel more than ordinarily fatigued.

WHERE CONDITIONS FAVOR THE MINER

The statement just made is based on facts and has reference to mines where conditions are, of course, favorable in every respect, as they are in the mines of the Connellsville coke region. To accomplish these results, however, there must be no delay waiting for smoke to clear or cars to be set. The miner's coal must be cut and shot down ready for loading, and empty cars must be on hand so that the miner can proceed at once with his work. There are times when it will pay the company to have a special timberman set posts, in different working places, so as to relieve the miner of this necessary work, and allow him to devote his whole time to loading his coal.

It is only fair to say that, in a seam of coal like that at Connellsville, where the height of the coal and system of mining are peculiarly advantageous, the miner finds less difficulty in moving about in the performance of his work than in seams where the coal is low and there are other hindrances and difficulties to be overcome.

THE JOLLY GOOD-NATURED FOREMAN

One particular feature that greatly assists the miner and his work is a good light, such as the electric cap lamp or the carbide light. Again, a good-natured foreman can do much to expedite the work of his men by his pleasing manner and his way of jollying men when undertaking a difficult task. The driver must be encouraged with a good word and, if off the track, given a helping hand to put the car back. In other words, the coal-producing spirit must prevail. LUMEN.

Perryopolis, Penn.

Letter No. 3—I have been greatly interested in the question of loading coal at the working face, as this work concerns a large production. First, let me say that it is the duty of every loyal miner to be in his place each working day and not allow one minute of his time to be wasted. Not only must the miner strive to increase his output each day, but he must clean his coal, taking care to throw out bone and other refuse. All coal should be cleaned at the face, as otherwise there is much delay when it is necessary to do this work on the surface.

Where there is the hearty coöperation of all mine officials with their men and the men are given what help is needed and do not have to wait for supplies of timber, tracking, etc., every man will have a disposition to do his best to increase his daily tonnage and load only clean coal. A miner should never be permitted to go home because some little work has not been done in his place. The foreman should make every effort to satisfy his men and keep them at work, since the loss of a ton of coal may mean the life of a soldier.

FAVORITISM AROUSES DISCONTENT OF MINERS

The Fuel Administration can do much to keep things moving smoothly at the mines, by showing no favor and treating every mine alike. When the government inspector shows a disposition to condemn coal loaded at a small mine, because it contains some refuse mixed with the coal, while he passes much of the same kind of coal at a larger mine, the miners cannot be blamed for being dissatisfied, and trouble is the result.

Discrimination in favor of the larger mines shows favoritism. All mines, large and small, should be treated with the same severity and made to load clean coal if we would increase production and win the war. At our mine, we have been able to increase the output 20,000 tons, during the first six months of the present year, over the same period of last year. We have accomplished this with only 80 men. Let every mine, large and small, do its best to show the same increase, and we need not fear the results of the war.

Chambersville, Penn. JOHN BUGGY.

INQUIRIES OF GENERAL INTEREST

Accounting of Materials

Some time since, in connection with the discussion of the unwarranted waste of material in coal mining, there appeared an excellent letter in which the writer described a good system of accounting of all material ordered and sent into the mine from the supply house. I do not remember the name of the writer, but would like to ask that this subject be again presented for discussion by the readers of *Coal Age*, in the hope that there may develop a simple and accurate system of keeping account of the supplies on hand in the warehouse, as well as showing the kind and amount of material used each month in the mine. The record should also show who ordered the material, the date and where it was to be used. The blank form should be arranged in such a manner that credit can be given for all material returned as not used.

We are desirous of starting some such system at our mine, believing that it will greatly increase the economy of operation by causing the mine bosses to look after and keep track of what material is sent into the mine. Practical mine foremen should be able to offer some good suggestions along this line. What we greatly desire is to ascertain the most practical form of printed blanks that can be prepared for this purpose.

Carpenter Creek, Mont. OFFICE MANAGER.

We are glad our correspondent has referred to this matter of accounting of mine supplies, which is one of the most important features in operating economy. The letter to which he has referred was written by William Jardine, Universal, Ind., and appeared in *Coal Age*, Vol. 9, p. 265.

We quite agree with the suggestion that mine superintendents and foremen will be able to submit many valuable ideas in regard to keeping track of mine supplies, and shall be glad to receive and publish blank forms used both in the ordering and accounting of material, and learn of the system employed by the storehouse keeper and the mine foreman, in their accounting of material on hand and in use. The comparison of these systems will undoubtedly prove of inestimable value to those interested in coal-mining economy.

Calculating Velocities of Air

A question that has puzzled quite a few of us appeared, some time ago, in the *Science and Art of Mining*. The question reads as follows:

A roadway 7 x 6 ft. is ventilated part of the distance with a 20-in. trough and the remainder of the way by a brattice placed 3 ft. from one side of the entry. The velocity of the air in the trough is 416 ft. per min.; what are the velocities in the narrow and wide sides of the brattice, respectively?

In the *Science and Art of Mining*, the answer to this question was given as 50.4 ft. per min., for the velocity on the narrow side, and 21.6 ft. per min., on the wide side of the brattice. According to the rules given in the Scranton textbooks, the velocity of an air current varies as the square root of the sectional area of the airway; or, indicating the velocities and areas, respectively, by v_1, v_2, a_1, a_2, the formula given is:

$$v_1 : v_2 :: \sqrt{a_1} : \sqrt{a_2}$$

Applying this rule, however, does not give the answer quoted above. Kindly explain. STUDENT.

Edmonton, Alta., Canada.

In naming an airway, by giving its dimensions, it is customary to give the height of the airway first, and its width second. As a 6-ft. airway would be very narrow, however, we assume that this airway is 6 x 7 ft., or 6 ft. high and 7 ft. wide. The sectional area of the 20-in. trough or tube is $0.7854 \times 20^2 = 314.16$ sq.in., or 2.181 sq.ft., and the velocity of the air being 416 ft. per min., the quantity of air passing is $416 \times 2.181 = 907.2$ cu.ft. per minute.

The narrow side of the brattice being 6 x 3 ft., its sectional area is 18 sq.ft. The velocity of the air in this space is, therefore, $907.2 \div 18 = 50.4$ ft. per min. Also, the wide side of the brattice being 6 x 4 ft. has a sectional area of 24 sq.ft. The velocity of the air in this space is, therefore, $907.2 \div 24 = 37.8$ ft. per minute.

Regarding the rule given for the variation of velocity and sectional area, it should be stated that this rule applies only to the circulation of air in airways having equal rubbing surface and under the same pressure, which appears from the formula

$$p = \frac{ksv^2}{a}$$

In the present case, the *quantity* of air in circulation is constant and the velocity varies inversely as the sectional area, which appears from the formula

$$q = av$$

In determining the relation of the different factors of a circulation of air, it is necessary to study carefully the conditions presented by the formula, after eliminating all the factors that are constant. For example, the two formulas just given show clearly the following:

1. The rubbing surface and unit pressure (or water gage) in two airways being equal, the velocity will vary as the square root of the sectional area:

$$v \text{ varies as } \sqrt{a}$$

2. The sectional area and unit pressure being equal, the velocity will vary *inversely* as the rubbing surface:

$$v \text{ varies as } 1 \div s$$

3. For the same sectional area, the velocity varies as the quantity of air passing:

$$v \text{ varies as } q$$

4. For the same quantity of air in circulation the velocity varies *inversely* as the sectional area:

$$v \text{ varies as } 1/a$$

EXAMINATION QUESTIONS

Hoisting Engineers' Examination, Pittsburg, Kan., May 15, 1918

Ques.—What are the duties of a hoisting engineer?

Ans.—A hoisting engineer should be on hand 15 or 20 min. before the time for his taking charge of the engine, observe carefully its condition and working and oil and adjust any accessible parts that may need attention. He should not leave his post, after assuming charge, until he is relieved by another engineer.

Before starting to hoist, the engineer should examine all brakes, rope fastenings, oil cups, valves and bearings. It is his duty to acquaint himself thoroughly with every part of the engine and know and answer promptly the signals given him from the mine. He must never move the cage except in response to a clearly understood signal, or after giving due notice of his intention to do so, by the proper signal.

When hoisting men he must use special care to observe the position of the cage in the shaft and not exceed a safe limit of hoisting. The engineer must not allow anyone to loiter in the engine room or himself converse with persons while operating his engine. He must never attempt to take charge of an engine if sick or otherwise incapacitated for duty.

Ques.—Explain the difference between a geared and a direct-connected hoisting engine, and state which you would prefer for Kansas mines and why.

Ans.—A geared engine is one in which the winding drum is operated by the revolution of a shaft carrying a spur or pinion the teeth of which mesh into a gearwheel on the drum shaft. In a direct-connected engine, the winding drum is operated directly by the engine, without the intervention of a pinion and gearwheel.

As the coal mines of Kansas are generally shallow, not exceeding 80 or 100 yd. in depth, geared hoisting engines are to be preferred, for the reason that this type of engine permits of a greater number of revolutions of the engine, for the same depth of hoist, and, therefore, gives the engineer better control of his engine.

Ques.—What horsepower must be developed to raise a weight of 400 tons 150 ft. in an hour?

Ans.—The theoretical power, which ignores the friction of the hoist, is, in this case $(400 \times 2000 \times 150) \div (60 \times 33{,}000) = 60.6$ hp., assuming the short ton of 2000 lb.

Ques.—How do you determine the horsepower of a tubular boiler?

Ans.—The heating surface of this boiler, which is the entire surface exposed to the flame and gases of the fire and includes the tubes, boiler plates and boiler heads so exposed, must first be calculated. For return tubular boilers the ratio of heating surface to horsepower varies from 14 to 18. Therefore, to obtain the horsepower of such a boiler, divide the heating surface, in square feet, by a constant, which may vary between these limits.

Ques.—What are the advantages and disadvantages of using the water from the exhaust pipes of a hoisting engine, in a boiler?

Ans.—The advantage of using the water condensed from the exhaust steam of an engine is the saving thereby effected of the heat in the exhaust steam, which would otherwise be lost but which, in the condensation, passes into the feedwater and assists in raising its temperature.

One disadvantage in the use of the water from exhaust steam and feeding it into the boilers without sufficient treatment, is due to the oil contained in the exhaust steam. This oil is taken up by the steam in the cylinder of the engine and if permitted to remain in the feedwater and enter the boiler may result in coating the boiler plates and tubes with a film of oil, which would prevent the contact of the water with the metal and cause the overheating of these surfaces and the bagging of the plates or the formation of blisters.

Another disadvantage is experienced when the oil saponifies under the action of the alkali or alkaline earth contained in the feedwater. This is more apt to happen when an impure mineral oil is used in the cylinder of the engine, as the presence of vegetable or animal matter is necessary to cause the action.

In order to derive the benefit arising from utilizing the heat of the exhaust steam to raise the temperature of feedwater, the latter should be passed through an oil filter, consisting of a layer of charcoal or coke over a layer of hay, which will absorb the most of the oil contained in the feedwater, provided the material of the filter is renewed from time to time, as required.

Ques.—What is the number of revolutions per minute, of an engine having a stroke of 3 ft. 6 in. when the piston speed is 900 ft. per min.?

Ans.—Each revolution of the engine corresponds to a double stroke or a piston travel, in this case, of 7 ft. The speed of the engine is, therefore, $900 \div 7 = 128\frac{4}{7}$ r.p.m.

Ques.—What, in your opinion, is the best system of hoisting signals in use in the coal mines of this state?

Ans.—One bell or whistle signifies to stop if the cage is in motion; when the cage is at rest the same signal signifies to hoist the cage if the signal is given from the shaft bottom or lower the cage if given from the surface or upper landing. Two rings or whistles signify to lower the cage. Three rings or whistles signify men are ready to get on cage and are waiting for the engineer to signal them by one ring or whistle that he is ready, after which one ring to hoist or lower, as the case may be, requires the engineer to use extra caution if men are on the cage. Four rings or whistles should indicate that the cage is to be hoisted or lowered slowly and with caution, owing to the uncertainty of its load. *Coal Age, Vol.* 10, *p.* 85.

COAL AND COKE NEWS

Uniontown, Penn.

Fifty thousand tons of coal were lost last week by a coal car shortage which has reached an acute stage in the Connellsville coke regions, according to a statement issued at the office of the regional fuel administration. There was an added shortage of 1274 cars over the week preceding, and that fact coupled with the shifting to coal shipment of a number of Frick coke plants due to the demands for coal by the Clairton byproduct works, created a situation which held the attention of both the fuel and railroad administration representatives in this region. The region's coke output aggregated 316,381 tons, while the coal figures showed a production of 199,957 tons.

W. L. Byers, manager of production for the Connellsville region fuel administration, has issued an appeal to miners and coke drawers to make claim for deferred classification to the draft authorities. He told the men that in their work they were rendering as valiant a service to the country as if they were in uniform, and that the region could ill afford to lose many of its coke workers. Employers were urged to coöperate with the men in the preparation of the necessary affidavits. The new age limits of the draft will take in the great majority of the workers in the coke region, and Mr. Byers' appeal was issued to assure the men that no taint was attached to the application for deferred classification.

Charleston, W. Va.

Coal mine operators from all parts of the New River and Winding Gulf section gathered here last Monday to devise ways and means of speeding up the production of coal, that being the object of the meeting, over which C. C. Beury, chairman of the New River Association, presided.

As the first speaker, T. A. Scott, of the New River Company, outlined what the production committee of the National Coal Association was endeavoring to do to aid the United States Fuel Administration in its efforts to increase the output of coal. Mr. Scott favored immediate action on any plan which would result in an increased production.

E. E. White, president of the E. E. White Coal Co. and chairman of the Winding Gulf Association, as well as the newly appointed production manager for the Winding Gulf and New River districts, briefly outlined some of the plans for increasing production he had in mind, but emphasized the necessity of coöperation of not only operators and miners, but the public in general in getting out coal.

J. D. Parrish, superintendent of the Charleston & Ohio R. R., assured the operators present that he appreciated the cooperation of all of them and would be glad to have any suggestions as to how the car supply might be bettered. He said the railroads hoped soon to be able to furnish a car supply sufficient to meet all requirements.

Sanction was given by the association to a plan to establish a production office in Charleston with T. L. Lewis, secretary of the New River Association, in charge. Mr. White, of course, being the executive of the committee. The office has already been organized and plans set on foot to wage a campaign for greater production, operators present pledging their support.

Pocahontas and Tug River Districts

The Pocahontas and Tug River districts are recoving somewhat from the slump which followed closely on the heels of the banner week of July 29. While, of course, those districts have felt to a slight extent the car shortage, yet it has never been felt to the same extent as the inability to get the miners to put in more time, a problem which has been worked out partly although the mines in the southern part of the state are far from having a quota of miners large enough to meet the capacity of all mines. More negro labor has been used in the mines in the southern tier of counties than anywhere else, and many colored men have been drafted. It is hoped, however, by refraining from frequent celebrations to gain more time to be used in mining coal.

Kanawha District

Lack of cars is still playing hob with the production of coal in the Kanawha district. While assurance has been given by the Charleston & Ohio Ry. and the Fuel Administration at Washington, little relief has been afforded so far and consequently it is certain that the mines in this region will fall far below last month in the total output. The total production in the Kanawha district last week was 170,431 tons, a slight increase over the previous week, but below the same period of last month. Just how serious the car shortage is may be gathered from the fact that 2560 hours were lost from this cause. Although a less number of hours were worked the cutters had enough coal cut to increase the total tonnage. Hours lost from labor shortage amounted to a total of only 183.

New River District

The New River District, generally speaking, has been one of the few in the State of West Virginia which has not suffered from a poor car supply, but even that district was retarded slightly this week and last week on one or two days by an absence of cars. While not experiencing any such trouble now, the mines in the New River field have been hampered in getting out coal by poor power supply. For a time the operators never knew at what moment their power would be cut off. Now, however, there seems to have been an improvement, but in order to insure a reliable supply in the future there has been some talk of employing an electrical expert to work with the operators and a representative of the power company, in order to determine just where any lack of efficiency might exist.

Fairmont District

The continuation of the poor supply of cars in the Fairmont district over a period beginning about the 1st of the month has kept down the output, and conditions may almost be compared to those prevailing in the district last winter, the run of cars not averaging much over 800 during the first three weeks of the month. Each week the supply starts off well enough, but the experience of Fairmont district mines is that before the week is over the number of cars furnished is far below requirements.

Late placing of cars is also retarding production. For instance, while there were 1732 cars in the Fairmont district Monday of this week, many of them were placed so late that no miners were on hand to load them. Conditions in general did not point to any betterment in the car supply in the field during the week. Requisition had to be made to all mines for railroad fuel this week to meet the shortage of last week, when not even enough cars were furnished to load railroad fuel. During the first part of the week the shipment of coal eastward was limited to 900 cars a day. That gas coal should not be used for railroad fuel in view of the necessity for byproduct coal, is the belief among operators of the Fairmont district.

Winding Gulf District

If there has been any failure on the part of Winding Gulf District mines it has not been due to any lack of effort on the part of those in the industry, but rather to transportation difficulties. With six engines of the largest type in commission, the Virginian Ry. gives promise of being able to handle more cars in and out of the region. It is probable that even four more engines will be added to the motive power equipment in the Winding Gulf region. More coal is being mined in the Winding Gulf region as a result of get-together efforts of operators and men. That a sincere, serious effort is being made by the Chicago & Ohio Ry. to supply more cars is the statement of Superintendent Parrish, of Huntington, who has expressed the belief that much would be accomplished if operators and miners would seek a closer relationship with trainmen.

Dallas, Tex.

Plans are being worked out with the approval of the officials of the Federal Fuel Administration in Texas by which it is hoped to secure coal from the mines in Mexico just across the Rio Grande sufficient in quantity to care for all local needs in Texas. Manuel F. Palacio, of Saltillo, Mexico, has gone to Detroit for a conference with Henry Ford relative to securing motor trucks in sufficient number to transport needed coal from the Mexican mines. Mr. Palacio carries with him letters from Governor Mireles of Coahuila, Mexico, and also from Governor Hobby of Texas, setting forth the situation and giving indorsement to the plan.

Mr. Palacio proposes to secure motor trucks and transport coal from the mines in Mexico located only a few miles south of the Rio Grande opposite Laredo and Eagle Pass. The coal of these mines, it is claimed, is equal in quality to the best Pennsylvania anthracite, and General Carranza and Governor Mireles have given permission for the mine operators to transport the coal to the border for the use of the people of the United States. These mines are just being developed and could be made to increase their output greatly if a market for the coal is found in the United States and means for transporting the coal to the border is provided.

Present prospects in Texas are that the people of the state will have to depend on wood and lignite for heating purposes unless a way is provided for getting coal from Mexico. The coal in Mexico can be produced at a low cost and the expense of transporting it to the border if motor trucks can be had will not be great. From the border the coal can be hauled to all parts of Texas and other states by rail.

PENNSYLVANIA

Bituminous

Uniontown—Deed for the sale of an undivided one-half interest of 150 acres of Springhill township Fayette County, coal to the Hecla Coal and Coke Co., was placed on record here recently. The sale was made by Charles H. Seaton and Lizzie S. Bowman for $60,255, or at an average of more than $800 per acre. The other half interest is involved in the J. V. Thompson estate. The Crystal mine of the Hecla company adjoins the new field.

Uniontown—Damage to the extent of $50,000 and forced suspension of the mine was the toll of a fire at the Gates tipple of the H. C. Frick Coke Co. The fire is supposed to have been started by a bolt of lightning during an electrical storm. The tipple itself is mostly of steel construction and was but little damaged but the shaft timbers were burned. During the same storm the mine of the Plumer Coke Co. located nearby, was flooded. The Gates mine fronts the Monongahela River and is now shipping its output by water to the Clairton byproducts plant.

Pittsburgh—The Crucible Coal Co. is negotiating with the Cornell Coal Co., of Creighton, for the purchase of the holdings of the latter company.

Blairsville—The Brown Coal Co., of this city, has begun work on the reopening of the old Hart mine near Clarksburg. The company has made arrangements to dump its coal off the Lowther Coal Co. tipple at Clarksburg.

Evans City—The Big Creek Coal Mining Co. has begun improving its mining town at Wahlville, near here. All the houses are being wired for electricity and the current will be furnished by the company. Water is also being piped into the houses and drilled wells will replace the old reservoir. The production of the mine was recently increased by the installation of electric power for mining machines and haulage systems.

Anthracite

Hazleton—On Aug. 26 the Wyoming Valley Water Supply Co. received permission from the Commonwealth to construct a new reservoir at Tomhicken. This will permit

the abandonment of the old dams, which are over rich anthracite coal seams that the Lehigh Valley Coal Co. wishes to mine.

WEST VIRGINIA

Lannat—The No. 4 Superior Coal Co. is building a new plant here and will install electrical equipment. The company was organized by W. J. Luttrell, J. W. Reedy, C. R. Luttrell and others.

Clarksburg—Extensive coal property, in which Pittsburgh business men are interested in part, located on Shinn Run, Harrison County, will be developed by the Shinn Run Coal Co., incorporated by F. P. Patterson, H. T. Klingensmith, E. C. Peeler and N. K. Taylor, all of Pittsburgh, and by Guy A. Hardesty, of Shinnston. The company has an authorized capital stock of $50,000.

Clarksburg—The leasehold on the Titchnell coal properties at Meadowbrook, near here, held by the Madigan-Johnson Coal Co., has been sold to new interests. It is understood that the new owners are planning to increase operations at the plant.

Lynch—The United States Coal and Coke Co. is planning for extensive improvements and additions at its coal mining properties near here, to provide for increased operations. At the present time the works have a capacity of approximately 10,000 tons daily.

Charleston—The Columbia Coal Co., Union Building, is planning for the installation of mining machinery, including electric equipment for operation, at its properties, for the development of about 300 acres of coal lands.

Huntington—That there exists an urgent need for at least 7500 more men to man the coal mines of West Virginia is the opinion expressed by Agent John G. Wilson, of the Huntington branch of the United States Employment Service. It will be necessary to replenish the ranks of the miners depleted in various ways in order to bring the mines of the state up to their fullest capacity. With the addition of 7500 men, the employment agent estimates that 75 mines could be operated, each man producing anywhere from 16 to 20 tons during an eight-hour day.

KENTUCKY

Sturgis.—The machine shop and stables, including livestock, of the West Kentucky Coal Co. Mine No. 2, at this place, were recently destroyed by fire. The damage was estimated at about $10,000.

Hazard—The Midland Mining Co., which recently filed notice of an increase in its capital from $100,000 to $150,000, to provide for expansion is now developing approximately 1800 acres of coal properties in the Hazard district. H. E. Bullock is president.

ILLINOIS

Danville—A new strip mine will be opened by White, Barger & Co., four miles southeast of this city. The new mine will be in the Grape Creek district, the opening of which mining field placed Danville in a leading place in the mining world. The seam runs 7 ft. 2 in. to 8 ft. 7 in., with an overburden of from 12 to 18 ft. of earth. C. J. White, a pioneer worker in the strip mining field, will be interested in the new company. He installed the Beech Flats mine at Rush Run, Ohio, said to the largest strip mine in the United States. This mine is owned by Danville capitalists. W. G. Hartshorn will be the president of the new company. He is a worker of a number of years' standing in the mining field, having opened ten mines in Illinois, three in Ohio, two in Alabama and one in Indiana. A. W. White will be the active manager of the new project and John W. Barger will also be active. The mine will cater to Danville trade, wagon business to have first attention.

Harrisburg—Unsatisfactory power supply in the Harrisburg and Carterville districts has led to a suggestion, which the operators are considering that Keokuk dam power be used. At present power is being obtained from an operating company, which generates its own power and supplies other operators with the surplus.

Carlinville—It is reported that the Union Pacific R.R. is planning to open up extensive coal fields in this section of Illinois. A field of 60,000 acres east and southeast of town is said to have been bought up for the company, which is expected to sink three big mines, one near Moore's branch, another southeast of town and a third to the south. The field is held in the name of the Illinois Union Coal Company.

Springfield—Efforts of Sangamon county florists and proprietors of greenhouses have resulted in a modification of the order issued some months ago by the National administration limiting them to 50 per cent. of coal during the year 1918. The modification, which applies to the entire State of Illinois, permits them to have a 100 per cent. supply where in the opinion of the state fuel administration it does not interfere with the coal supply of industries working on war orders, provided that they use one-half of their coal in the form of screenings.

Springfield—The tipple of Citizens' Mine A collapsed a few days ago and threw nearly 250 men out of employment and curtails production in Sangamon County 1500 tons a day until it can be repaired. No one was injured. While repairs are being made limited production is maintained by hoisting through Mine B, the galleries of which connect with those of Mine A.

Gillespie—The order forbidding shipment of coal to coal-producing communities is causing trouble here. The Superior Coal Co. is a large producer here but does not sell for home consumption. A local mine is being sunk, but it will not be ready for several months. C. T. Woodward, county fuel adminstrator, is looking into the situation. The same state of things exists at Greenfield.

Decatur—Decatur mines are working 100 per cent. efficiently. They are from 30 to 60 days behind in their coal orders and are now hoisting 1000 tons of coal daily, which is their capacity. Local manufacturers are storing large volumes of coal and there is every indication that householders will do the same. No coal is going out of Decatur and Macon Counties. The fuel situation in general for the coming year is regarded as favorable, and this means much, as Decatur is a large industrial city. The Wabash Railway Co. alone has stored 30,000 tons of coal in its Decatur yards.

Carlinville—A new coal shaft is being sunk by local capital, the idea being that the new mine will be able to supply coal for local consumption by the opening of the winter season. The new mine is located near the Carlinville Clay Co.'s plant, south of town. A. H. Bell is the president and C. H. McIntosh, secretary.

Panama—The loss of the Panama local of the United Mine Workers through the alleged dishonesty or dereliction of its officials will not be as great as was at first thought, according to a report of an investigating committee composed of A. E. McReaken, James Hicks and Frank Hartman. The shortage was at first estimated at $15,000. A good deal of the money has been repaid and it is understood the loss will not be more than $3000. A warrant has been issued against a former official who is missing.

Edwardsville—Coal operators in this section are experiencing considerable difficulty on account of the scarcity of water. Continuous operation of the mines through the summer, coupled with the drought, which has been only partially broken, has depleted the lakes and ponds upon which most of the mines depend. Most of the operators have had to resort to tank cars. About 125,000 gallons are being "tanked" out of Alton each day.

ARKANSAS

Fort Smith—W. J. Pendergrass, of this city, and associates have organized the Majestic Coal Co. for the purpose of opening a 600-ton mine, two miles from Midland. Application to open the plant has been approved by the Fort Smith fuel administration. The company owns 250 acres of coal land and has a lease on 300 more acres. The coal is 3 ft. thick and the property is located a half mile from the Midland Valley railway tracks. It is the intention of the corporation to begin sinking a slope as soon as the application is approved by the National Fuel Administration.

Foreign News

London, England—Dissatisfied with a wage award which they considered unfair, a large number of miners in the Yorkshire coal fields went out on strike on Aug. 22. The strike lasted for only one day, as the men returned to work after the employers granted all demands.

Edmonton, Alta.—Mines in this neighborhood are largely idle for want of orders. Twin City Coal Co.'s mine closed down for a week and work at other mines is reported slack. In spite of warnings issued, the majority of people are putting off buying in the hope of prices going down by reason of more men and teams being available during the winter. The Dominion Government is blamed for lack of definiteness in handling the coal situation as in all that has been done to encourage the East to buy Western coal there has been some sort of qualification which has discounted the recommendations.

Personals

Richard Nesson, of Springfield, Ill., has been appointed mine inspector for the Litchfield district, succeeding Thomas A. Lewis, who resigned to take up another line of work.

W. B. Gathright, for the past 14 years connected with the Louisville office of the St. Bernard Mining Co., of Earlington, Ky., has been named assistant manager and sales agent succeeding the late Julius Bierach, who died early in the month.

Vance McCarty, for the past 12 years manager of the Pittsburgh branch of Edward R. Ladew Co., Inc., manufacturer of leather belting, has been appointed general sales manager of the company, with headquarters in the New York office, 54 Franklin Street.

Howard Marvin, formerly manager of Boyts Porter and Company, of Connellsville, Penn., manufacturer of the Yough mine pumps, has been made general manager of the International Clay Machine Co., of Dayton, Ohio, manufacturer of mining machinery.

Obituary

Albert E. Waggle, of Monroeville, Penn., mine superintendent at the local mine of R. H. Cunningham, was killed on Aug. 14 by the premature explosion of a blast. Mr. Waggle was 55 years of age.

Charles E. Gartside, a pioneer Illinois coal operator, died last Wednesday at St. Luke's Hospital. He had been sick four months. He was 68 years of age. Formerly he was for 40 years president of the Gartside Coal Co., succeeding his father, Joseph Gartside, founder of the company. He retired several years ago.

Recent Coal and Coke Patents

Mechanical Stoker. A. G. Elvin, A. B. Fahnestock and F. H. Clark, New York, N. Y., 1,267,644. May 28, 1918. Filed Sept. 20, 1917. Serial No. 192,260.

Coal Washing Apparatus. L. L. Llewellyn assignor to Pittsburgh Coal Washer Co., Pittsburgh, Penn., 1,267,565. May 28, 1918. Filed Jan. 5, 1918. Serial No. 210,415.

Supporting and Adjusting Mechanism for Mining Machines. N. D. Levin, assignor to Jeffrey Manufacturing Co., Columbus, Ohio, 1,267,675. May 28, 1918. Filed Sept. 30, 1911. Serial No. 652,099.

Regenerative Coke Oven. E. Coppeé, Brussels, Belgium, 1,267,380. May 28, 1918. Filed July 28, 1914. Serial No. 853,603.

Furnace Regulator. C. H. Stalker, Ann Arbor, Mich., 1,267,601. May 28, 1918. Filed Oct. 16, 1916. Serial No. 125,845.

Manufacture of Fuel Blocks or Briquets. E. R. Sutcliffe, assignor to Pure Coal Briquettes, Ltd. Cardiff, Wales, 1,267,711. May 28, 1918. Filed Mar. 27, 1915. Serial No. 17,504.

Gas Producer. J. W. Hornsey, assignor to General Reduction Gas and Byproducts Co., a corporation of Delaware, 1,267,410. May 28, 1918. Filed July 3, 1914. Serial No. 848,704.

Mine Elevators, Car Lock for. S. Galli Breegy Hill, Kan., 1,268,001. May 28, 1918. Filed Jan. 4, 1918. Serial No. 210,305.

Smoke Consuming Furnace. O. D. Orvis, New York, N. Y., 1,267,446. May 28, 1918 Filed Oct. 23, 1916. Serial No. 127,115.

Mining Machine. R. E. Dunlop, assignor to Jeffrey Manufacturing Co., Columbus, Ohio, 1,267,992. May 28, 1918. Filed July 28, 1914. Serial No. 853,644.

Stoking Mechanism. H. L. Moore, Pittsburgh, Penn., 1,267,439. May 28, 1918. Filed June 19, 1916. Serial No. 104,628.

Coal Washing Trough. G. E. Alleman, Shoemakersville, Penn., 1,268,531. June 4, 1918. Filed Aug. 25, 1917. Serial No. 188,098.

Dumping Car. A. Lichtenstein, Brooklyn, N. Y., 1,268,588. June 4, 1918. Filed Mar. 21, 1917. Serial No. 156,354.

Method of Mining Coal. A. H. Kuhn, Pittsburgh, Penn., 1,268,584. June 4, 1918. Filed Aug. 14, 1914. Serial No. 856,850.

New Incorporations

Adams, N. Y.—The Adams Coal Co. has filed notice of an increase in its capital from $35,000 to $50,000, to provide for expansion.

Whitesburg, Ky.— The Kentucky-Harlan Coal Co. Capital, $100,000. To develop coal properties in Harlan County. George F. Ryan is the principal incorporator.

Wellsburg, W. Va.—The Ohio Valley Fuel Co. Capital, $100,000. To operate coal mines in the Ohio Valley section. J. K. Wells is the principal incorporator.

Pittsburgh, Penn.—The Victory Coal Mining Co. Capital, $50,000. To operate coal properties in the Pittsburgh field. J. Fred Morlock, of Buffalo, N. Y., is treasurer.

Wheeling, W. Va.—The Ohio Valley Fuel Co. Capital, $10,000. To develop coal lands in Brooke County. Incorporators: J. K., M. L. and S. G. Wells.

Cassville, W. Va.—The Cass Hill Coal Co. Capital, $50,000. To operate coal properties in the vicinity of Cassville. Incorporators: R. L. Stallings, C. C. Hetzel and G. H. Hetzel.

Wilkinsburg, Penn.—The Wilkinsburg Domestic Coal Co. Capital, $50,000. To develop coal properties in the Wilkinsburg district. S. R. Hall, of Jeannette, is the principal incorporator.

Charleston, W. Va.—The Harmon Coal Co. Capital, $50,000. To mine for coal in the Charleston field. J. C. Gary, James E. Staton and A. F. Harmon are the principal incorporators.

Kittanning, Penn.—The Pittsburgh & Fennelton Coal Co. Capital, $50,000. To operate coal properties in the vicinity of Kittanning. C. H. Dyer, of Pittsburgh, is the principal incorporator.

Pittsburgh, Penn.—The Lebanon Block Coal Co. Capital, $25,000. To develop coal lands in the Pittsburgh field. William M. Swart, of Dormont, is the principal incorporator.

Jackson, Ky.—With a capital of $60,000, the Panhandle Coal Co. has been organized to develop mine property. W. O. Bender, E. O. Bailey and E. I. Hawkins are the principals.

New York, N. Y.—The Adelphi Coal Co., Inc., a Maryland corporation, has filed notice of authorization to operate in New York with a capital of $50,000. P. L. Vannorden, 1 Broadway, will act as local representative.

Chattanooga, Tenn.—Loomis & Hart Mining Co., capital $10,000, has been incorporated by Gaston Raoul and others, to operate coal mine on Raccoon mountain, to supply coal for the Odorless Refrigerator Co., of Chattanooga, with which Raoul is connected.

Hazard, Ky.—The Midland Mining Co., Lexington, has secured 1800 acres of land near Hazard and plans early development. The organization is capitalized at $150,000, having recently increased its stock from $100,000. D. L. Pritchard has been named construction engineer and H. E. Bullock president.

Henderson, Ky.—The Uniontown Coal Co., capital $100,000, has been incorporated by C. C. Porter, president, Dandridge Spottswood, vice-president and general manager, and J. H. Turner, secretary-treasurer. Henderson, Ky., will be headquarters of the company, while the officers are all Nashville men. The company has secured an operating mine at Uniontown, Ky.

Chattanooga, Tenn.—The Laurel Fork Lumber and Coal Co., capital $60,000, has been incorporated by Albert Crumley, H. M. Gordon, John Morrow and others. The Suck Creek Coal Co., also of Chattanooga, has increased its capital from $50,000 to $200,000. At Huntsville, Tenn., the Big Spring Coal Co. has been chartered with a capital of $12,000 by J. T. Prather and others.

Industrial News

War, W. Va.—The Bradshaw Coal Co. is building 60 houses for miners at its plant here, and also putting in a good deal of new electrical equipment.

Clarksburg, W. Va.—A 150 kw. electric plant is to be installed by the Valley Falls Fuel Co. The company expects to have the new power unit in operation within the next two months.

St. Louis, Mo.—St. Louis will begin at once the storing of coal on the levee at the foot of North Market St., adjacent to the new municipal dock, from which a track will be laid. A stock of about 15,000 tons will be placed there as a reserve.

Hawesville, Ky.—The Central Kentucky Block Coal Co., which was incorporated with a capital of $200,000 a short time ago, plans development of 2000 acres of land, for a daily capacity of 500 tons, and plans installation of equipment.

Lexington, Ky.—George F. Ryan and others are behind the Kentucky-Harlan Coal Co., according to report from Whitesburg, this concern figuring to develop coal mines and townsite near Harlan with capital of $100,000.

Lexington, Ky.—Jack Bryan and Louis Young, of Lexington, have purchased the Ivy Mill Coal Co. mines at Harlan, Ky., on Big Black Mountain, and plan extensive improvements and developments of the property.

Bluefield, W. Va.—Not only is new equipment being added to the Rolfe plant of the Pocahontas Fuel Company, but 37 new houses have been built. New equipment consists of 100 new mine cars. At the Cherokee plant of the company, 27 new miners' houses have been built.

Springfield, Ill.—The Springfield Board of Education has awarded to the Scott Coal Co. the contract for coal for the coming winter at these prices: Mine-run, $3; pea, $3.20; lump, $3.20; duff, $2.55; egg, $3.20, and screenings, $2.70. The Scott company was the only bidder.

Kimball, W. Va.—Many improvements are being made by the Houston Colliery Co., of which E. L. Stafford is superintendent, at the company's plant here. A new power house is being built and equipped with automatic stokers under the boilers; at the same time 25 miners' houses and a club house are being erected.

Whitesburg, Ky.—The Powell Coal Co., recently organized with a capital of $50,000, plans to develop lease secured from the Eureka Elkhorn Coal Co., handling two mine openings, and daily capacity of 500 tons. Material has been secured to erect tipple. Power plant and mining equipment will be installed.

Huntington, W. Va.—Announcement has been made by the Chesapeake & Ohio R. R. that figures for coal loading for the month of July show that all records for this work have been broken, a total of 3,145,105 tons having been loaded during this month. This amount is approximately 300,000 tons in excess of any previous month.

Chicago, Ill.—The Cement-Gun Construction Co. has recently completed the application of a waterproof gunite lining to the air shaft of the No. 11 mine of the Old Ben Corporation, Christopher, Ill., and is now engaged in doing the same work for the J. K. Dering Coal Co. at both the main shaft and air shaft of the new mine at Eldorado, Ill.

Pittsburgh, Penn.—In connection with extensive improvements at its Wheatland works, the Pennsylvania Railroad Co. has awarded a contract for the construction of a large new coaling station, including ash-handling department, the entire work being estimated to cost $150,000. The Crowell, Lundoff Little Co., Cleveland, Ohio, is the contractor.

Briceville, Tenn.—The Cross Mountain Coal Co., main office Knoxville, Tenn., which recently increased its capital from $400,000 to $500,000, plans development of 3000 acres of land, for a daily output of 600 tons. Willis P. Davis, formerly of Louisville, and connected with some large iron plants of Knoxville, is manager of the company.

St. Louis, Mo.—The Walter A. Zelnicker Supply Co. recently secured the services of Merle G. Peterson, who is now connected with the company's Chicago sales force at 428 First National Bank Building. Mr. Peterson was formerly associated with the Niles-Bement-Pond Co. and Pratt & Whitney Co. His father, Carl Peterson, is western representative of Baldwin Locomotive Works, with offices at Chicago, Illinois.

Crooksville, Ohio—An order has been issued by the federal director of railroads changing the contract of a small line 3.7 miles in length running between Sayre on the Zanesville & Western to San Toy. Formerly the line was controlled by the Baltimore & Ohio and a long route was covered to permit the coal mined on the line to be shipped to the market. Now the coal will go out over the Zanesville & Western.

East St. Louis, Ill.—The contract for supplying the city's fuel repirements from Aug. 1 to May 1 has been let to Frank Maule at $4.20 a ton, subject to any increase caused by a Federal order or an increase in freight rates. The contract calls for 2-in. screenings. The Cahokia Coal Co. and the John T. Maule Co., each bid $4.40 a ton. Last year the price was $3.10 and $3.25 a ton. The consumption is about 800 tons.

Williamson, W. Va.—Improvements costing $40,000 are being made to the plant of the Standard Thacker Coal Co. at Chattaroy under the direction of L. G. Bray, general manager. By such improvements it is hoped to increase the capacity of the plant 10,000 tons annually, giving a total production of 75,000 tons a year. Work was started on these improvements on July 1, and it is believed that they will be completed by Oct. 1.

Charleston, W. Va.—There was a total of 44 deaths in West Virginia during July as a result of accidents in the mines. Four of such deaths were outside the mines and forty within the mines. Twenty-five deaths were caused by falling roof and coal. Eight miners met their deaths on or under mine cars, motor cars killing four. Live wires caused the death of three. There were seven deaths each in Districts 13 and 14. Thirty Americans were killed, the rest being foreigners.

Toledo, Ohio—Considerable activity prevails at the docks of the lower lake ports, which is shown by the records of loadings at the Toledo docks of the Hocking Valley and Toledo & Ohio Central railroads. The Toledo & Ohio Central docks during the week ending Aug. 17 loaded 92,000 tons as compared with 78,000 tons the previous week, making a total of 1,120,000 tons for the season. The Hocking Valley docks during the same week loaded 197,837 tons as compared with 169,928 tons the previous week, making a total of 2,482,000 tons for the season.

Indianapolis, Ind.—Shipments of coal to 41 industrial plants in Indiana have been discontinued because these plants have been stocked with a sufficient supply of coal to meet needs for several weeks. The order was issued by R. L. Flood, of the quartermaster's corps, assigned to coöperate with the Indiana Fuel Administration in establishing priority shipments of coal to industries engaged in war work. The order was made following instruction which had been received by A. M. Ogle, director of state distribution of the Federal Fuel Administration, that plants with excessive supplies of coal should receive no more coal. It is said that some plants have enough coal on hand now to operate for a year.

Indianapolis, Ind.—A tentative plan has been drawn up regarding the distribution of coal among the 54 cities of Indiana which are entitled to receive anthracite. The plans were agreed upon by Alex R. Holliday, assistant fuel administrator of Indiana, and H. N. Pease, western representative of the anthracite department of the Federal Fuel Administration. Officials of the state administration state that it will be impossible to divert any of the anthracite coal from any of the 54 cities which are designated by the order.

Pineville, Ky.—The property of the Federal Coal Co., which owned and operated a number of coal mines on Straight Creek, was sold on Aug. 19 by Judge J. M. Gilbert, as Special Master under a decree of the United States District Court of eastern Kentucky, for $1,400,000. The stocks and bonds of the company are owned by Louisville and Chattanooga parties, who organized the Federal Coal Co., to take over the property of the Continental Coal Corporation, which filed a petition in bankruptcy. Disagreements arose between the Louisville and Chattanooga interests concerning the management of the property under the reorganization, and the property was again thrown into court. Several months ago a division of the property was made as between the Louisville and Chattanooga interests, the latter taking the property on the Left Fork of Straight Creek, the Louisville interests taking the properties on the Right Fork, which embraced the property of the old Straight Creek Coal and Coke Co., which was owned by Louisville capitalists and by them sold to the Continental Coal Corporation. The latest sale was made to C. M. Preston, of Chattanooga, and Thurston Ballard, of Louisville, representing the two interests. The property which goes to the Louisville interests is now being operated as the Liberty Coal and Coke Co., under the management of Judge M. H. Barker, of Louisville.

MARKET DEPARTMENT

Weekly Review

Coal Output Shows Further Decrease—Poor Car Supply and Layoffs Keep Down Tonnage—Reserve Stores of Coal To Be Limited—Northwest Shipments Show Improvement —Market Conditions Quiet—Nonessential Industries Have Poor Outlook for Fuel

PRODUCTION of bituminous coal continues to decrease in spite of all efforts made by operators and Fuel Administration officials to speed up production. The causes for the poor output still remain the chronic ones of insufficient cars and slacker labor. Many of the producing districts report that their operations have been forced to suspend for periods ranging from half a day to four days because they were given no cars to load. Not only does this poor transportation situation result in meager tonnages, but patriotic labor that is anxious to prove its good intentions toward the country at the present time is denied the opportunity to work steadily. Then, again, pay day at many mines is still followed by an increase in the percentage of absentees, men whose craving for a spree or a layoff is stronger than the pleas made by speakers throughout the mining regions that coal is needed to win the war.

During the week ended Aug. 17 inadequate car supply and labor shortage combined to keep the output of soft coal down to 11,910,000 net tons, which is far below the weekly figure of 14,270,000 net tons considered necessary to meet essential demands. It is a foregone conclusion that some drastic policy will have to be put into effect if war work is not to suffer, and an intimation of the manner in which the situation will be met is indicated by the announcement of the Fuel Administration that stocks of steam, byproduct and gas coals are not to be hoarded, regardless of whether the consumer with the reserve stores is in a preferred or nonpreferred industry. Mandatory limits have been set on the number of days' supply of fuel which may be stored by industries in different sections of the country, and the Fuel Administration will see to it that these limits are not exceeded.

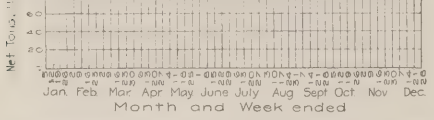
Anthracite production during the week ended Aug. 17 totaled 1,924,800 net tons, which is not only a falling off of 127,133 net tons compared with the week of Aug. 10, but is 63,800 net tons under the quantity mined in the same week of last year. Inadequate labor forces are chiefly responsible for the loss in anthracite output. Since April, 1918, to date, however, the total production of hard coal amounts to 39,634,247 net tons, an increase of 723,969 net tons over the quantity mined in the like period of 1917.

The movement of coal to the Northwest shows signs of improvement, though the tonnage is still considerably behind pre-season estimate. Bituminous coal loaded on vessels at lake docks during the week ended Aug. 17 amounted to 1,109,611 net tons, an increase over the week preceding of 85,192 net tons. Supreme efforts will be required if the Northwest requirements are to be met before the close of the lake season.

Market conditions are quiet in both the steam and domestic grades. Dealers' stocks are generally quite low, but there is some coal in the yards of retailers and consumers are still placing orders. The heavy storage demand from domestic consumers has been satisfied to a large extent, and there seems to be little danger of a serious shortage in domestic fuel next winter. However, conservation measures are the order of the day, and there will doubtless be further curtailment of labor, transportation and fuel in activities that fail to come within the classification of strictly essential. It is probable that many such concerns will find it necessary to suspend operations next winter.

COAL PRODUCTION

The decrease in production which began after the record week of July 13 not only continued during the week of Aug. 17, but the output during that week also fell below 12,000,000 net tons for the first time since June 22. Preliminary estimates place production (including lignite and coal coked) during the current week at 11,910,000 net tons, a decrease compared with the week of Aug. 10 of 379,000 net tons, or approximately 3 per cent, but an increase over the



corresponding week of 1917 of 1,597,000 net tons, or 15.4 per cent. Production necessary during the balance of the summer weeks to make past deficit now amounts to 14,270,000 net tons, 247,500 net tons or approximately 21 per cent. in excess of the average weekly production during the coal year to date. The average production per working day is estimated at 1,985,000 net tons, a decrease compared with the average daily summer requirements of 92,000 net tons or 4.5 per cent. but 266,000 net tons or 15.4 per cent. in excess of the average daily production during the week of Aug. 17, 1917.

Anthracite Production.—Production of anthracite in the United States during the week of Aug. 17 is estimated at 1,924,800 net tons, a decrease compared with the week preceding of 127,133 net tons or 6.2 per cent., and a decrease compared with the current week of last year of 63,800 net tons or 3.2 per cent. The average daily production during the week of Aug. 17 is estimated at 320,800 net tons, 4.5 per cent. behind the average daily production during the coal year to date and 2.8 per cent. behind the average daily production during the same period of 1917. Total production for the coal year to date is estimated at 39,634,247 net tons, an increase over 1917 of 723,969 net tons or 1.9 per cent.

CARLOADS OF COAL ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended: July 27	Aug. 3	Aug. 10	Aug. 17
Bituminous shipments, 123 roads	228,231	220,940	215,996*	207,822†
Anthracite shipments, 9 roads...	40,942	39,632	39,280	36,857†

* Revised from las' report. † Subject to revision.

Shipments decreased during the week from all districts with the exception of western Pennsylvania, Tennessee and Kentucky, Alabama and the Rocky Mountain and Pacific Coast states. Material decreases occurred in central Pennsylvania, from which districts shipments declined 2500 car loads, or 6.7 per cent.; from southwest Virginia, where shipments declined 221 carloads or 8.1 per cent.; and from the districts including Illinois, Indiana and western Kentucky, where shipments declined approximately 1700 carloads or 3.4 per cent Compared with last year, however, all districts show improvement. For the coal year to date, all districts with the exception of Michigan also report increased shipments over the same period of 1917.

Lake Shipments.—Bituminous coal loaded on vessels at lake ports (including vessel fuel) during the week ended Aug. 17 is estimated at 1,109,611 net tons, an increase over the week preceding of 8.5 per cent. and over the weekly average during the month of July and August of 9.9 per cent.

For the week ended Aug. 17, shipments of bituminous coal to New England are estimated at 586,918 net tons, an increase over the week of Aug. 10 of 3.4 per cent. Rail receipts through the New England gateways estimated at 204,864 net tons decreased 13.8 per cent. compared with the week of Aug. 10, while tidewater shipments estimated at 382,054 net tons increased 15.8 per cent. During the current week shipments from all harbors exceeded the average weekly shipments during the coal year to date, while rail receipts fell 5.9 per cent. behind.

Shipments of bituminous coal from all tidewater harbors during the week of Aug. 17 not only exceeded the shipments during the week preceding, but also the weekly average during the coal year to date with the exception of Hampton Roads. Shipments from all harbors exceeded the weekly average for the coal year to date by 6.5 per cent., from New York and Philadelphia by 3.6 per cent., and from Baltimore by 35 per cent., while shipments from Hampton Roads fell behind 3.8 per cent.

Beehive Coke.—The production of beehive coke in the United States during the week of Aug. 17 is estimated at 581,000 net tons, an increase compared with the preceding week of approximately 1 per cent. The average production per working day is estimated at 97,000 net tons as against 96,000 net tons during the week of Aug. 10

The operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania report production during the week of Aug. 17 of 368,323 net tons, their plants being operated at 71.7 per cent. of their present capacity as against 70.3 per cent. during the week preceding. Loss of time attributed to car shortage amounted to 2.5 per cent. of present capacity as against 0.6 per cent. during the week of Aug. 10, but such losses were offset by slightly improved yard labor conditions and other causes not reported.

Byproduct Coke—Operating conditions in the byproduct industry during the week of Aug. 10 were not as good as the week preceding, a slight shortage of byproduct coal causing the plants to be operated at 9.0 per cent. of their present capacity as against 91.5 per cent. during the week of Aug. 3. Operators in Illinois, Indiana, Kentucky, Maryland and Massachusetts report decrease in production. Factors limiting production in Kentucky and Massachusetts were repairs to plants, in Indiana coal shortage, in Illinois both repairs to plants and coal shortage, and in Maryland other causes. Improved operating conditions were reported in Pennsylvania and Tennessee. The installation of a battery of 51 ovens by the Youngstown Sheet and Tube Co. during the current week was the cause of the increased capacity in that state.

BUSINESS OPINIONS

Marshall Field & Co.—Shipments of dry goods for the week were very much in excess of the same period of 1917. Road sales for immediate delivery were larger than for the same week a year ago. Very few lines are being offered for spring delivery. Slightly fewer customers were in the market compared with the current week a year ago. Collections continue good.

Dry Goods Economist—Prices of all kinds of dry goods continue to advance and in most lines scarcity becomes more marked, while it is evident that this condition will become intensified with the increased purchases of the Government for the equipment of a greater army. In no branch of the trade is the shortage of materials so great, however, as in woolens and worsteds, both women's dress goods and fabrics for men's wear. The price of raw cotton has gradually advanced and speculation in the staple is active.

American Wool and Cotton Reporter—The cotton market is a speculative one, more or less influenced by traders and what happens from day to day. The underlying strength is the dry weather in the Southwest. The outlook for a large crop does not seem so favorable at present, but one thing seems certain, and this is that all the crop will be picked at present prices. The mills are not buying a great deal at present. The woolen goods market is gaining in strength. Fewer persons expect that there will be any allotment of raw material, and on this basis operation for the Government must increase, while at the same time production for civilian distribution must decrease. It is unlikely that prices will be made for woolen fabrics. If new wool is not available, it may be possible that substitutes will be apportioned, but even under such conditions, it does not seem likely that the production of fabrics for civilian distribution will increase greatly.

Bradstreet's—As regards the leading industries, it is useless to advert to anything else than the requirements engendered by the war, which involves the production of increased quantities of steel for ships and munitions. But it is impossible to greatly hasten outputs with supplies of coal, coke and labor entirely insufficient. From every part of the country save Texas come complaints about paucity of labor. In the section just excepted an influx of farmers from the drought-stricken areas has benefited the labor market. Under the circumstances, women are being inducted into industrial pursuits on a steadily extending scale. With new selective draft laws in prospect, further sweeping changes will ensue, and therefore it is not difficult to visualize the near-future situation of the so-called non-essential industries, many of which, however, will be diverted to war work. Crop news, particularly as regards corn and cotton, points to deterioration, but wheat is turning out better than earlier indicated.

The Iron Age—Coal and coke supply still limit pig iron and steel output. The continuance of an adequate labor supply under the new call for fighting men is a serious problem, and even more grave is the situation caused by the set purpose of labor leaders to bring about union control of the steel industry. The situation as to coal and coke and transportation does not measure up to the enlarged requirements of the war. With an average of 360 blast furnaces operating last month, the pig iron output was 110,000 tons a day. With an average of 335 furnaces operating in April, May and June of last year (25 less than in July, this year) the pig iron output for those three months also averaged 110,000 tons a day. Thus 25 more furnaces are required now to keep output up to the rate of last year. The pig iron shortage complained of for months grows more acute; but the proposal from Washington that the few remaining cold furnaces be started up will come to little. Operators of some of the small furnaces now blowing, particularly in the South, threaten to put them out if the pig iron price is not advanced by October.

Atlantic Seaboard

BOSTON

Awkward situation arises through pressure to unload water-borne coal. New England not equipped to take on easily so much coal within so short a time. Demurrage accrues, but consumers take their medicine cheerfully. New ruling on the reserve supply permitted different requirements. All-rail movement shows increase even over July, due to volume of wagon coal. Under the recent decision at Washington it is probable that current shipments to a large number of plants will be shut off, and the coal thrown to needs that have not been so well served. Baltimore piers badly congested and inquiries are persistent as to why normal movement to New York piers is not resumed. Detention also threatens at Hampton Roads. Anthracite volume only slightly reduced all-rail. Reading barges load at New York piers.

Bituminous—The recent agreement in Washington that New England should continue to have the benefit of the 30,000,000 net tons annually of bituminous has resulted in volume shipments on an even larger scale than during July. Both all-rail and by water, coal lately has been thrown at New England as if within the short space of a few weeks we must take all or go without. Both at Baltimore and at Hampton Roads there has been a bunching of steamers to load for New England, a great effort being made to make up this territory's quota, but the number of ships has increased to such extent that it is physically impossible to find enough berths for them at this end to discharge. The Boston & Maine R. R., for instance, needs coal in volume to build up a proper reserve against the winter, but today this railroad is obliged to release coal to other consignees because there are not sufficient discharging facilities at Boston, Portsmouth or Portland, to unload the coal without most expensive delays. Commercial coal for distribution inland, in many cases, has to be unloaded at the same wharves where railroad fuel is handled, and due to the increasing ratio of all-rail receipts of engine coal the past five years the railroads now find themselves unable to take on all the water coal that is offered them.

The ability of a large number of consumers to receive coal at this time is being limited in the same way. At this writing there is a steamer in Boston Harbor that has been waiting six days without an open berth. Larger ships have been taken care of meanwhile because detention of the latter is so expensive, but it is a commentary on the way shipments to New England have been handled that ships are kept waiting when there is a world-wide shortage of tonnage; $2.50@$3 is now nothing unusual for a demurrage charge, and while consumers inland and on tide water occasionally make wry faces their disposition is to accept the situation and be thankful for the coal. It is said there will be 70 steamers this week for Mr. Storrow's advisory committee to allocate, and it will be some problem not only to find cargoes for them all, but to find consignees willing to obligate themselves for the demurrage charges that are certain to accrue to high figures. All this makes a most awkward situation. It is obvious that three months from now, in the latter part of November, this territory will again be in great need of coal, and by that time all the shipping agencies will be swamped with demands from other quarters.

Perhaps the most important announcement of the week is the recent decision at Washington through a committee of state administrators of which Mr. Storrow was chairman, definitely naming the number of days' supply to be permitted different classes of consumers. The understanding is that these limits are to be rigidly adhered to, and that only in special cases and then on recommendation by state fuel administrators to Washington is any deviation to be allowed.

Receipts of bituminous at the five New England gateways show an even larger tonnage than during July. For 22 days in August the average number of cars passing was 723, including railway fuel. Receipts by water have been the largest on record. The increase in bituminous all-rail is due to the volume of wagon-loaded bituminous now coming forward in box cars at the rate of 100 cars or so daily. This coal is rather difficult to distribute just at this time because partly of the 75c. extra price, but chiefly because labor is scarce and it is difficult to free the cars promptly. The car service officials are on the qui vive to find stations where there is any delay in unloading cars, and this volume of box-car coal has to be spread around as thinly as possible.

Congestion continues unabated at Baltimore. It is shown that the piers there are not able to handle with dispatch the volume of coal sent there and in several cases steamers already on demurrage have been shifted to Hampton Roads because the outlook for loading at Curtis Bay was so hopeless. Those distributors on Long Island Sound who are normally dependent to greater or less extent upon coal from Baltimore & Ohio and Western Maryland territory are again asking pertinent questions as to why, if congestion prevails at Baltimore, cannot this congestion be relieved by allowing a greater tonnage to move to the New York piers in the usual way. The Baltimore & Ohio piers at New York are today handling less than 50 per cent. of the coal they could handle, and there is a surplus rather than a shortage of bottoms for Long Island Sound traffic. Of course, the great anxiety has been to furnish cargoes for the increasing number of steamers, but if both Hampton Roads and Baltimore are to be blocked with ships then some other move will have to be made.

The Hampton Roads situation is today rather uneven, but with extra detention threatening. Shippers are fearful that any moment a large tonnage will be ordered to byproduct plants or to line trade or taken for Government use at the piers and are therefore proceeding very cautiously on their commitments to load bottoms.

Anthracite—Receipts of domestic sizes at the gateways average 440 cars daily for the period Aug. 1-22, only a slight reduction in the tonnage as reported for July. Steam sizes are sagging off and today with the volume of bituminous in hand consumers are disinclined to buy further.

Reading barges are now loading at Port Reading, N. J., instead of at Philadelphia. This is partly due to submarine threatening and partly due also to an effort to speed up movement. The Port Reading piers, of course, have not the facilities and more than likely the extra detention there will more than offset the difference in mileage for the tugs. The Railroad Administration is still given to experiments but one could wish a more favorable time to try them out.

NEW YORK

Receipts of anthracite show gain and situation is an improvement. Tidewater conditions are better and with demand easing up dealers believe real danger is past. Steam coals are in good demand. Bituminous conditions easier with demand for bunker coals remaining heavy. No delay in loading vessels. Commercial coals scarce.

Anthracite—Receipts show a steady gain and dealers are beginning to feel that with consumers exercising a little care the situation next winter will be a large improvement over last. With coal coming here in slightly increased quantities, there is a strong feeling that dealers will be able to clean up most of the urgent orders now on their books, particular attention to be paid to orders of one and two tons. With this object before them there have been conferences between the Fuel Administrators and retail dealers in some of the Boroughs of Greater New York, but no definite plan has been outlined pending definite assurance from the Fuel Administration as to what can be done toward increasing receipts.

The dumpings at the local docks for the week ending Aug. 23 were 7616 cars, an increase of 547 cars over the previous week. On Aug. 21, 1409 cars were dumped, which is thought to be a record for any one day.

The tidewater situation is gradually getting better. More coal is being handled and dealers are not so urgent for shipments. Boats are plentiful, but the rates are high. Chestnut coal is running easier than either of the other sizes. Egg and stove continue to be tight, with pea in bad shape. The steam coal situation remains practically unchanged. Buckwheat No. 1 is in good demand and there is plenty to meet all needs.

sary demands. Some shippers find it hard to dispose of their stocks of barley and culm, owing to the scarcity of bituminous, but there is no grumbling. In some sections of the Greater City stove coal is in greater demand than egg.

The situation in Brooklyn and Queens, where fears have been entertained of a serious shortage, is picking up. Efforts are under way whereby every consumer will have some coal in his cellar by the time it is necessary to start the furnaces. It may be that the plan will include the dumping of the coal on the sidewalk and that the buyer will have to put it away in the cellar bins, much time being saved thereby.

It is expected that the full winter schedule of prices for coal at Tidewater will become effective on Sept. 1, although no announcement has yet come from Washington. This will mean an advance of 30c. per ton to the present prices for the domestic coals.

Current quotations, per gross tons f.o.b., tidewater, at the lower ports, are as follows:

Circular	Individual	Circular	Individual
Broken..$6.75	$7.50	Buck...$5.10	$5.90
Egg.... 6.35	7.10	Rice.... 4.65	5.10
Stove... 6.60	7.35	Barley.. 4.15	4.30
Chestnut 6.70	7.45	Boiler.. 4.60	
Pea..... 5.20	5.95		

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates. Prices for buckwheat, rice, barley and boiler are not fixed by the Government.

Bituminous—Judging from the tonnage dumped at the local docks during the week ending Aug. 23, consumers supplied by this market are getting their share of the output. There were 7091 cars dumped as against 6413 cars the week previous, a gain of 322 cars.

With the adoption at Washington of the report framed by state fuel administrators showing the maximum limits of storage, public utilities and preferred industries in Southern New York and New Jersey will not be allowed to have more than 30 days' supply of steam coal on hand, while non-preferred industries must get along with 15 days' supply. Of byproduct and gas coals, byproduct and gas plants may have 45 days' supply ahead and preferred industries may carry 30 days' supply.

The demand for eastern coals is steadily increasing, particularly for Navy and transport service. Locally the bunker situation is in good shape. Vessels are quickly loaded and there is no delay reported from that quarter, although the demands remain heavy.

The commercial coal situation is in good shape, considering conditions. Demand is heavy and consequently stocks at the docks are low. Some shippers with coal to their credit in the pools are surprised when they put boats in for it, to learn that it has been absorbed and that there is no coal for them.

There are persistent rumors of contemplated changes in the status of jobbers. These proposed changes, which are said to include the almost elimination of jobbers who have began business since April 1 of last year, are now said to be under consideration by the Washington authorities. There has been no increase in coals available for spot buyers and regular customers are getting good supplies.

Current quotations, based on Government prices at the mines, net ton, f.o.b. tidewater, at the lower ports, are as follows:

	Mine Gross	F. o. b. N. Y. Gross
Central Pennsylvania:		
Mine-Run, prepared or slack.....	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of-Mine.....	3.08	5.23
Prepared.....	3.36	5.51
Slack.....	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite demand grows as summer wanes. Car service causes trouble. Greatest shortage of coal in suburban districts. Drastic ruling on long hauls. Production increases, and local shipments to some extent. Relative demand of sizes unchanged. Broken coal allotted. Lightless night violators fined. Bituminous suffers from car shortage. Production slightly off.

Anthracite—As the end of the month approaches the shipping companies are again besieged for coal. The small dealers, not only in the city but from the surrounding country, are becoming most persistent. When the smaller buyers learned that they must depend on their 1916-17 quota, with no opportunity of increasing their business, they anticipated no difficulty in obtaining their meager allotments and did not at first give the matter much concern. Now, with fall almost upon them, they appear almost panic stricken; and some who claimed their tonnage for the basic coal year was too insignificant to worry the shippers about are now clamoring for every ton. In many instances they are hunting up their county fuel administrators and appealing to them for aid.

The city fuel administration has just handed down a drastic ruling on long deliveries. All dealers have been notified that after Sept. 15 they must discontinue making deliveries to customers at exceptionally long distances from their yards. It is left up to the dealers to decide just what is a long haul. The authorities say the dealers have had all summer to look after such customers and after the above date they must turn such orders over to dealers nearby the customer. This ruling in a way recalls the rumors that were strongly current last spring that the authorities intended to district the city and the chief complaint of the retailers against the ruling is that the administration left it until so late in the season.

We still incline to the belief that the city is receiving an increasing proportion of fuel, but the dealers are not willing to admit this. Yet this week the largest retail company used considerable newspaper space stating that the orders which they had taken so far, and which they had expected to be until Oct. 15 in filling, were more than half filled and they notified the public that they would use every effort to fill the others and had hopes that they would be able to do so.

We have found yards in some localities that are practically full of coal, while an adjoining dealer has no stock at all. These cases cause bitter complaints from the latter class of dealers. Upon inquiry we learned that such cases are not at all uncommon, being caused by a shipper, usually a small operator, who desires to fulfill his obligations for the coal year to a certain customer and then close the business relationship with him. This of course cannot be understood by the dealer whose credit is good but who has no coal.

The dealers are becoming impatient at the delay of the railroad companies in adjusting claims. Coal is sometimes transferred enroute and the original consignee stands charged with coal for weeks. When coal is lost in transit, and for which the railroad companies always stand responsible, the dealers hesitate to accept it for fear of not being reimbursed for an indefinite time. It is only their urgent need of coal that impels them to accept it.

Egg and stove in the outlying sections and stove in the city proper are by far the scarcest sizes. Pea coal continues to be eagerly unloaded, but there is considerable in stock in several yards. As the exemptions from Washington on buckwheat coal are coming through more promptly for necessary consumers, this size is not so free with some customers as it was for a few weeks. However, we do know of one large company who has had sufficient of this size to offer to a few favored retail customers and while a few of them turned it down, others eagerly grabbed it and stored it away.

This week the anthracite companies were all notified of their allotments of broken coal which they are expected to ship from now on to the gas companies throughout the eastern seaboard. One company alone in this city is to receive 125,000 tons. Broken is a size that always has to be made specially, and as a matter of fact the companies can get a better price for the coal by breaking it down into the smaller domestic sizes.

This week over 100 persistent violators of the lightless night rules were called before the fuel authorities and fined. They had been given a number of warnings, but continued the violations, with the result that they were given the option of contributing to the funds of the Red Cross or being prosecuted.

The steam coal trade shows no sign of change, all sizes being quickly cared for. There is also some indication of a slightly increasing demand for culm locally, but the heaviest demand continues to be from outside points.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken.....	$4.90	$6.25	Buckwheat..	$3.40	$4.45
Egg.....	4.50	5.85	Rice.....	2.90	3.80
Stove.....	4.75	6.10	Boiler.....	2.70	3.70
Nut.....	4.85	6.20	Barley.....	2.40	3.30
Pea.....	3.45	4.70	Culm.....	1.25	2.15

Bituminous—There is much dissatisfaction still manifest over the distribution of cars in all districts shipping to this territory. The chief complaint comes from central Pennsylvania and it is the old story of one mine being short, while others have more than they can fill in a single day. This condition is again showing its effect in the labor supply, as the men are inclined to shift to the workings where the car supply is best.

Heavy consumers in the city, those on strictly war work, continue to get the heaviest shipments, and this is especially true of power plants, who now have the biggest stocks of their career on hand. There continues to be some delay in shipments at tide points to strictly coastwise destinations, although the overseas trade is not affected at all.

BALTIMORE

Successful application of plan to cut down coal supplies of preferred class here to be applied nationally. Jobbers as purchasing agents, working with fuel administrator of state, found solution for shortage. Hard coal men have labor and supply troubles.

Bituminous—After laying a plan before the National Fuel Administration about three weeks ago for the relief of an acute fuel shortage in non-preferred business classes here, the Maryland administrator was given permission to put it into practice. Reports gathered from all lines of industry here had shown that some of the preferred class had coal supplies on hand for from 90 to 155 days ahead, and with steady supplies that not only assured them of coal for immediate use but also some for additional storage. Other industries were shown with but a few days' supply on hand.

It was shown that the lists forwarded by the administrator to the district representative for filling had not been met because of lack of authority to divert preferred coal. The administrator was given permission to put stop-orders through the district representative to mines that were to supply industries here with large stocks on hand, and to order shipments to other industries without coal. The old jobbers' group, now purchasing agents, were then used to distribute all excess coal diverted here through the same means to the Maryland administrator, and this worked so successfully that the past week not only saw few complaints of business houses short of coal for immediate needs, but the administration was able to get enough coal running direct from mines to prevent any further stop-shipment orders being executed.

That the national administration last Thursday admitted the justice of the plan by ordering definitely that Maryland public utilities be allowed but 30 days coal in advance, along with the preferred industries of a war-character here, and non-preferred industries of the state but 15 days supply ahead, is of considerable interest. For gas coal the byproduct and gas plants are allowed 45 days' supply; preferred industries 30 days, and non-preferred no storage of this fuel. Limits for storage for industrial plants throughout the country are to be enforced.

Anthracite—The labor shortage is becoming more and more acute in this city, and many of the coal yards are unable to have their deliveries keep pace even with the comparatively small amount of coal allotted them. Unless some increase in price is granted the dealers, in order that they can raise the wages of drivers and yard helpers to a point where they can be retained against prices offered for war-work, the trade feels that a serious situation will develop shortly. Confronted by the July fall-off in tonnage and the fact that the spurt for early August is not now being maintained, Robert F. Roberts, chairman of the city committee of the fuel administrative force here, went to Philadelphia the past week to confer with the Anthracite Committee about speeding movement to give Maryland the allotment originally promised before heavy winter weather comes. He was unable to get any promise of improvement, however, especially in view of a decrease in tonnage production announced for the week. "We are doing the best we can," is the answer now to the cry for more coal reaching all branches of the fuel administration and the dealers themselves.

Lake Markets

PITTSBURGH

Car supplies uncertain. Supply of labor being considered. Coal very scarce.

Car supplies in the Pittsburgh district have improved slightly, but it is too early to determine whether this marks a general trend or is merely incidental. No official information is available as to whether the

Railroad Administration feels able to comply with the request of the district, made Aug. 16 through R. W. Gardiner, manager of production for the district, for a larger car supply, predicted largely upon the fact that during the first half of August there was a decided decrease in the car supply, although the July supply had not been satisfactory and had not permitted sufficient Lake shipments to promise making up the full Lake quota by Oct. 15, the date by which it had been hoped the Lake movement could be completed.

On Aug. 21 a conference was held between John C. Frazee, Federal director of the Public Service Reserve, and other representatives of the Federal employment service, with more than a score of the leading coal operators of the district, relative to the amount of labor the coal district could employ, but no definite figures were approved, chiefly because the matter hinges so largely upon prospective car supplies. It appeared that if the men now on payrolls would work full time the present car supply could be fully utilized. For an increased supply more men are in all probability required.

There is more complaint by byproduct coke ovens that they are not receiving full supplies, and this indicates the scarcity of coal, since byproduct ovens are given a high degree of preference. The shortage at byproduct ovens, however, is not regarded as serious, the chief matter being that it is desirable for them to accumulate a surplus against the winter.

The market remains quotable at the set limits: Slack, $2.10; mine-run, $2.35; screened, $2.60, per net ton at mine, Pittsburgh district, brokers being allowed to charge 15c. brokerage in addition. The brokers find practically no coal at this time.

TORONTO

Dealers months behind in deliveries and refusing orders. Many consumers unprepared for cold weather. Civic authorities promise rigid enforcement of restrictions. Quotations nominal.

Conditions as regards coal supply have shown little change during the past few weeks. Dealers are still months behind in making deliveries, and new orders are now being taken. A large proportion of the consumers are still without their winter supplies of hard coal. Bituminous is more plentiful, but it is difficult to obtain deliveries, and some dealers are taking orders only on condition that purchasers do the teaming themselves. The civic authorities announce that the order to the effect that householders whose usual supply is in excess of six tons will receive only 70 per cent. of their customary supply will be strictly enforced. Coal dealers are ordered to make returns weekly showing amount of coal on hand, orders taken and deliveries made, and if any consumer receives more than the amount to which he is entitled, the excess will be removed.

Quotations for best grades per short ton are nominally as follows: Retail anthracite, egg, stove, nut and grate, $11; pea, $10; bituminous steam, $9.25; slack, $8.25; domestic lump $10.50; cannel, $13. Wholesale f.o.b. cars at destination, three-quarter lump, $7; slack, $5.82.

BUFFALO

Rather slow movement. Anthracite still more scarce than bituminous. Reduction of shipments to Canada appear to be warranted. Cars not so scarce.

Bituminous—The trade is decidedly dull, and some shippers are getting the notion that the actual demand is not what it was. From the action of the Fuel Administration it would appear that the shortage is expected to increase, but such is hardly the appearance of the trade here. Buffalo has been hard hit by the various rulings, first by ordering coal to the lakes from the Pittsburgh district, then to New England from all available districts, then the cutting of Ohio coal out of this market, and finally the reduction of Canadian shipments 50 per cent.

Still jobbers agree that the supply to Canada has for quite a long time been better than it was with us, and especially as one proceeds eastward. Canada paid a better profit to the jobbers, and the roads there sent their cars to the mines direct and had an advantage in that, so that the anthracite consumers were able to buy bituminous to make sure of a winter supply of something, though they did not on that account abate their demand for anthracite. The situation all through is not certain, though, and the consumer is warranted in doing what he can to provide fuel.

The jobbing situation does not improve. Some members of this branch of the trade say they have not made a living since last fall, and they do not know which way to turn. They have made vain efforts to obtain closer mine connections or to buy control of mines, but with little or no success. The outlook is not promising.

Bituminous prices are for the most part made by the operator. The jobber does not venture to set up local prices, saying that it is easier to sell at mine prices and let the consignee do the rest. The added costs make the delivered prices as follows: Thin-vein Allegheny Valley, all sizes, $4.65; Pittsburgh lump, $4.45; Pittsburgh mine-run and slack, $4.20; smithing and smokeless, $5.60; cannel, $6.20, all per net ton, f.o.b. Buffalo.

Anthracite—The prospect of another advance in local prices sets the consumers to teasing for coal with renewed vigor, but a supply that is not over half what it was in the spring does not make any improvement possible. The shippers give no explanation, except to say that it will all come out right when the fall shipments improve. Complaints of consumers who have managed to get more than they are entitled to come in, but all the distributors can do is to shrug their shoulders and say it is a violation of the rules.

The western and northern shipments are badly curtailed, new restrictions still coming in, so that if consumers in that direction are to keep warm next winter they will need to lay in some other fuel. This state of things does not apply to the lake trade, which is pretty well kept up, though it is plainly the plan not to ship as much by that route as was shipped last season.

Lake shipments have made a spurt to 130,000 tons for the week, of which 22,800 tons cleared for Duluth and Superior, 16,000 tons for Fort William, 40,800 tons for Chicago, 41,700 tons for Milwaukee and 9 00 tons for Green Bay.

Lake coal freights continue at 48c. to Duluth, Fort William, 50c. to Green Bay, 55c. to Milwaukee and 60-65c. to Chicago.

DETROIT

Inadequacy of domestic fuel supply continues a troublesome feature of the Detroit market. Manufacturers' appeal to Federal authorities brings no increase in allowance of anthracite. Lake trade shows slight shrinkage.

Bituminous—While shipments of bituminous coal into the Detroit market make a fair aggregate, the tonnage is not greatly larger than is required for supplying the present needs of the steam coal users. There is little stock in excess of these requirements that can be utilized in increasing the factories' reserve piles. For the present, however, interest centers largely in the matter of coal for household use. With the domestic consumers of Detroit allowed only 601,000 tons of anthracite and dependent almost wholly on bituminous to offset not only a 24 per cent. reduction in supply of anthracite but the loss of smokeless and coke as well, the conditions are creating much uneasiness not only among the coal trade but among the household consumers.

In a survey made under direction of the Detroit Board of Commerce it was revealed that approximately 88 per cent. of the population of the city are still unprovided with winter fuel. Even were coal coming into Detroit in much greater quantity than it is now, it is doubtful if satisfactory distribution to all those without coal could be effected before the actual need for its use arises. With shipments holding their present volume the distribution problem is greatly complicated.

Anthracite—Disappointment was the most prominent result of the trip to Washington of a special committee of Detroit manufacturers to urge on the Federal authorities the importance of increasing the city's allotment of anthracite. The committee, headed by J. J. Crowley, president of the Detroit Board of Commerce, and accompanied by W. K. Prudden, fuel administrator of Michigan, made its appeal to the Federal Fuel Administration, to the Railroad Administration and to representatives of the War Industries Board, but was told an increase in the city's allowance of anthracite would be impossible. A promise was given by the Fuel Administration that efforts would be made to have a larger amount of domestic bituminous sent forward to Detroit during the next month. The larger part of the bituminous arriving at present consists of mine-run. This, it is said, cannot be used to advantage in the hot air furnaces, which are the only heating equipment of hundreds of Detroit homes.

Lake Trade—Various conditions have combined to bring about a shrinkage in the volume of coal being moved over the lake routes. Ore carriers delayed in thick weather were slow in unloading, reducing tonnage supply early in the week. Loading for the week is likely to fall short of 1,000,000 tons of cargo coal.

COLUMBUS

The major portion of the efforts in the coal trade now put forth are used in getting a sufficient tonnage to the Northwest in order to tide over the winter. There is a strong domestic and steam demand.

The coal trade in Ohio is now wholly at the mercy of the priority order issued by the Federal Fuel Administration. Exceptions to the ruling are appearing almost every day, and as a result there is a fair tonnage moving to public utilities and essential industries. But on the whole the greater efforts are being made to secure 28,000,000 tons for the Northwest before the winter closes lake navigation. In the meantime the steam and domestic demand can be cared for only out of the leavings, so to speak.

The movement to the Northwest has now reached a high level. The vessel movement is generally efficient and practically no time is lost at either end of the journey in loading and unloading. The ore movement is good. In some instances lake vessels are going up light, but such cases are quite rare. Reports show that the coal is moving off the docks of the upper lake ports quickly, and there is no congestion to hold up traffic. The tonnage is still considerably behind pre-season estimates and supreme efforts will be required to fill the requisitions. Lake prices are strong at Government levels.

The steam business is rather quiet, due to the operation of the priority order. A considerable quantity of screenings is coming into the Columbus market as the lake trade produces it. But it is only due to large surplus stocks accumulated earlier in the season that there is not considerable shortage of coal among manufacturing plants. Public utilities are being looked after with exceptions to the priority order, and the same procedure is used in the case of supplying essential industries. Non-essentials are having the worst time in securing fuel. Railroads are still large consumers as the freight movement is extra heavy.

The domestic trade is rather quiet also. Dealers stocks are generally low and they have not been able to replenish them as desired. But there is some coal in the yards of retailers and consumers are still placing orders. Generally speaking, private users have a larger amount of fuel stocks at this time than ever before, and that is a reassuring factor. Retail prices are strong at fixed levels. Practically no Pocahontas is arriving in the local trade. Some West Virginia splints are received and find a ready sale.

CINCINNATI

Fair car supply, steady demand and some removal of domestic pressure mark the trade just now. Lake movement is in full swing.

The movement of coal through this gateway to the Lakes, as well as to points north, continues in a steady volume, aided, as to the Lakes, by the operation of the priority order, giving preference to cars loaded for the ports. The car situation is not so good as could be desired, although on one or two roads it is better than on others. Receipts of new cars, the result of the large contracts let by the Government, have not yet begun to exercise any perceptible effect on the enormous demand for rolling stock, and production, while below the maximum demand now fully in evidence, will probably continue for some time to be in excess of the ability of the railroads to handle. One favorable sign is that the retail trade seems to be fairly well taken care of, indicating that the heavy storage demand from domestic consumers, which has been pressing all summer, has been to a large extent satisfied, and that, accordingly, there is little danger in this immediate section of any serious domestic shortage of fuel next winter. However, it is of course the large industrial consumers who have most cause to worry, especially those whose operations cannot be classed as essential to the conduct of the war. It is probable that many such concerns will find it necessary to suspend operations next winter, as it is virtually certain that there will not be enough coal to supply all industrial and domestic requirements, and the non-essential industries will consequently be left, literally, in the cold.

LOUISVILLE

Car shortage more serious during the past week, with labor supplies considerably under needs of mine operators. Jobbers having considerable trouble in securing coal. Retailers meeting with good demand for domestic, but making prompt deliveries. No yard stocks accumulating, but plenty of steam coal on hand.

Conditions at the mines have been worse during the past few days than for some

time past, due to the fact that cars are so scarce that mines in western Kentucky have been forced to close down half and full days at a time awaiting an unsteady supply of cars. The present shortage of cars is largely due to the heavy movement of coal from the Virginia-Eastern Kentucky district to the Lake region, which is keeping cars on the road for long intervals, either under load or returning empty, resulting in additional supplies of cars moving into that district, and cutting short the supply for western Kentucky. Even the eastern Kentucky district is short of cars at the present time.

Retailers have caught up fairly well with domestic stocking orders, and are now making prompt deliveries, in some cases deliveries on the same day that the order is placed. However, the domestic demand is taking care of all the coal delivered on the market, and no yard stocks are accumulating. Practically all stocking is on western Kentucky coal, and some little Hazard coal, but all eastern Kentucky, Straight Creek, Jellico and other good grades are now moving to the lakes, with the result that the better grades are practically unobtainable for domestic consumption, and even concerns which can not burn low grade coal are having trouble in securing supplies. The steam demand has been fairly active, but steam coal has been accumulating to some extent. A number of old contracts have been renewed of late, and with heavy expirations of contracts in September and October, the steam outlook is promising.

Jobbers are having much trouble in securing supplies of coal, as eastern Kentucky coal is unobtainable, and the western Kentucky mines are being offered more business than they can take care of, with the result that the jobbers cannot find supplies of any moment.

BIRMINGHAM

Coal production falls below tonnage of previous week. Manpower at mines seriously affected by draft. Car supply also inadequate to insure full time operations at some points. Demand for steam and domestic holds up well. No surplus coal available.

The output of coal in the Alabama field for the week ending Aug. 17 showed a loss of 16,000 net tons over the previous week's record of 427,000 tons, according to figures tabulated in the office of District Representative E. A. Holmes. This loss can be attributed to three causes—failure of labor to work full time, shortage of labor, and inadequate supply of equipment for loading coal. The draft is taking many men away from the mines and paydays during the past week caused the usual resultant idleness.

As regards market conditions, trade is brisk in both steam and domestic sizes, and consumers of a nonessential character are having difficulty in securing a fuel supply. Domestic coal is being stored as rapidly as conditions of supply will admit, and the past few days of fall-like weather will likely accelerate the buying movement, if such be possible.

Coke

CONNELLSVILLE

Labor conditions slightly better. Connellsville coal for byproduct ovens. Screenings from dumps increased. Coke production about stationary.

Oven labor conditions appear to be somewhat more satisfactory, but the drain of coal from the Connellsville region to operate byproduct ovens recently completed is such that beehive ovens are hardly able to maintain their former rate of production, which in April, May and June was about 340,000 tons a week and in July rose to about 350,000 tons. As matters are now aligned an output of about 325,000 tons a week seems to be in prospect, but as more byproduct ovens are completed it is possible that this may be reduced. The change in point of coking is of course only by the producer-consumer class. The merchant ovens in the region are making fully as much coke as formerly.

Allocations of surplus coke, or coke that might possibly become surplus, continue to be made, and the appearance of any furnace coke in the open market is practically prevented. Offerings of foundry coke continue relatively free and the supply appears to be not only adequate to current consumption but to afford an opportunity for some foundries to stock coke against the winter.

Production of screenings from old dumps, chiefly for household use, continues to increase, partly by reason of new undertakings and partly by reason of a slightly better labor supply. When not under 3-in. and properly prepared this material would be permitted a price of $7.30, the price set for such coke in general, but on account of appearance the material must necessarily go at a discount, and $6.50 is about the highest price obtained. Even at the increased rate of preparation the dumps are expected to last the year out.

The market remains quotable at the regular set limits; Furnace, $6; foundry, 72-hour selected, $7; crushed, over 3-in., $7.30, per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended Aug. 17 at 326,610 tons, an increase of 7600 tons.

Buffalo—The coke trade is easy as regards the supplies of ore and flux, but as difficult as ever as to the supply of coke itself. The furnaces are in as close touch with the coke ovens as they can be, and that is their salvation. The supply is never adequate, but it manages to answer in some way and all the furnaces are able to keep running. In the ore trade all is booming. Lake receipts for the week were 330,376 gross tons, a good season's average, which is likely to keep up. Every effort is made to keep up the output of the byproduct coke ovens in this district, but the new plant building by the Donner-Union Co. in the city does not promise to be in running condition this year.

Middle Western

MILWAUKEE

Dealers looking for an advance in soft-coal prices, and possibly in anthracite, on Sept. 1. Supply outlook good.

There have been no new developments affecting coal prices at Milwaukee since the recent advance of 40c. per ton in anthracite grades. State Fuel Administrator Fitzgerald is in Washington, ostensibly to confer with the National Fuel Administration concerning priorities to the Northwest, but dealers are expectant that when he returns he will bring orders for an advance in bituminous coal, and possibly the customary September lift in anthracite.

Before leaving, Mr. Fitzgerald made Milwaukee's colony of florists happy by giving them permission to use 100 per cent. of their fuel needs provided screenings are utilized. Heretofore they were permitted to use only 50 per cent. of their actual needs and were denied anthracite absolutely. This order is taken to indicate that the demand for some grades of coal is not taxing the supply to the utmost.

From present indications Milwaukee is safe from a serious coal shortage. Consumers will have to be satisfied with most any grade of coal, however, and everyone must practice economy in fuel consumption.

Since last week's report coal receipts aggregated 27,993 tons of anthracite and 204,951 tons of bituminous. The season's receipts thus far, according to the latest revision, foot up 306,863 tons of anthracite and 1,882,720 tons of bituminous.

A Vesper, Wis., brick manufacturing concern has decided upon an investment of $500,000 to develop Wisconsin peat beds. Experts hold that a good quality of coke can be produced from peat, as well as the regular coal byproducts, such as gas, ammonia, etc. Wisconsin peat beds are almost inexhaustible and represent a potential saving in coal of millions, according to expert calculation.

ST. LOUIS

An unusually quiet market on everything. Domestic orders practically stopped. Steam coals heavy. Severe car shortage. Poor transportation keeping prices up. Country demand poor and extreme warm weather interferes with business.

The local situation is one that is considerably hampered by the continued hot weather. The local coal business is practically at a standstill. Orders have stopped coming in, and the yards are making poor deliveries. The labor shortage is interfering with the deliveries in a retail way and this threatens to become a serious matter in a short time.

During the past week Fuel Administrator Crossley, in conjunction with the St. Louis Fuel Committee, has put on inspectors to keep a record of the employees of coal companies, with a view toward reporting them to the police authorities as idlers if they do not continue to work.

There is a fairly good demand in a domestic way for Carterville coal, but it is extremely hard to get. The local steam demand is not anywhere near what the mines have to offer, and the Chicago market is not absorbing steam sizes in sufficient quantities to keep the prices anywhere near the Government maximum. If it were not for the railroads the market would be glutted.

A fairly good tonnage from the Standard field has moved to Michigan. This, however, has been for the most part screened coal and 6-in. mine-run. The operators hesitate to ship too much of their coal there for the reason that it would create a car shortage here. This is already apparent.

The Louisville & Nashville is furnishing equipment for about one-half time and the Iron Mountain has mines that for five to six days straight have no equipment. The Illinois Central is in bad shape and also the Missouri & Ohio. The road that suffers mostly in car shortage and in transportation is the Iron Mountain.

In the Carterville field the mines have had some relief in the way of water, three or four heavy rains taking care of that temporarily. The supply of electricity from the Public Service Co. still continues to keep many mines idle a portion of the time. Labor is dissatisfied and the operators much discouraged.

A heavy tonnage of this coal still continues to go for railroad purposes, the Fuel Administration apparently falling down in its efforts to divert it to the channels where it could be used to better purpose. Offsetting this is the surplus of coal in the Standard field that the railroads could well take care of. Similar conditions continue in the Duquoin field. The labor shortage here is severe.

The Mt. Olive field still continues to be nearer normal than any other field in the state. Car supply is fair and so is the labor problem. There has been a scarcity of water that affected some of the mines to some extent. The movement has been good and the demand about equal to the production. A good tonnage of this coal is also going to railroads.

In the Standard field some mines on the Illinois Central have been idle for three days straight on account of no cars. Mines on the Louisville & Nashville are working about three to four days a week on account of no equipment. Cars are short on the Missouri & Ohio.

The distribution of cars on the Illinois Central seems to continue to impose unfair conditions upon some mines. There is a surplus of practically all grades of coal in this field, and in the past week some mines were idle rather than work and have coal unbilled. This covered all sizes, and this condition exists at this time.

To relieve this condition Lieutenant-Governor Crossley secured a ruling from Washington that restrictions on all industrial plants in the matter of storage coal would be lifted until Sept. 10, permitting them to store such coal as they wanted for the present and the future of screenings and low grade coal. Western Missouri could use a large tonnage of this coal if the zone restrictions were removed.

In the matter of gas house domestic coke the St. Louis Fuel Committee's contention is that the local price should be based upon the price of deliveries and $6 f.o.b. ovens with the rate from the Earlington-DeKoven field in western Kentucky, which is $1.70. This reduces the wholesale price of coke for the dealers f.o.b. the ovens in St. Louis from $9.60 to $7.70.

There is no change in wholesale prices and all coal is taking the Government maximum excepting Standard 2-in. lump, which is around $2.40 to $2.45, and screenings, which are going at from $1.55 to $1.60. The prevailing market price per net ton f.o.b. mines is:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.55@2.70	$2.55@2.70	$2.40@2.70
3x6-in. egg	2.55@2.70	2.55@2.70	2.35@2.55
2x3-in. nut	2.55@2.70	2.55@2.70	2.35@2.55
No. 2 nut	2.55@2.70	2.55@2.70	.....
No. 3 nut	2.55@2.70	2.55@2.70	.....
No. 4 nut	2.55@2.70	2.55@2.70	.....
No. 5 nut	2.05@2.20	2.05@2.20	.....
2-in. scrgs	2.05@2.20	2.05@2.20	1.25@1.50
3-in. lump	.....	.....	2.25@2.40
2-in. lump	.....	.....	2.25@2.40
Steam egg	.....	.....	2.25@2.40
Mine run	2.35@2.50	2.35@2.50	1.85@2.00
Washed:			
No. 1	2.75@2.90	2.75@2.90	.....
No. 2	2.75@2.90	2.75@2.90	.....
No. 3	2.55@2.75	2.55@2.75	.....
No. 4	2.55@2.75	2.55@2.75	.....
No. 5	2.05@2.20	2.05@2.20	.....

Williamson and Franklin County rate is $1.10; Duquoin field, $1; Standard and Mt. Olive fields, 95c.

COAL AGE

Volume 14 New York, September 5, 1918 *Number* 10



The Heroes of the Pick

By Rufus T. Strohm

Written Expressly for COAL AGE

THEY had drawn away from the heavy toil
And dropped the drill and the miner's lamp;
They had grown unused to the smell of oil,
The powder reek and the sultry damp;
For there wasn't one but had passed his prime,
And work seemed more than their frames could bear,
So they swapped the sweat and the sooty grime
For the soothing pipe and the easy chair.

BUT the war came on, with its vast demands
For guns and shells and the men to fight,
And the mines were stripped of the youthful hands
That took up arms in the cause of Right;
Then the old graybeards who had quit the race
And stood aside for the younger men
Traveled back once more to the working face
And bent to their old-time tasks again.

FOR the country's need in the dismal strait
Was great as the skillful hands were few,
So they scorned to load, and they would not wait
But did the thing that they best could do;
And their wrinkled faces were freshly scarred
By falling coal and by flying chips,
And their twisted fingers grew rough and hard
From clutching long on the shovel grips.

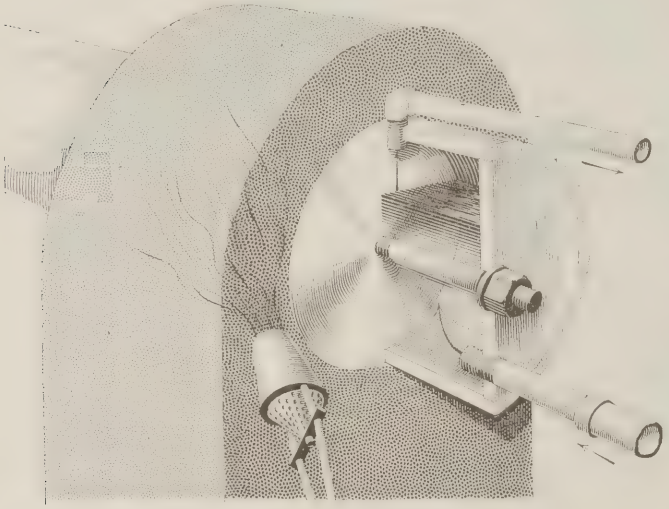
THEN here's to the veterans of the mine,
Whom age nor weakness could hold in thrall,
But who manned the gaps in the working line
When youth had answered the bugle call;
For they give the help that the nation craves
And show the spirit that wins the day,
And they put to shame all the slacker knaves
Who dare to do any less then they.

IDEAS AND SUGGESTIONS

Removing a Tight Crankpin

BY J. A. LUCAS
Ozone Park, N. Y.

Many difficulties arise in removing a crankpin for repairing. To do this tedious job without damaging the pin I hit upon the idea shown in the accompanying illustration. A piece of pipe of the diameter of the pin was internally threaded on one end and plugged with a



HOW THE CRANKPIN WAS REMOVED

plate, thus forming a container, which was held against the end of the pin by means of a bolt. A water inlet pipe was threaded into the bottom and an outlet at the top. While the crank arm was heated with a torch, water was circulated in the container, the circulating water keeping the pin cool. Upon heating the crank arm or disk, it expanded and the pin was then easily removed.

Slush Line Joints

Portions of anthracite mine workings for many years have been filled with the fine coal dirt and pulverized slate and rock resulting from preparation of coal in breakers. However, now and then a progressive colliery official will work out some modification of old methods which will simplify matters and save money. This was illustrated by a simple expedient adopted by the Lehigh Valley Coal Co. and noticed in operation at its Dorrance colliery, within the city limits of Wilkes-Barre, Pennsylvania.

For years the ordinary screw joint has been used on flush lines. On a long line many connections are necessary, and difficulty has often been experienced in unscrewing joints which rusted tight. Many times joints have had to be cut with a "diamond point" tool in disconnecting pipes when changing lines. This method took time and wasted material. To overcome this obstacle a simple and effective joint was devised which has given satisfaction in operation.

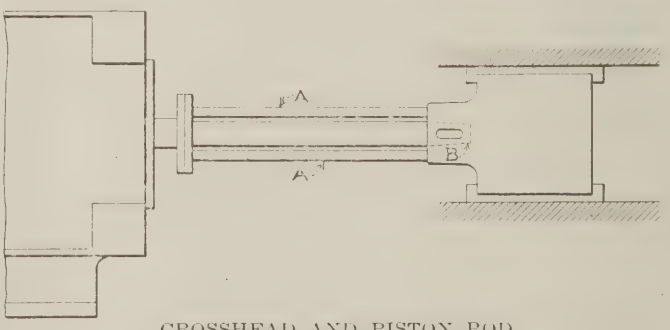
At the Dorrance colliery the slush material is carried into the mines down an 800-ft. borehole through a 6-in. pipe line. From the bottom of this borehole the slush is carried a considerable distance along gangways before reaching the workings to be filled. It is on this latter line that the couplings in question are made. On straight lines of 6-in. pipe, couplings consist of pieces of 7-in. pipe 20 in. long. The joint is made by driving wooden wedges in between the 7-in. coupling and the 6-in. pipe around both ends of the coupling. There is a space of about $\frac{1}{4}$ in. between the 6- and 7-in. pipe. This joint is readily made in about ten minutes.

When this kind of a joint is made, the 6-in. pipe has blank ends, the thread being omitted. A blank-end pipe lasts longer than a threaded pipe, which is weakened by the threads. To loosen this pipe coupling the wedges are knocked out and then the 7-in. sleeve is driven back with a sledge. These couplings will stand any pressure likely to be met with in practice, and they will last until a change of pipe is necessary under usual conditions. Turns in a pipe line can be made, a line bending 7 ft. in 20 ft. of length. In this case an 8-in. coupling is used in making a joint. *Coal Age* is indebted to the courtesy of H. Price, the inside foreman at the Dorrance colliery, for information in regard to the slush joint described.

Crosshead Removed by Heating

BY A. J. CAHEN
Brooklyn, N. Y.

Some time ago a 500-hp. engine of the Corliss type was to be dismantled, and it was found impossible to remove the crosshead from the piston rod by any of the customary methods. The end of the rod *B* was a taper fit in the head, as indicated in the accompanying draw-



CROSSHEAD AND PISTON ROD

ing. After several schemes were tried and abandoned, I decided to utilize the principle of expansion and contraction of metals under the action of heat and cold, and arranged as follows to get the head off the rod.

In the drawing the rod and crosshead are shown with the rod projecting its maximum distance from the cylinder, which gave a measurement between the end of the crosshead and the face of the stuffing box gland of about 6 ft. A gasoline torch was applied near the

middle of the length of the rod, where a sheet-steel hood had been arranged. Although various observers had prophesied that it would be impossible to heat the rod sufficiently in this way to cause it to expand appreciably, nevertheless, after application of heat for some little time, the length of the rod had increased as much as was required for the purpose.

After the rod was heated a measurement was taken between the face of the gland (which was backed up against the stuffing box after the packing was removed) and the inner end of the crosshead. According to this measurement a pair of steel shafts were squared off slightly longer than it was supposed they would be required. These were placed as at *AA*, on opposite sides of the piston rod between the crosshead and the stuffing box, where they were supported upon a suitable frame. Cold water was then poured on the hot piston rod and the instant it commenced to shrink it pulled the crosshead snug against the ends of the shafts and a moment later the crosshead was forced free.

Alarm Bell on Mine Car

By Matthew Stafford
Chase River, Vancouver, B. C.

In many mines the main haulage road is also used as the traveling way on account of it's being the intake and it is desirable to allow the men to travel in fresh air. There are, however, other local causes. Traveling on the haulage roads—especially when the trip is running—involves an element of danger that every miner realizes. This is enhanced when the road is used for main and tail haulage, and it is for this special system that I wish to suggest an improvement that I think would be appreciated.

There are certain parts of these haulage roads where the trip is running the rollers and the drums make a noise, similar to that of a running or approaching trip. This causes the men and boys to run to the nearest manhole or squeeze themselves against the side. After a short period of waiting they step out thinking they have been fooled, probably only to get the scare of their



DETAILS OF ALARM BELL

lives with the real article in the shape of the trip suddenly coming upon them. We all know the safest plan is to strictly prevent men from traveling on the road while the trip is running, but sometimes this plan is evaded.

What I would like to suggest would be the placing of a good sized bell attached to a spring and made to fit on the front car of the trip—either full or empty—by two properly shaped hooks to prevent its toppling over. The top of the bell and the spring should be no higher than the top of the car. I think this would be in line with the safety movement that is doing much good in the prevention of accidents.

Duty and Destiny

IT is not every man who realizes that as he goes his way his destiny accompanies him. And the man who has learned that duty and destiny are inextricably woven together is as unusual as he is fortunate.

There is getting to be small place in the world today for the man who cannot see his plain duty and recognize the fact that his own and his country's destiny depend on his performance of that duty. It is a fine thing that hundreds of thousands of coal miners are learning to express the product of their labor—not in terms of net tons, but in terms of guns, shells and ships. For a miner to know that four shovelfuls of coal mean a 3-in. shell for his brother or son to shoot at the Hun is the best possible way for him to see his duty and the destiny of his family, self and country. And when all the miners in America begin to dig coal on the basis of a 3-in. shell for every four shovelfuls of coal, it won't be long 'till the boys "over there" will have finished what they set out to do.

WE have a national duty, too, that is growing clearer and plainer to all — America must use her forces to the limit to crush German kultur as quickly as possible and thus make life, rather than death, the destiny of millions of men; for the best opinions are that a long-drawn out war would suit the German plans better than anything else—for the German believes that war is the chief business of man.

Where is the man who cannot see his individual duty in the face of a national duty like this? If there is such a man in the mining industry, he can only fail to see his duty by looking through the glasses of ignorance or blind prejudice. He will do well to remember that there will be a sorry destiny for the man in America who cannot see his duty in this day and time.

DUTY is a sublime word because it means work and service. there are many ways of gaging the size of a man. You may find his intelligence by examining his brain. Better still, you may find the kind of man he is by looking into his heart. But nowadays you had better look up and down his backbone to see if he means to do his full duty to his country and its allies, by aiding them in working out the destinies of free men in the world.

To the man who is so fortunate as to be a skilled coal miner, a motto is offered for the duration of the war:

I Am a Coal Miner.
I Can Produce 300 *3-Inch Shells a Day.*
I Ought to Produce 1800 *Such Shells a Week.*
I Must Do All I Can to Crush the Hun.
I Will Do My Duty.

THE coal miner who lives up to this will never need to have a fear about his destiny. It will take care of itself.

COAL MINERS OF AMERICA—Your wills are your own, and your wills are your masters. The destiny of thousands of good men at the front is in your hands. It is up to you to make answer.

Simpson Creek Coal Co.'s Tipples

By R. G. READ
Chicago, Ill.

SYNOPSIS — *Many novel features are embodied in the design of these tipples. The coal coming down the mountain side instead of consuming power generates it. Falls, and consequent degradation of coal, are carefully avoided so far as possible throughout the entire design.*

THE fundamental consideration governing the design of tipples Nos. 2 and 3 of the Simpson Creek Coal Co., at Galloway, W. Va., was the saving of power and labor for operation. Contrary to the general practice of using a retarding or drag conveyor where the coal is to be delivered for loading to a lower level than the mine, a conveyor of the apron type was used. By this arrangement the potential energy in the coal due to the action of gravity was utilized instead of being wasted, together with the additional power required to actually drag the coal down the hill. The topographical conditions were particularly favorable to the working out of this idea in these installations.

Fig. 2 shows the general arrangement of the No. 3 tipple, the No. 2 being substantially the same except that the conveyor is shorter and on a uniform pitch. The trip of 80 cars, containing 2¼ net tons of coal each, is delivered to the tipple by a chain car haul. A Phillips crossover dump delivers the coal to a hopper, from which it is fed by means of a reciprocating feeder to the apron conveyor, which discharges it onto the gravity screens.

The empty cars are kicked back onto a car-haul tripmaker which elevates them to the level of the loaded track and pushes all preceding cars out onto the empty track, so that the trip is made up mechanically. The loaded car haul has an adjustable capacity of three to five cars per minute, and is so located with regard to the scales that each car comes to a stop while being weighed. The driving machinery is located in a concrete pit below the floor, an idler sprocket being used in order to gain headroom around the machinery. The reciprocating feeder is provided with an adjustable-stroke crank and an adjustable-speed motor. The discharge end of the feeder plate is perforated so as to allow the fine coal to drop through, providing a cushion for the lumps. This also makes a partial separation for picking on the conveyor when desired.

The conveyor is 48 in. wide, of the long-pitch apron type, mounted on two strands of bushed roller chain with inclosed-oiling, chilled-tread rollers. The drive is placed

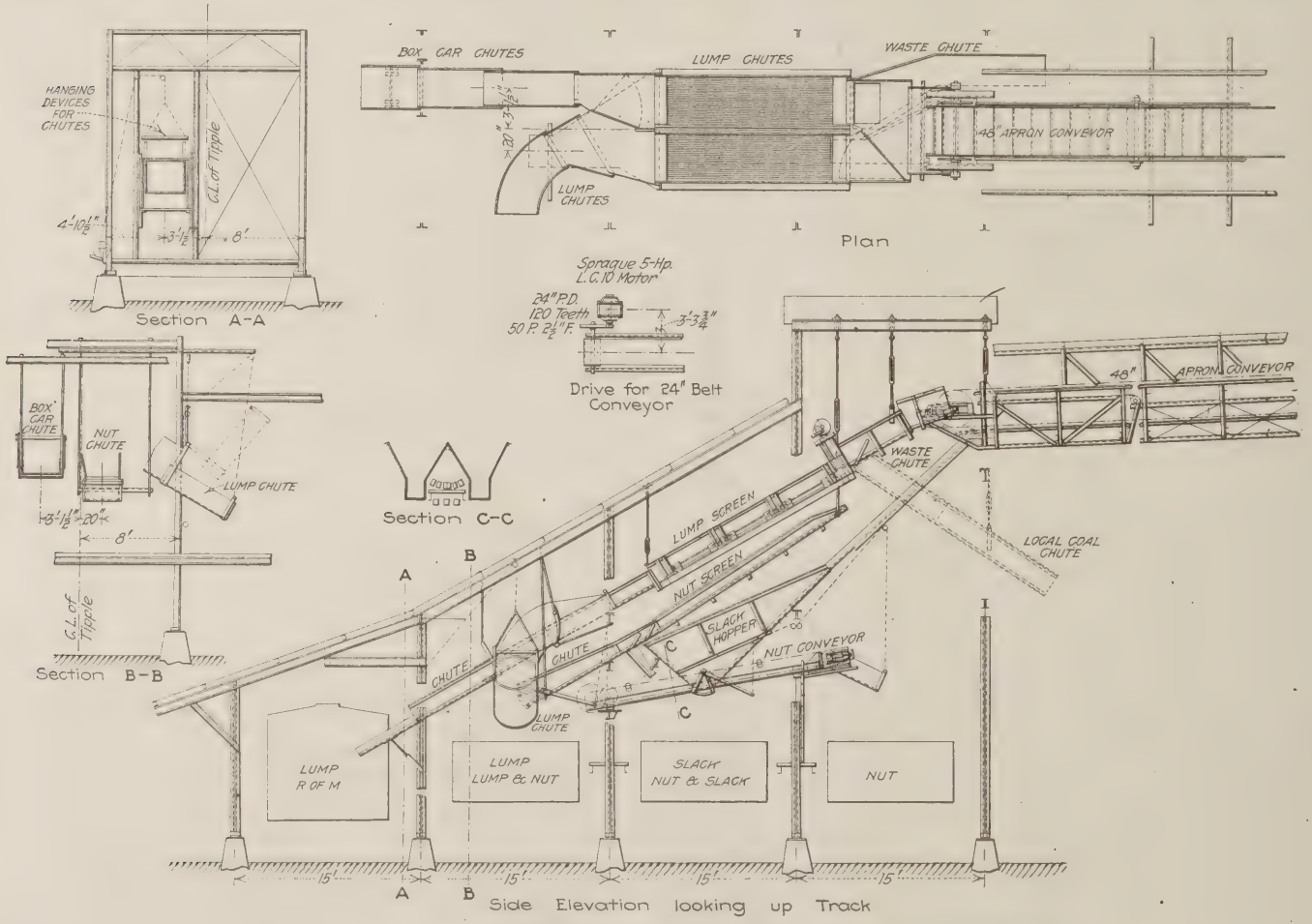


FIG. 1. ARRANGEMENT OF SCREENING EQUIPMENT IN THE TIPPLES

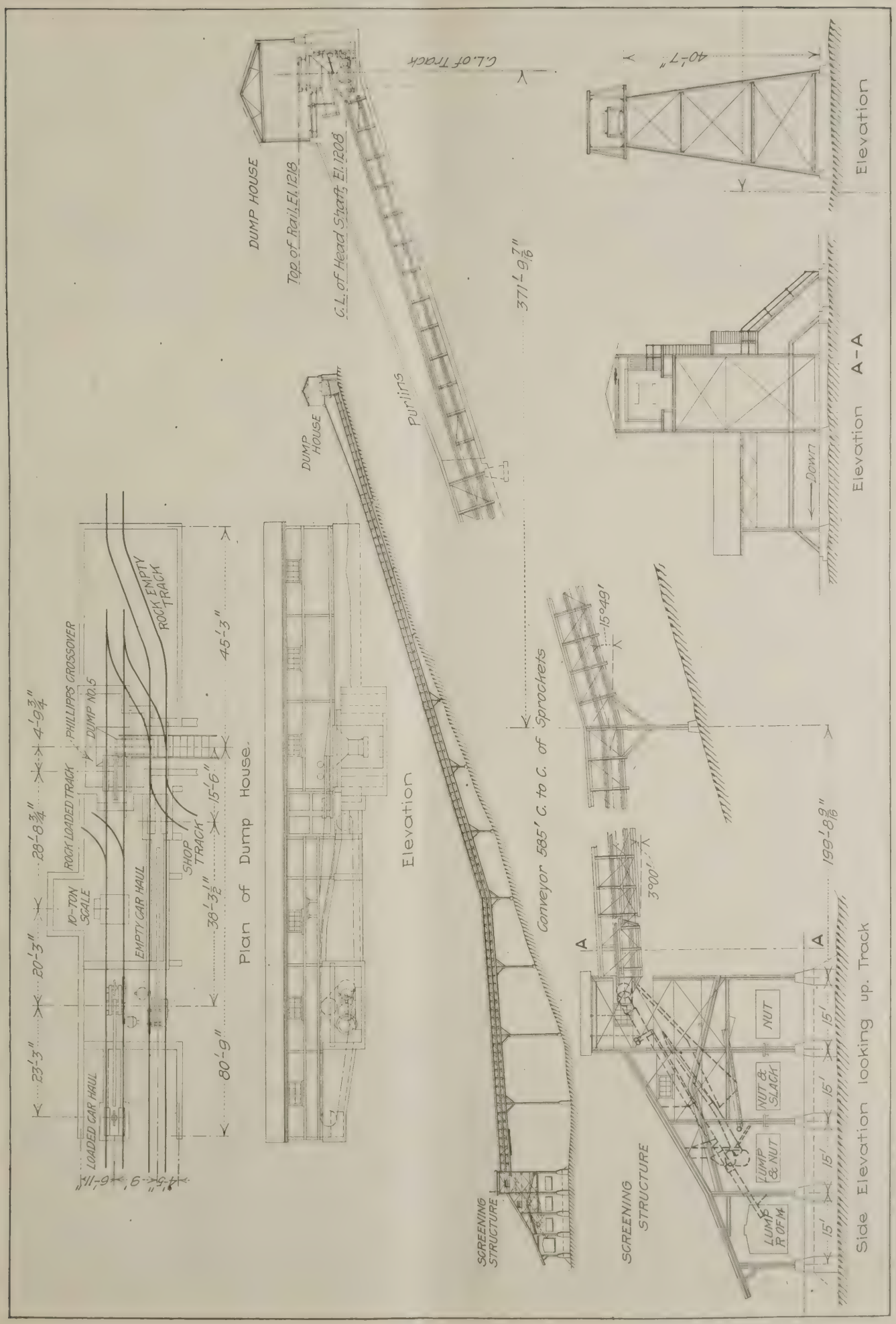


FIG. 2. GENERAL ARRANGEMENT OF NO. 3 TIPPLE, DUMP HOUSE AND CONVEYOR LINE



FIG. 3. DISTANT VIEW OF NO. 2 TIPPLE, DUMP HOUSE AND CONVEYOR LINE

at the head end, all machinery being mounted on a self-contained steel frame on concrete foundation. The take-up is located at the lower end and the pitch of the conveyor on the flatter portion is sufficient to run the line when loaded, so that no power is applied through the take-up shaft.

A 20-hp. adjustable-speed motor is geared direct to the drive shaft. This motor starts the conveyor empty, and as the conveyor becomes loaded the power taken becomes less and less until the motor is finally run as a generator with an output of 30 hp., which is returned to the line. A magnetic brake attached to the motor holds the load when the motor is stopped. The control is of the remote push-button type with magnetic acceleration. A push-button station for starting and stopping is operated by the dumper, and a stop and safety (no start) station is located on the trimmer's platform in the tipple.

The discharge end of the conveyor is carried on a pivoted frame so that the screens can be adjusted without increasing the drop of the coal. The discharge chute is connected to the take-up shaft and moves with it, thus maintaining the proper relation between the two. The speed of the conveyor may readily be adjusted to travel from 50 to 90 ft. per minute.

Fig. 1 shows the arrangement of the screening equipment. Contrary to accepted practice, the point of discharge to the railroad car was considered as the basic point rather than the discharge onto the screens. The entire screening equipment, including the discharge of the conveyor, is adjustable, so that any reasonable pitch can be secured without increase in breakage. The point of discharge to the car is also adjustable within reasonable limits.

The principal requirements in this installation are the loading of large quantities of thoroughly screened ¾-in. lump and run-of-mine in open and box cars, and the loading of slack in open cars. It is also necessary at times to load nut coal in open cars. It will be noted that the design is such as to accomplish the main purposes with the minimum of uncontrolled travel of the coal in the chutes. The usual position of the nut and slack tracks is reversed, and the nut coal is conveyed to avoid increasing the height of the discharge of the conveyor which would be necessary in order to make a gravity distribution of the nut. Special attention was given to the design of the main loading chute, so as to make the loading apron sufficiently easy of operation to insure its being used. This means the minimizing of the drop of the coal into the car.



FIG. 4. GENERAL VIEW OF NO. 3 TIPPLE AND CONVEYOR

The veil plates on the lump screens are electrically operated, a separate motor being used for each of the two sets. These are made up of three sections each. Each screen has a surface of 4 x 16 ft., and by using different combinations of the veil sections it is possible to adjust the screening to the actual requirements for inspection of the coal. The design of the veils is such as to permit of their being lowered without the necessity of removing any small lumps which may be lodged between the screen bars.

The box-car loaders are of the pivoted truck type known as Model 3C Christy. These are particularly suited to the requirements of this installation. Domestic coal is taken care of by a steel tank in connection with the No. 2 tipple. Both tipples are of steel throughout, and the roofing and siding are of asbestos protected metal.

The control of the motors is of the remote type with magnetic acceleration operated by push button. Each motor is provided with a field rheostat for adjusting the speed. A 25 per cent. series winding is provided for

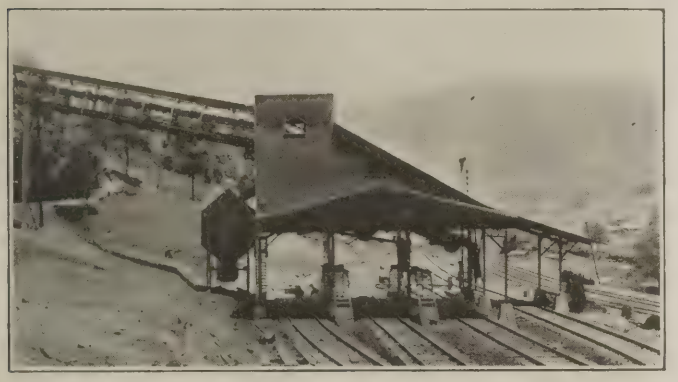


FIG. 5. NO. 2 TIPPLE AND DOMESTIC COAL TANK

starting. This is automatically cut out when the motor reaches full speed, after which it operates on straight shunt winding.

Fig. 4 is a general view of the No. 3 tipple. Fig. 5 shows the No. 2 screenhouse and domestic coal tank, while Fig. 3 presents a general view of the No. 2 tipple. Each tipple has a normal working capacity of 500 tons per hour, but a much larger output could be handled should necessity require.

The entire equipment was designed and furnished by the writer, and the conception is original. The construction work was carried out by Elkins Read. The Simpson Creek Coal Co. owns 3100 acres of the Pittsburgh seam, which is exceptionally thick and free from impurities. J. W. Galloway is president of this company, J. E. McGowan, secretary and treasurer, and David Williamson, vice president and general manager.

A New Mine Mule

A new wrinkle in the solution of transportation problems for small mines, quarries, sand pits and operations of such character is worthy of attention, and more especially at this time, when the nation-wide cry is for more coal. At a time when the labor market is drained the only solution in answer to such a cry is by the greatest possible adaptation of all mechanical means for the speeding up of production.

A step in this direction, the importance of which is apparent upon short consideration, is the recently perfected Leathers mine motor now being built by the L. A. Leathers Co., of Brookville, Penn. About a year ago this concern built the first motor as an experiment, in an effort to eliminate the use of mules on a long outside haul at a mine too small to warrant the installation of a power plant or the purchase of the more expensive type of mine locomotives. The experimental motor was built by mounting a Ford chassis on a substantial white-oak truck fitted with flanged wheels for use on the mine track. Several features have been added to eliminate some of the inherent automobile characteristics not suitable for mine haulage.

After a year of continuous service the motor is giving most excellent satisfaction, and the mine tonnage has been tripled, being raised from 50 to 150 tons per day. For the small mine operator, so many of whom have commenced operation during the past two years, this haulage innovation should prove a godsend. It not only enables an increased production, but at the same time eliminates mules on the long hauls by the substitution of a motor obtainable at a low first cost and which can be operated at all times on outside haulage as well as in any mine entries in which the ventilation is suitably arranged.

Best Weather-Resistant Paint

The best paint to resist weather is one made from pure linseed oil combined with pigments of permanent color and high protective quality. Linseed oil cannot be adulterated and yield best results in a paint; thinners and dryers are not, however, adulterants. The popular belief that white lead is the best procurable body for a paint is rapidly being disproved by the employment of other and better pigments or mixtures of pigments. Science has made possible improvements in paint making just as it has in the other branches of human endeavor.

"Slacker Boards" in West Virginia

In an effort to stimulate coal production, what are known as "slacker boards" have been erected at each of the 15 operations of the New River Co. in Kanawha and Raleigh Counties. The slacker board is a large blackboard appropriately lettered so that the result of the day's work can be filled in the blank spaces and read at a glance. Among other things the board gives the allotted tonnage, tonnage produced for the day, number of men working, number off, hours worked, names of men not working, etc. These boards will be conveniently placed near the company offices where the men can readily see them and see what they have accomplished for the day.

Another innovation of the New River Co. is the daily posting of Associated Press bulletins at each of the operations giving the latest war news each day. In connection with the war it may be interesting to state that to manufacture ammunition for one hour's bombardment on a one-mile front requires 7000 tons of coal. Thus it will be seen why every effort is being made to speed up the production of coal and why the war department has ordered that no more miners be enlisted.

Large Underground Synchronous Substation

By R. P. HINES
Fairmont, W. Va.

SYNOPSIS—*An increasing load growing ever more remote rendered the installation of a transforming and converting station underground advisable. This has now been in use for many years with marked advantage in operation and has given entire satisfaction.*

IN VIEW of the discussion, pro and con, on the subject of underground substations, which took place in the columns of *Coal Age* some months ago, it was thought that a description of such an installation that has proved its worth and reliability by years of continuous service, together with certain other features connected with its development, would perhaps prove of great interest to many readers. It is with this hope in mind that this article has been prepared.

The coal-mining development where this substation is installed is located in the bituminous coal field of Somerset County, Pennsylvania. The coal being mined is what is locally known as the C Prime seam. The company operating this development has various other mines in the same region, and a central steam-electric generating station has been installed, from which power is transmitted to the company's operations in the vicinity.

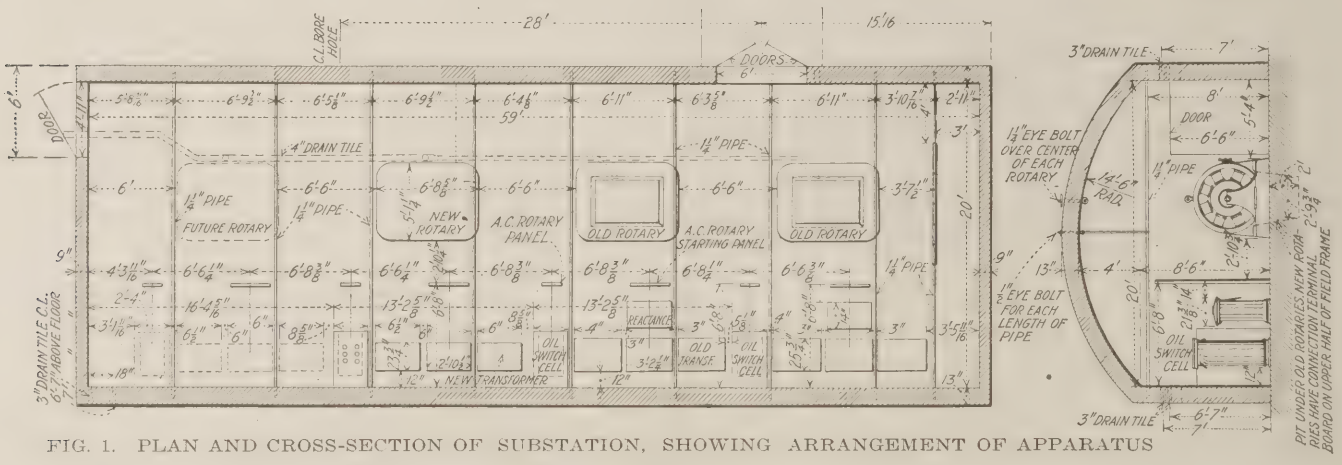


FIG. 1. PLAN AND CROSS-SECTION OF SUBSTATION, SHOWING ARRANGEMENT OF APPARATUS

The particular mine where the substation under discussion is installed is located about four miles from this central generating plant, and power was originally transmitted to it at a pressure of 6600 volts. In the initial installation and development a substation consisting of two 150-kw., 275-volt, direct-current synchronous converters, with necessary transformers, switchboard and accessories, were installed in a brick building located about 200 ft. from the pit mouth.

This first substation was installed about 1907 and served the needs admirably for several years, but finally development in the mine had progressed so far that the main workings and much of the electric locomotive haulage were more than a mile away from the outside. Additional copper feeder had been installed from the substation, from time to time, until the point had been reached where the bettering of inside voltage conditions was slight in proportion to the expense for the copper required, and the load on the substation and transmission line had gradually increased to such a value that it was necessary to provide additional capacity in both.

After carefully considering the problem, it was decided to move the substation to the inside of the mine, to a location about a mile from the pit mouth, thus placing it centrally with respect to the area to be supplied.

In order to get additional carrying capacity in the transmission line, it was decided to raise the transmission voltage from 6600 to 11,430. This was easily accomplished by merely reconnecting the power transformers at the generating station from delta to grounded Y on the high-tension winding. Of course, all the transformers receiving power from this line had also to be reconnected on the high-tension side from delta to grounded Y.

To provide the additional substation capacity, and also to prevent shutting down the mining operations while the substation equipment outside was being dismantled, moved inside of the mine and reërected, a new 150-kw. synchronous converter equipment, complete with requisite transformers and switchboard, was purchased. The transmission line was extended overland about a mile from its former terminus, to a point directly above the new location for the substation inside of the mine, and a borehole drilled down into the mine, piercing the substation room.

By shooting out the rock, sufficient space was provided in which to construct the room for the substation equipment. This substation room is 20 ft. wide, 59 ft. long, and has a brick arched roof 13 in. thick on a radius of 14½ ft., giving a height of 8½ ft. at the walls and 12½ ft. at the center. The floor is of concrete, and the walls are of brick 13 in. thick. The walls and roof are thoroughly treated with a waterproofing compound. Sheet-steel doors are used at the entrances to the room.

The borehole is cased throughout its entire length with 5-in. iron casing, cemented in. This casing is extended above the ground level about five or six feet. This prevents flooding the borehole from surface water and places the cable clamp and cable end bells, or potheads,

high enough above the ground to prevent accidental damage. Suitable knife-blade disconnecting switches are provided on the transmission line at the borehole, and there is also installed an electrolytic lightning arrester. Power is taken from the overhead transmission line down to the substation at 11,430 volts, through a No. 2 American wire gage, three-conductor, varnished cambric, insulated, lead-cased, wire-armored, jute-and-asphalt-finished cable suspended in the borehole casing. This is approximately 275 ft. deep, and the whole weight of the cable is supported by the wire armor. This is fastened by a clamp designed for the purpose resting on the top of the borehole casing. End bells, or potheads, of the disconnecting type are used on each end of the cable.

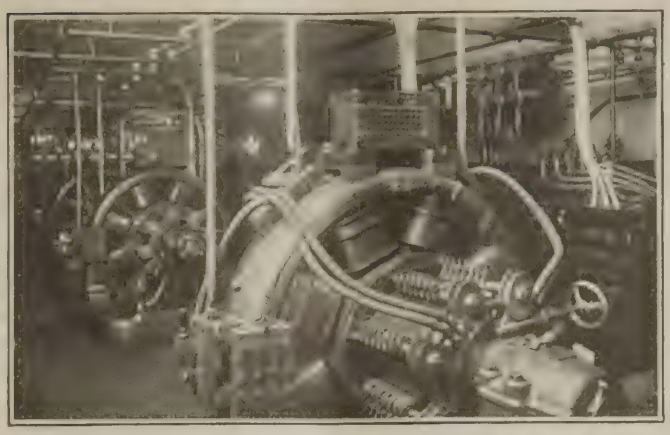


FIG. 2. INTERIOR VIEW OF SUBSTATION SHOWING PIPE CABLE SUPPORTS

The cable is taken into the substation room through the brick side wall, and connects to the high-tension bus which extends the length of the room, being carried on pipe framework, from which it is supported by petticoat-type porcelain insulators mounted on iron pins. The plan view of the room and the layout of the apparatus accompanying this article (see Fig. 1) will give a clear idea of the relative location of the different parts of the equipment.

The synchronous converters are six-phase, compound-wound, 900-r.p.m. machines, and for each converter three single-phase, 60-cycle, oil-insulated, self-cooled transformers connected in grounded Y three-phase on the high tension, and six-phase diametrical on the low tension, reduce the voltage from 11,430, at which the power is received, to 186, at which it is applied to the collector rings of the converter. With each set of three transformers there is used a separate external three-phase, oil-immersed reactance, for compounding the direct-current voltage of the converter, maintaining practically a flat compound of 275 volts from no load to full load.

The high-voltage oil circuit breakers have each pole in a separate oil tank, and are inclosed in brick cells with slate tops. They are provided with knife-blade disconnecting switches in the leads connecting them to the high-tension bus.

The direct-current panels are all grouped together at one end of the room, while the alternating-current rotary starting panel and the alternating-current rotary panel for each machine are mounted together and located conveniently to the machine which they control.

It will be seen from the illustrations (Figs. 2, 3 and 4) that all the wiring is carried overhead on a pipe framework, to which suitable porcelain insulators and fittings are attached. The main cross pipes of this framework run from one side wall to the other and are supported at a central point by a hanger from the arched roof. The overhead wiring is more accessible than that which

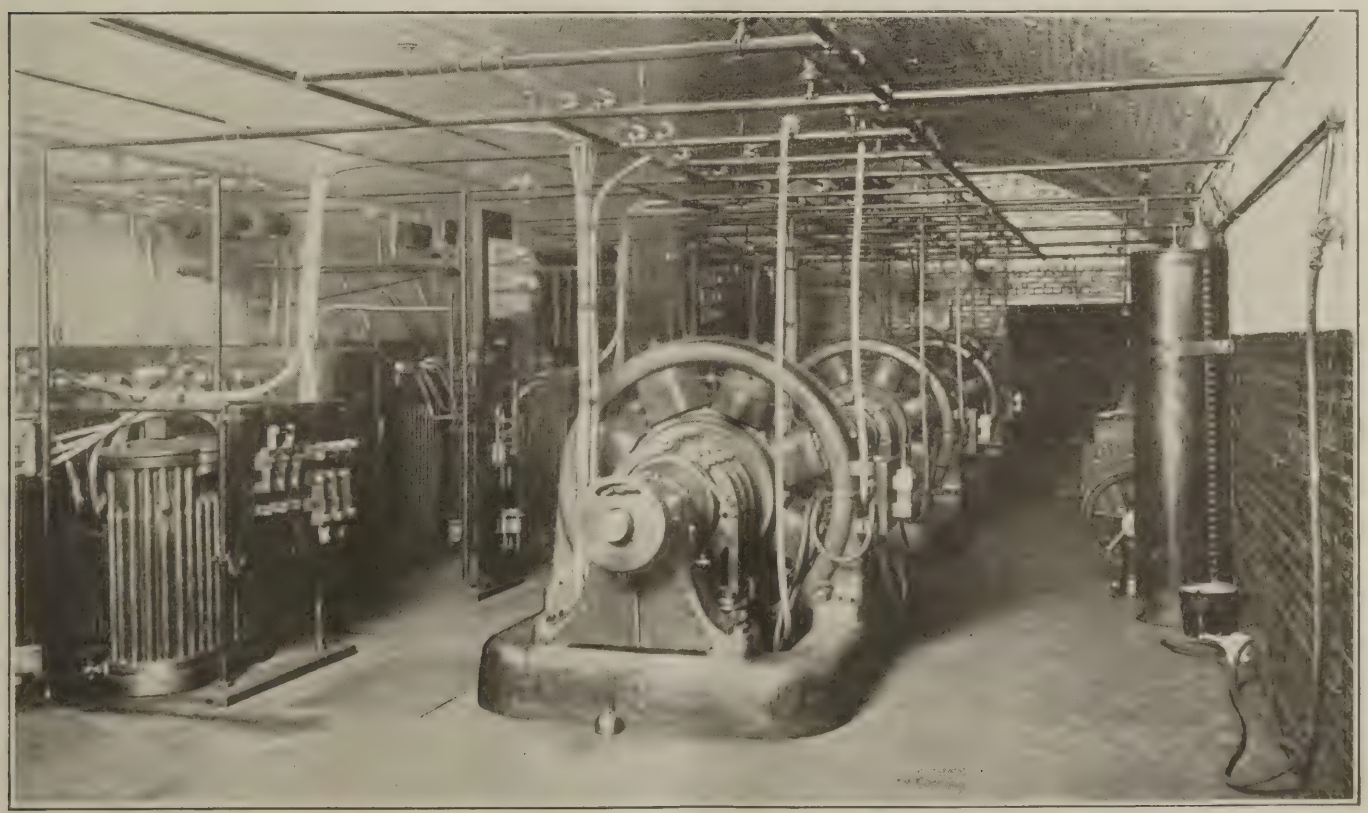


FIG. 3. VIEW IN SUBSTATION, SHOWING ROTARIES AND VERTICAL AIR RECEIVER

is carried in conduits in the floor, and it was thought less likely to give troube. Furthermore, it will not be submerged by water in the room, as that in conduit might be. The new machine was arranged specially with the terminal blocks for the leads on top of the field frame, thus making the usual pit under the machine unnecessary, and at the same time rendering it more adapted to the overhead scheme of wiring.

A small motor-driven air compressor of about 6½ cu.ft. capacity, with an air receiver, pressure gage, pop safety valve, air piping and rubber air hose, is installed for the purpose of furnishing a bountiful supply of compressed air, to be used in thoroughly blowing out all the dirt, carbon and copper dust from the machines.

All the cables are insulated with varnished cambric. A large eye bolt is set in the roof over the center of each machine for the attachment of a chain block when removing the armature, or doing other work of like nature.

In making the change from the outdoor to the inside location, the newly purchased machine and its equipment were first installed in the inside substation and put into operation, running in parallel with one of the machines in the outside substation, while the other machine and its equipment were dismantled, moved inside, reërected, and placed in operation. Then these two machines in the inside substation were operated in parallel, while the remaining old machine outside was taken down, moved inside and set up there. The whole change was made without interruption to the power supply to the mine.

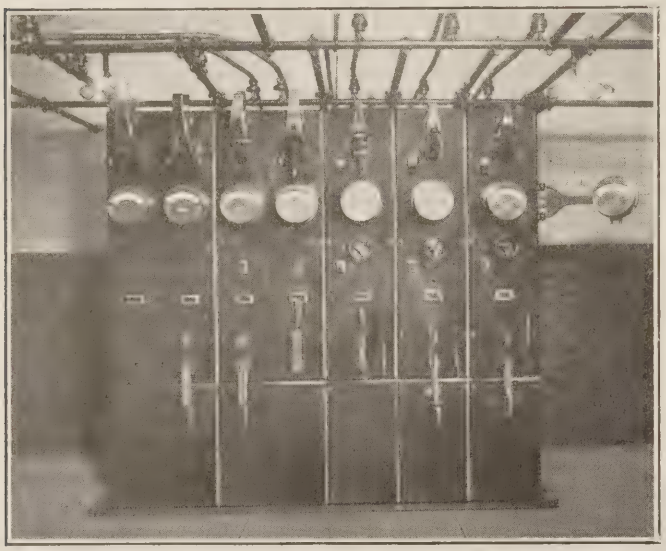


FIG. 4. SWITCHBOARD AT END OF SUBSTATION

The inside substation now contains three machines, and there is space for a fourth. This, it is expected, will be installed some time in the future, when load conditions require it.

The inside substation has been in constant daily operation since December, 1911, or somewhat over 6½ years now. The marked improvement in the operation of all classes of electric machines inside since this station has been operating has resulted in considerably fewer burnouts from low voltage, and consequently a large decrease in the cost of upkeep and more output from mining machines, pumping units and locomotives. There have also been enjoyed all the many other benefits which these features bestow, as well as those which result from a power supply with normal voltage well maintained at all times. In all respects the substation's service, operating benefits and reliability have been most satisfactory during this period of years.

In passing, it may be interesting to call particular attention to the fact that the two old machines have been in continuous service about 11 years, and that all three units are perfectly standard commercial machines, having had no special treatment to make them more moisture proof than ordinary units. The substation room is well ventilated by the air from the mine fan, is dry at all times, and no temperatures above the ordinary normal have been experienced.

Legal Department

CONDUCT OF BUSINESS BY ADMINISTRATOR—The administrator of the estate of a deceased coal merchant has no power to continue the business as representative of the estate. (Maryland Court of Appeals, Willinger vs. German Bank of Baltimore City, 103 Atlantic Reporter, 433.)

LESSEE'S RIGHT TO USE MINE PASSAGEWAYS IN REMOVING COAL FROM ADJOINING LANDS—Under a general warranty deed to underlying coal, with the right of ingress and egress to and from the land proper for the purpose of mining and removing the coal, without express provisions as to the time for removal nor as to use of the passageways in removing other coal, the grantee became vested with ownership of the coal in fee, terminable only by exhaustion of the coal or abandonment of the grantee's rights. He is also entitled to utilize the space made by removing coal for the purpose of removing coal owned by him under adjacent lands. And while a tract that is in open workable condition is being mined, the fact that there may be a temporary suspension of operations therein will not deprive the mine owner of the right to use the driveways for transportation of other coal, where he is acting in good faith and mining in the customary manner. Nor is coal in the ribs of a mine forfeited because left for a time to support the surface, the owner of the land having waived the right of surface support. (Pennsylvania Supreme Court, Westerman vs. Pennsylvania Salt Manufacturing Co., 103 Atlantic Reporter, 539.)

APPORTIONING DELIVERIES UNDER CONTRACT FOR YEAR'S FUEL REQUIREMENTS—Plaintiff contracted to deliver defendant's entire requirement of coke for one year, estimated at 40,000 tons, for shipment in approximately equal monthly installments. In certain months deliveries fell materially below the average of 3333⅓ tons called for by the contract, and defendants demanded deliveries in excess of that average quantity. Plaintiff sued for the price of coal delivered but not paid for, and defendants counterclaimed for damages for failure on plaintiff's part to fill orders in excess of 3333⅓ tons in each of certain months. Held, that defendants were entitled to credit for losses sustained through plaintiff's failure to make deliveries up to the full average quantity of 3333⅓ tons for each month, but that there was no breach of contract in plaintiff's failure to make monthly deliveries in excess of that quantity. "Taking into consideration that each month's delivery was to be treated and considered as a separate and independent contract, we cannot agree with the construction placed upon the contract by the defendants that the plaintiff was required to anticipate and provide quantities greatly in excess of the approximate stipulated amount required to be delivered each month under the terms of the contract. In effect, the plaintiff would unexpectedly be called upon in any given month to furnish any quantity of coke only limited by the full running capacity of the plant of the consumer." (Pennsylvania Supreme Court, Poland Coal Co. vs. Rogers, 103 Atlantic Reporter, 559.)

Advantages of Storage-Battery Locomotives*

By C. W. CHAPPELLE
Manager St. Louis office of the Ironton Engine Co.

THE use of the storage-battery locomotive in mines for gathering coal is a comparatively new application of one of the oldest pieces of electrical apparatus we have, as storage batteries, in one form or another, have been in use in this country for nearly thirty years; and while the storage-battery gathering locomotive has only been in general use for about four years, it has proved to be eminently satisfactory when used under the proper operating conditions.

Until the introduction of this machine there were about four general methods of gathering coal; namely, by mules, by cable-reel locomotives, by electric crabs and by straight trolley locomotives. As the purpose of this paper is to point out some of the advantages of storage-battery locomotives, it would probably be best to discuss briefly the other methods in the order mentioned.

The actual cost of mule haulage will, of course, vary with localities and mine conditions, but it has increased greatly during the past two years. In a great many mines where the coal is low it is usually necessary to cut out additional top or bottom, and sometimes both, to obtain the head room required for the mules. Again, the amount of coal that can be hauled by mules in low coal as against that in high coal is naturally less, owing to the difference in the size of the mules which can be used. In figuring upon the maintenance of mules in coal-mining work the main items of expense are first cost, feed and shoeing, veterinary, barn attendance and harness.

Importance of Housing, Drainage and Ventilation

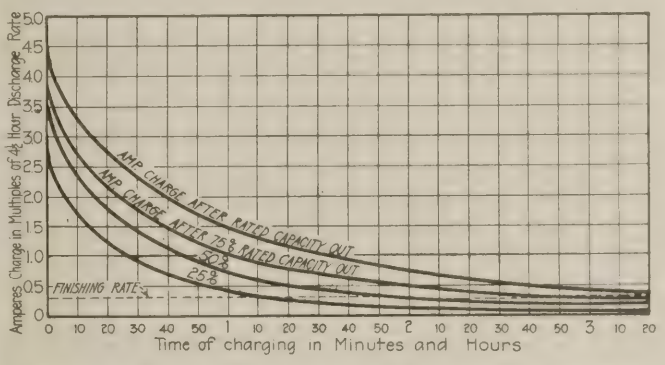
In addition to the items noted the question of proper housing, drainage and ventilation are important factors, as well as the transportation of food and refuse if the mules are kept underground. Stables for mules should be kept clean and well lighted, as good care means simply good insurance. A mule may last at this work anywhere from five to ten years, but again he may be killed by accident at any time, and the amount of work which he can do will always vary with his physical condition.

The cable-reel locomotive is an adaptation of the trolley locomotive for gathering purposes, by means of a more or less complicated motor-driven cable reel mounted upon it. In order to obtain the best results from a machine of this type the tracks in the rooms should be bonded. On account of the fact that this cable-reel mechanism is complicated and that the cable is always subject to excessive wear, accident and abuse, the upkeep of this type of machine is always high, although its first cost may be somewhat lower than that of a storage-battery machine; but on account of these points it cannot gather as much coal in a given amount of time.

The electric crab is a device built on the nature of an electric winch and is used for the purpose of pulling cars out of a room by means of a flexible rope or cable; it is generally used where the grades are so heavy that they can not be negotiated by either a locomotive or a mule.

The straight trolley locomotive is also used for gathering, but the method calls for installation of trolley wires and track bonding in the rooms. Also, on account of the necessity of constantly handling the trolley pole and because the trolley voltage in the rooms is usually low, due to excessive copper loss, it is much slower than the storage-battery locomotive.

The storage-battery locomotive realizes more of the ideal conditions in connection with the gathering of coal than any other machine which has been produced up to date. It eliminates the cost, installation, upkeep and damage of overhead wiring, as well as the expense of track bonding. It allows of increased speed in gathering, as well as the elimination of handling a trolley pole or cable. It combines the speed, power and dependability of the locomotive with the simplicity of mule haulage and means greatly increased production over all previous methods.



CHARGE CHARACTERISTICS OF STORAGE BATTERY

The curves show what may be accomplished in the way of charging at high rates of current at the beginning of the charge and tapering the charging rate off as the charge progresses. These results were obtained by charging a battery from a constant potential source, the voltage of which was equal to the number of cells in the battery multiplied by 2.3. Under this method, with the battery discharged when put on the circuit, one half of a complete charge would be put into the battery in one hour. Also, as the charge progresses, the current automatically tapers off so that the cells never gas or heat injuriously

The field or range of action of the storage-battery locomotive has not as yet been clearly decided or limited. It seemed at first as if it would be limited merely to gathering work, but in many instances it has been used to advantage in main-line haulage. This is true particularly in new propositions which are just being started and where the distances to be traveled are not too great, and also in situations where the grade is favorable to the loads to be hauled.

I do not believe, however, that the storage-battery locomotive will supersede the trolley machine for main haulage work in general, but rather that an intelligent combination of the two types will nearest approach the ideal condition; this condition, of course, means the greatest number of tons of coal transported during a working day for the least amount of money per ton.

*Paper read before the Peoria meeting of the Illinois Mining Institute, May 24, 1918.

The storage-battery locomotive does mean, however, more tons of coal gathered with the use of less men, less power, less upkeep and less all around trouble than by any other mechanical means.

There are two distinct types of storage-battery locomotives in general use. One is the straight storage machine, in which the size and capacity of the storage battery is relied upon to do a full day's work, and the other is the combination type in which the storage battery is oftentimes comparatively small and is simply used as an auxiliary source of power in a trolley machine; the motors in the machine are operated in series when working from the trolley and in parallel when working from the battery, the battery receiving some charge from the trolley through a resistance during the former period.

Naturally the heart of a storage-battery locomotive is the battery, and contrary to the general belief a storage battery is not a thing of mystery, neither is it a complicated piece of apparatus requiring highly skilled men to look after it. It is one of the oldest and simplest pieces of electrical apparatus that the electrical engineer has to deal with, and can be cared for by anyone who is willing to obey simple instructions. Like the mule, however, it needs food and drink, and it requires it regularly. The food is electricity applied in the form of amperes for a certain amount of time, and the drink is pure water; and unless the water is known to be pure it should be distilled to make sure. Storage batteries should not be overheated while being charged; such overheating is usually caused by charging at a higher current rate for a longer period of time than the instructions give.

The batteries in these locomotives are usually put in specially designed compartments, either in or on the locomotive frame; the cells are assembled in groups in extra-heavy wooden trays, and these trays are usually insulated, by some form of porcelain insulator, from the locomotive frame. The individual battery cells are so assembled in the trays that the flat of the plate is in the direction of motion of the locomotive, thus producing a "dashpot" effect in the jars and absorbing all hammer-blow effects against them.

Troubles Experienced in the Early Days of Locomotive Construction

In the early days of locomotive construction considerable trouble was experienced with the lead type of storage battery due to jar breakage. This has been practically eliminated by the use of a so-called "guaranteed compound" jar, which is really an extra-heavy walled jar with a lot of rubber in it. In the Edison type of battery the jar is of metal and jar breakage is therefore eliminated. Originally a spring suspension scheme for the batteries was tried to some extent, but as it was never very practical it did not come into extensive use. At present the general practice is to assemble the trays in the battery compartments as snugly as possible, leaving just enough clearance so that a tray may be lifted out when required. Practical experience has demonstrated that rigid battery compartments with trays assembled in this manner are best.

There are two distinct types of storage batteries used in this class of work; one being the lead-sulphuric acid type and the other the iron-nickel-alkaline type, better known as the "Edison."

The lead battery used for this purpose is what is known as the pasted-plate type, with the exception of the "ironclad exide," in which the active material, as the lead oxide is called, is inclosed in slotted hard rubber tubes to keep it from shedding. The solution, or electrolyte as it is called, in the lead battery is a mixture of sulphuric acid and water having a specific gravity of approximately 1280 deg. The working voltage range of a lead cell on discharge is from 2 to 1¾ volts. The life of the lead type of storage battery used in these machines will be approximately 18 months to 2½ years, depending upon their construction and the kind of care they receive.

Characteristics of the Alkaline Type of Battery

The alkaline type of battery, better known as the Edison battery, is composed of positive plates containing nickel hydrate in perforated steel tubes and negative plates containing iron oxide in rectangular tubes or pockets, the containers in both cases being nickel plated. This element or group of positive and negative plates is contained in a nickel-plated steel jar, and the solution or electrolyte is a mixture of caustic soda or potash having a specific gravity of about 1250 degrees.

The working voltage range of an Edison cell is from 1.4 volts to 1 volt, approximately. The life of this type of battery is estimated at five years. On account of the difference in the working voltage of the two types of battery it is necessary to use a greater number of cells of the Edison battery than the lead type.

The batteries on these locomotives are usually charged either through a suitable resistance direct from the 250-volt trolley circuit in the mine or they are charged by means of a separate motor-generator charging set, in which case the voltage of the generator can be properly proportioned to the battery. The motor-generator method of charging is by far the best for the battery, and is also the most efficient in regard to current consumption. It is, however, considerably higher in the matter of first cost.

I would state that I have tried in this paper to outline the storage-battery locomotive and its application in a general way only. I have not tried to go into comparisons of cost as against mule haulage, but for general purposes it is safe to assume that a four- to five-ton storage-battery locomotive will replace from three to four mules. Each installation is a problem by itself, and this problem readily can be solved by taking the following points into consideration: The number of cars to be hauled per day; the number of cars to be hauled per trip; weight of the empty cars; weight of the loaded cars; greatest distance locomotive will have to travel per trip; the grades the locomotive will have to encounter in making one trip or cycle, both with and against the load; general character of the track and mine cars. In this connection the round trip should be divided into parts having different characteristics, such as different weight of train and different grades to be encountered.

With the foregoing information a person will be able to go to the various builders of the machines and obtain a clear and concise idea as to what can be expected in the way of results.

Discussion on Mr. Chappelle's Paper

FOLLOWING the reading of the foregoing paper there was a most interesting discussion on the merits of the storage-battery locomotive as applied to the gathering of coal in mines. The special field of this type of motor was enlarged upon and information was desired as to the care which should be given this machine, both in charging and in operation. Possible battery troubles were also discussed. The haulage of powder by electric locomotives brought out some good points, and the application of the storage-battery type to this service was commented upon. Altogether it was an unusually good discussion and the principal points made by each of the speakers participating in the discussion are noted in the following pages.

IT was stated by C. W. Chappelle that it costs approximately one-half as much to gather coal by storage-battery locomotives as it does with mules; that the storage-battery locomotive has come into active use in coal mines during the last four years, and is therefore comparatively new as regards coal mining. This type of locomotive is not a universal panacea for all haulage problems, and it is not expected to supersede the trolley locomotive; but an intelligent combination of the two should produce the best results. In many instances storage-battery locomotives are installed where trolley motors should have been put in. An intelligent investigation should be made in each case to see whether the battery locomotive is suited to the work.

Continuing, Mr. Chappelle noted that a storage battery may be charged at a high current rate at the start, provided the current is tapered off, so as to prevent gassing and overheating of the battery. As to storage troubles, in the first stages of battery-locomotive design much difficulty was experienced with jar breakage, but this was largely eliminated by the use of heavier trays and jars, and by installing the cells so that the flat of the plate is in the direction of travel (the length of the plate across the track) of the locomotive, thus providing a dashpot effect in the jar.

In regard to progress made, it was stated that in the earlier types of battery locomotives the speed was rather slow, being around 2½ miles an hour. Modern machines operate at from four to six miles an hour when loaded and from six to ten miles an hour running light. A good point was made by Mr. Chappelle who suggested that the Institute appoint a committee to collect and tabulate data on the actual cost of the various methods of hauling and gathering coal, whereby an average cost could be arrived at. Up to the present time not many mines know what it is costing them, and no two mines have exactly parallel operating conditions. The answer to the ultimate problem in all engineering propositions usually resolves itself into dollars and cents.

A number of representatives of storage-battery companies were present and responded to requests for information. At this point, Taliaferro Milton, Chicago district engineer of the Electric Storage Battery Co., with general office and works at Philadelphia, Penn., remarked that the storage-battery locomotive has its own special application in coal mines and that great care should be taken to see that it was properly applied. In his opinion it would never entirely replace the trolley locomotive—both types have their own fields of application. The storage locomotive in a few instances has been misapplied, and in such cases its failure has not been due to any inherent defect of the locomotive or batteries, but nevertheless such failures have given this type a "black eye" at times.

Further, great care should be taken in analyzing the haulage conditions before the locomotives are purchased, to determine the proper battery capacity. A large percentage of troubles with storage-battery locomotives has been due in the past to the fact that not sufficient battery capacity was provided for in the initial installation and no provision made for substituting a larger battery. From the original survey it is a simple engineering problem to calculate the required capacity in kilowatt-hours necessary to do the work in hand. This capacity having been determined, T. Milton would recommend that a storage battery having capacity considerably in excess of the calculated quantity be installed. In fact, he would recommend that the calculated requirements in kilowatt-hours be used as a guide to determine the minimum battery which should be used, and that the actual battery adopted should be the largest one which can be installed on the locomotive within the limits of the available space and weight requirements, providing this larger battery does not exceed double the calculated capacity requirements.

Continuing, he stated that the locomotive manufacturers must protect themselves in selling battery locomotives by specifying what the locomotive will do under definite, specific conditions of tonnage, length of haul, grades, working hours and other duty conditions. The locomotive may be sold under these definite specifications and live up to them on trial runs. Later on the conditions in the mine may be entirely changed and the work required of the locomotive will be so increased that it may be found that the battery on the locomotive is not of sufficient capacity to do a day's work. While this is no fault of the locomotive or battery, and while the manufacturer is protected by the working specifications, yet the operators are dissatisfied because the locomotives cannot meet the excessive requirements. If, therefore, a liberal factor of safety is used in determining the proper battery capacity, this condition will probably never arise. The money expended in this additional capacity is not wasted—it is a real investment. Even if this excess capacity is never taken out of the battery during any one day, the battery, because it is not worked up to its full capacity, will have an increased life; therefore, while the original investment is increased on account of the excess battery capacity, the maintenance is reduced. The excess investment is therefore returned to the purchaser in longer life of the battery. Simultaneously, the excess capacity acts as an extra insurance and has a real value to the operator.

Mr. Milton lays particular stress on the care and operation of the batteries on the locomotives, saying that there is no such thing as a "foolproof" battery—batteries require systematic attention. The instructions given by the battery manufacturers are simple and any mine employee who has common sense and who can be relied upon to obey orders and follow instructions can, in a short time, be converted into a good battery operator. The actual time spent in the care of the battery is little if the attention be systematic and in accordance with the instructions.

The point was brought up that the determining factor in selecting storage-battery locomotives for operation in coal mines is cost per ton of coal handled. While this question is largely an economic one, and while any one would install battery locomotives if it was proved that the cost per ton of coal handled would be reduced by the use of such locomotives, yet there are cases where the storage locomotives will be used even though the cost per ton of coal handled is increased by the use of this type. There are cases where it is necessary to use locomotives in order to get the required tonnage. The Electric Storage Battery Co. maintains a staff of competent engineers who visit the mines from time to time to inspect the batteries and to coach the operators in the proper handling of them. If the operators will take advantage of the services thus offered, the benefits to the manufacturers and operators will be mutual.

Mr. Bowers, of the Edison Storage Battery Co., of Orange, N. J., spoke of the disappointment expressed in the work accomplished by the battery loco-

motive in six months or a year. The work might be increased from 50 to 100 per cent. over that for which the locomotive was bought, and then the motor might be condemned because it would not respond. It was advised that in the original installation the demand be figured out and then the capacity of the locomotive be increased from 25 to 50 per cent. Also in the care of a locomotive—the services of an expert are not required—any man of intelligence who will follow a manufacturer's instructions will do. The storage-battery type is becoming so well known that a special operator is not necessary. In the early days it was necessary, but not now.

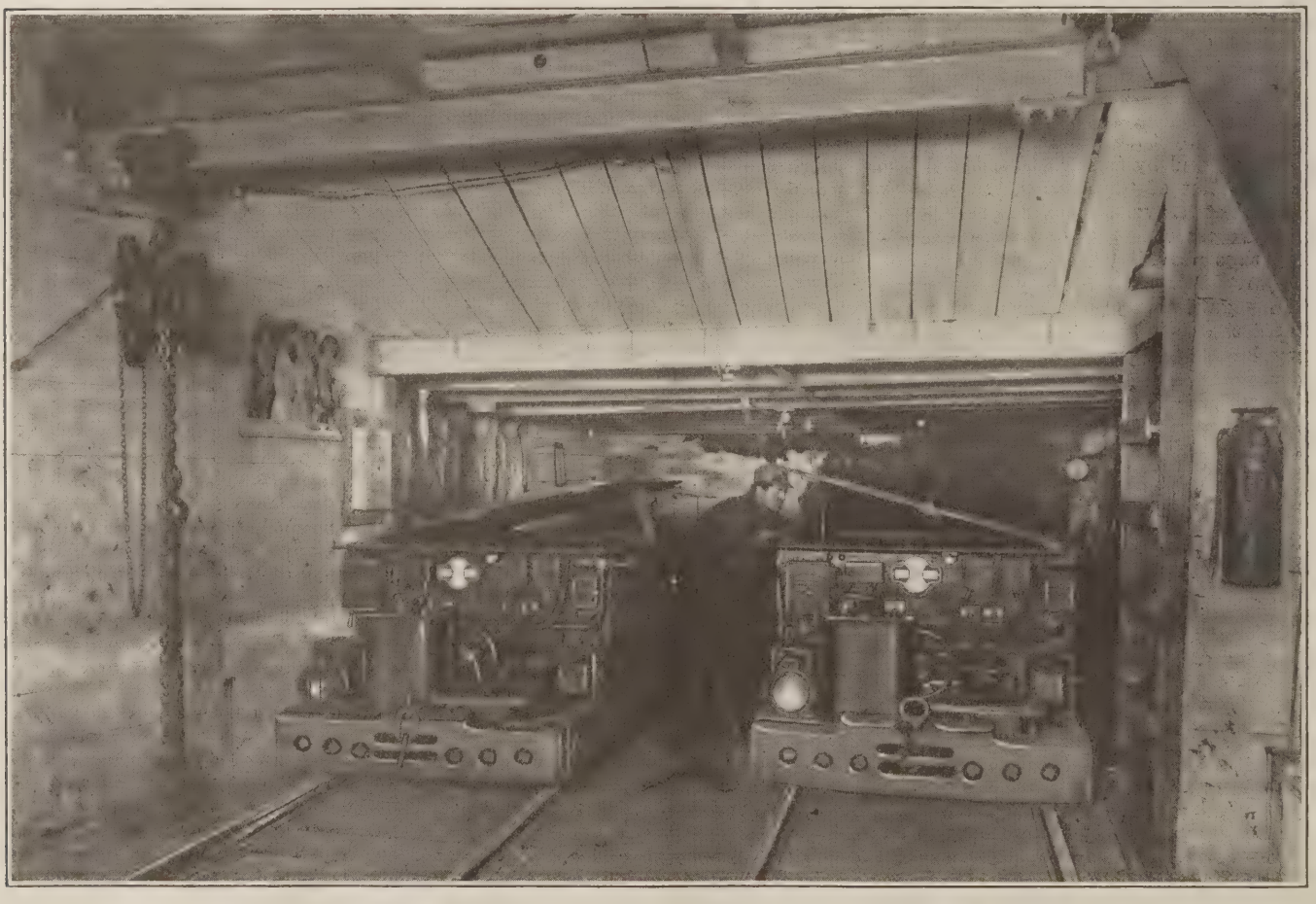
In replying to inquiries as to trouble encountered in the operation of storage-battery locomotives, T. Milton stated that the chief trouble was due to too small battery capacity, as previously noted. Too much emphasis could not be attached to this feature of locomotive design; also a battery should receive systematic attention and care. The regular instruction book issued by the Electric Storage Battery Co. gives some good ideas in this connection, but the main points, however, are brought out on the metal plate the company attaches to the battery box on the outside of the locomotive. The points brought out on this nameplate are the fundamentally important ones to which special attention should be paid.

Prominent among all instructions are suggestions about charging batteries. The motor-generator set is better suited for charging storage batteries than is the trolley current, for the following reasons:

The battery usually consists of 48 cells, and to completely charge this battery requires from 110 to 125 volts. The trolley voltage is usually 250 volts, so that in order to charge the battery direct from the trolley it is necessary to put in a rheostat to reduce the voltage at the battery terminals to 125 volts. It is thus seen that if the full 250 volts are maintained on the trolley there will be as much energy wasted in the charging rheostat as is stored in the battery. Aside from the wastefulness of this method of charging direct from the trolley, the trolley voltage varies considerably so that it is difficult to determine beforehand just how much resistance is required in the rheostat to produce the proper current for charging the battery in a specified time. By the use of a motor-generator set a practically constant voltage can be maintained at the battery terminals with no loss, except the regular losses in the motor-generator set. Moreover, by obtaining any desired voltage the battery can be charged properly in accordance with the battery characteristics and thus insure better operation from the battery.

In reply to an inquiry as to the protection afforded a storage-battery motor against injury from overload, C. W. Chappelle stated that most locomotives have fuse or circuit-breaker equipment, and the motor is protected by either slipping the wheels, the circuit breaker opening or the fuse blowing. The slipping of wheels on a storage-battery locomotive will not hurt anything, and it acts as a safety valve against overloading the motor. As to the fuse, the only danger is that sometimes too heavy a copper wire is used as a fuse and when it does not melt at the proper time then a burnout is caused. The storage battery is a reservoir of energy and has a great capacity; this large capacity is used, not to handle heavy overloads on the locomotive, but to operate it over a considerable period of time at normal capacity. However, a standard five-ton Ironton locomotive having a rated drawbar pull of 2500 lb. has actually given 4000 lb. on a good clean rail. Motors used in storage-battery locomotives are not rated in horsepower but are based on a temperature rise of 75 deg. C. for a period of one hour. A 10-hp. series motor may be safely operated at 30 to 35 hp. for short periods of time or momentarily.

The question was asked what troubles occur with the battery itself. Mr. Chappelle replied that trouble is sometimes caused by a battery being improperly charged. The success of a battery locomotive depends largely upon the proper installation and charging of the battery; it is better to purchase



CHARGING TWO FIVE-TON STORAGE-BATTERY LOCOMOTIVES IN A MINE

The operator is shown testing the specific gravity of the solution in the storage-battery cells to determine the state of charge. The specific gravity (that is the density) of the solution in a lead storage battery varies with the state of charge and gives a direct indication of the condition of the battery

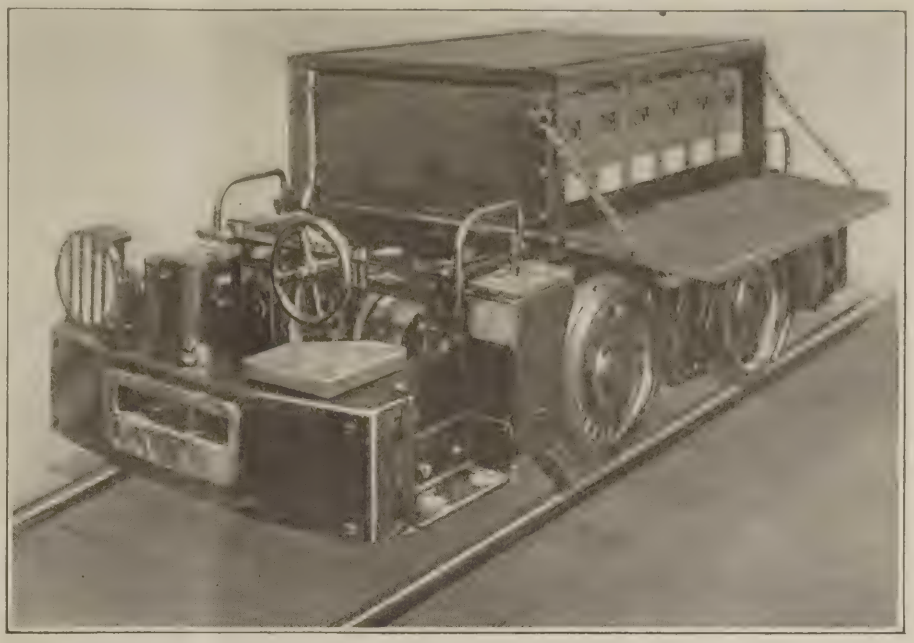
the charging equipment for the locomotive from the makers and thus get a complete unit designed to work together and insure against divided responsibility. Locomotive manufacturers furnish complete motor-generator sets and automatic switchboard equipment to properly charge batteries.

Mr. Milton here brought out some interesting points. In comparing the trolley and storage locomotives, he stated that in the former type the limit to power is the station; but this is not true of the storage battery. In this connection, power and energy should not be confused. The faster the current is used the quicker will the battery be exhausted; the kilowatt-hours determine the length of activity of a battery, and the rate at which the energy is used up is indicated by the pointer on the meter.

Continuing along this line of thought, W. G. Ferguson, of the power and mining department of the General Electric Co., of Schenectady, N. Y., stated that it has been some five years since the storage-battery locomotive was first installed on a practical basis in coal mines and that Mr. Chappelle no doubt recalled having witnessed the first trial locomotive which was placed in a mine near Cambridge, Ohio, and which was tried out for several weeks. This installation occurred shortly before the strike came on in Ohio and for certain reasons the locomotive did not prove satisfactory to the mine management. It was practically impossible to keep the locomotive on the rails due to the fact that it was being operated over mule tracks, and instead of hauling coal the locomotive would be on the ground for three or four hours each day.

The locomotive was taken out of this mine and resold to a mine in Indiana and has been in continuous use for several years, giving the owner remarkably satisfactory service. This bit of history was given in order to illustrate the main points to be brought out to the effect that battery locomotives cannot be applied haphazardly to coal mines, as conditions vary so greatly that failure will result in many cases unless a thorough study has been made of the situation. When applying storage-battery locomotives to coal mines, especially for gathering work, it is essential to know a great many things about the mine which are otherwise not necessary when applying the trolley type of locomotive. It has become the practice to apply trolley locomotives solely on a basis of weight and dimensions, as the amount of power used by the trolley locomotive is practically unlimited in quantity since it is derived from the trolley wire. The storage-battery locomotive is at a disadvantage in this respect because it must carry the power with it.

One must know exactly how the locomotives will distribute and collect cars, whether cars will be placed at and taken from the "face" or whether they will be delivered at the room necks. Furthermore, it is essential to know the weight of loaded and empty cars, approximate car output per day per locomotive, grade conditions, depth of rooms, side and height clearances, length of entry (whether this is single or double entry) and finally the location of the parting with respect to the working rooms. It is, of course, difficult at times for a prospective operator to accurately state all of these details, but he can as a rule give a very close estimate of how the operation of the mine will be handled. When all of these conditions are known, it is possible to calculate the amount of battery power necessary for a day's work and then the weight of battery can be proportioned to the weight of the locomotive chassis. It is obviously impractical to design a locomotive with an overbundance of battery capacity and at the same time obtain a locomotive chassis of sufficient weight and strength to carry this battery without obtaining a locomotive as a whole far out of mechanical proportions and very much heavier than necessary for the work. It is sometimes found to be the case that these gathering locomotives will be handled in much the same way as when mules are used. That is, if it has been the past practice to haul two or three cars with mules, the new user of battery gathering locomotives will doubtless continue to haul two or three cars with the battery locomotive, thus resulting in very inefficient haulage and requiring far more battery capacity than would otherwise be necessary if larger trips better proportioned to the weight of the locomotive are used.



FOUR-TON ELECTRIC MINE LOCOMOTIVE EQUIPPED WITH 48 CELLS

Continuing, Mr. Ferguson said that the locomotive will handle from three to five times as many cars as a mule, and when doing so will be working at the normal working load for which the locomotive was designed; thus it will use a less amount of battery power than if it is compelled to make frequent trips over a long track with a very light load. It should be realized that the weight of the locomotive is a large percentage of the total weight of the trip, and consequently a good deal of battery power is used up in operating the locomotive itself. A locomotive should not be loaded up to the slipping point of the wheels, as this condition causes the storage battery to deliver an abnormal rate of current which tends to reduce the battery capacity and the speed of the locomotive.

When the operation requires the handling of small trips and the cars are distributed over a wide area, it is better to plan on using two small locomotives rather than one large one, as the total amount of battery capacity needed for covering the extended mileage is so large and heavy that the locomotive itself will be inefficient and will use the battery power to a very decided disadvantage. In fact it is oftentimes the case that two locomotives of a well proportioned weight and battery capacity can obtain a given car output with less total battery capacity than would a large, heavy locomotive which carries the battery around all day long, hence uses power for moving this excess amount of battery. The above remarks are, of course, more or less of a general nature but they are capable of being proved by concrete examples. The main point which Mr. Ferguson endeavored to make was that one must know the amount of kilowatt-hours used by a given locomotive and make the most economical use of it.

A good deal of careful consideration should be given to the selection of the charging apparatus, as the life and safety of the storage battery depends to a great extent upon how a battery is charged and the safeguards taken to prevent a heavy reversal of current. Standard lines of charging panels are available from several large manufacturers who have made a special study of battery requirements and will furnish equipment best suited to the type of battery in use. The most important feature of the charging panel is the re-

verse current circuit breaker, which will open the main charging circuit whenever the source of power is interrupted either by opening of a station breaker or by short circuit between the generator and the storage battery. If short circuit occurs and no protection is provided, the battery may reverse the current and attempt to feed other apparatus such as pumps, fans and other machines that may be operating on the lines. If an 85-volt battery is being charged direct from a 250-volt trolley circuit, there is usually enough series resistance in the charging circuit to limit the amount of reverse current to a safe discharge value. However, if the circuit is not interrupted, the battery locomotive would be discharged in the morning instead of being charged, and consequently a day's loss would be the result. It is quite obvious, therefore, Mr. Ferguson noted, that one can afford to spend a few hundred dollars for the protection of the expensive storage battery.

When storage batteries are charged from a 250-volt circuit, it is necessary to use a regulating rheostat in the circuit to reduce the voltage of the trolley to that required at the terminals of the battery. Consequently, there is considerable loss in the rheostat itself. Take, for instance, a 48-cell lead battery. When it is charged by the so-called constant current method it requires 125-volt maximum at the end of the charge, and if a 250-volt trolley circuit is used, the loss in the rheostat will equal the amount of power put into the battery. An 80-cell Edison battery charged in the same manner will require 150 to 155 volts resulting in the loss of about 100 volts in the rheostat. If but one or two storage-battery locomotives are used in the mine, this loss of power in rheostats is not important, but when 10 or 12 locomotives are used the kilowatt-hours in the rheostat will be considerable and it is then essential to select a motor-generator set having a generator voltage equal to that required for the charging of the battery; thus the charging power may be used most economically.

In conclusion Mr. Ferguson stated that the storage-battery locomotive should be operated so that the loads will not be too large or too small for the rating of the locomotive, and a good deal of judgment should be exercised by the operator. Brakes should be used with discretion and this bad habit common to operators of trolley locomotives should be overcome. The storage battery should be watered regularly and charged in the manner prescribed by the instructions.

James Taylor, coal investigator of Illinois, introduced the subject of powder haulage and called attention to the strict state laws in this matter. He considered that if a storage-battery locomotive conveyed powder to the face that it might ground and explode the powder. However, as to the care of this type of locomotive, he believed it was no more care than a mule. In charging the storage battery the locomotive should rest on wood rather than T-rails, to avoid escape of electricity, provided such were possible. As a case of quite questionable management Mr. Taylor cited a mine in which four motors were used for haulage. It was the custom here to change around the motormen once a month; under this system a runner learned the grade on his haul and then exchanged with a motorman from another part of the mine, and both runners commenced over again to learn their runs.

Continuing on the subject of haulage of powder, the statement was made that a storage-battery locomotive undoubtedly was safer to use in such service than a trolley locomotive would be. Mr. Chappelle was of the opinion that a number of factors enter into the reason for this: the battery is in a steel compartment usually covered with fairly tight covers, and the electrical circuit of this type of machine, while it is running, is contained within itself; that is, the circuit is a metallic one, the current traveling from the battery to the controller, through the motor and back to the battery again. He agreed that in charging a storage-battery locomotive from a 200-volt grounded trolley circuit that it should be charged on wooden rails where possible. He also cautioned that an open flame should be kept away from the battery compartment at charging time, for the reason that if the gas which is given off at charging time is ignited then cracked jars or broken covers are liable to result.

Further, about the only way that sparking could occur in a battery locomotive while it was in operation would be by wiring trouble, controller or motor trouble, a loose cell terminal or the burning off of such a cell terminal. As to the production of sparks at the time when powder is being hauled, a mule can produce sparks by its shoes striking certain rock or steel. And as far as that goes, a man pushing a powder car might smoke. It is a significant fact that prominent manufacturers of explosives are using storage-battery locomotives in their works, as they are the safest mechanical method of haulage around plants of this character. The inference was drawn that there would be slight danger in coal mines comparatively from similar use of the battery locomotive. As a precaution, an empty car might be placed between the locomotive and the powder car which would seem to eliminate any danger from stray sparks; if an insulating drawbar was used, it should still further eliminate the possibility of any leakage current getting to the car. The comment was made that currents still could be transmitted through the track from the motor to the car; also if the empty car was wet, the insulation would be weakened.

An interesting contribution to the discussion was made by A. J. Moorshead, president of the Madison Coal Corporation. He stated that the selection of the method of hauling powder was a matter of safety and economy. In a general way, he considered that an operator was foolish to use storage locomotives for distributing powder. The Madison company is putting in storage-battery locomotives, but they will not be used for hauling powder. A special powder car has been devised by Mr. Moorshead which is expected to be electricity proof. Three powder transportation boxes are being constructed of two layers of wood between which is sheet asbestos. Wooden screws are used where fasteners are needed. The powder box is mounted on a truck and each car complete will cost from $100 to $150. Before being placed in active service, these cars will be tested; after the box has been filled with powder in cans, a wire will be passed round the box a number of times and a current of electricity will be turned on.

Mr. Moorshead went on to say that 25 per cent. of his time was given to investigating safety matters. In connection with haulage he noted that while mule drivers constituted 5 per cent. of the force, accidents to them amounted to 30 per cent. Also that 30 per cent. of expenditures for accidents was for drivers. As a class they are reckless and uncontrollable. Here Mr. Moorshead related a story which was particularly well appreciated, but the writer will not attempt to repeat, as a layman should never try to encroach on the special field of a pastmaster in an art. In view of his findings in the haulage situation, he gave storage-battery gathering locomotives a trial and found that while developing best efficiency, a storage motor displaced 3½ mules and on 320 tons of coal hauled a saving of 1½c. a ton was effected. Furthermore, this mechanical haulage eliminated 60 to 70 per cent. of inside coal transportation accidents. In view of all this, the Madison Coal Corporation is equipping its plants with storage-battery locomotives and considers them a good investment.

The transportation of powder in the state coal mines was of considerable interest to the members of the Illinois Mining Institute. Accidents from explosions of powder en route from the foot of the shaft to destination brought about the enactment of laws requiring all current to be shut off from a mine at times of haulage of powder. The main switch is securely fastened so that no current passes through the inside feeder wires. Two men lock the switch down and it takes both to open it. Mr. Moorshead states that the men of his company were taught the rule of strict obedience to orders in this connection—if they failed, they were given a good stiff army order. Many times the reason for accidents was due to lack of order, discipline and obedience; the latter two on the part of the employees of a company—the former in the case of a plant which does not have the good appearance a manufacturing concern should possess. Neatness and order about a plant are assets whose value often amounts to more than dollars and cents to a company.

Outbursts of Gas in Crowsnest Field*

By JAMES ASHWORTH
Consulting Mining Engineer, Vancouver, B. C.

SYNOPSIS—*Describes certain violent gas outbursts which, with other causes, have closed down mines in the Crowsnest field. One mine gives off 15,695 cu.ft. of firedamp per ton of coal mined, the volume of the methane at atmospheric pressure being about 580 times the volume of the coal. One authority believes the coal is an unstable chemical compound and suddenly changes its condition. The presence of other hydrocarbons than methane and possibly the presence of hydrogen adds to the danger. The author advocates longwall methods for working such coal.*

IN 1914 I contributed to the Manchester Geological and Mining Society a paper entitled "Outbursts of Gas at the Morrissey Collieries." These mines were owned by the Crow's Nest Pass Coal Co., Ltd. In continuation of what was there stated I may say that after No. 1 mine was closed work was not resumed in this part of the coal field until 1907, when a new mine known as No. 7 was opened up.

This mine was lower down in the geologic section than No. 1 mine, and had an overhead cover of about 800 ft. The seam has a steep angle of dip (65 to 75 deg.) and a total thickness of 32 ft. Only about 16 ft. of the footwall portion was worked, and in the middle of that portion was a natural parting, separating the two 8-ft. portions, the bottom half of the coal being harder than the top part. The mine was ventilated by a force fan, and therefore the main haulage road became the return airway.

Gas Filled Face of Heading with Small Coal

The first serious outburst of gas in No. 7 mine occurred at the face of the main level on Jan. 27, 1909. It filled the level with small coal for a distance of 15 ft. from the face. The gas was given off in such a large volume that it extinguished a safety lamp 30 ft. outside the main entry. Yet a horse which was left inside by its driver was afterward found alive.

On Apr. 19 a second outburst occurred in the upper counter level, about 1550 ft. from the outside. It displaced 15 tons of coal dust and was accompanied by the discharge of a considerable volume of gas.

A third outburst took place May 5, in a raise in the soft coal between the main entry and the upper counter level. The raise was up about 25 ft. and 14 ft. back from the face. Two men were at work in the raise and had evidently attempted to escape, as one was found on the timber at the bottom of the raise and the other in the level below, both having been smothered by gas and dust. Only about six tons of coal dust was displaced. It may be noted that both the level and upper counter were open for several yards past the place where the raise was being driven up.

A fourth outburst occurred May 19 at the face of the main entry, soon after the miners had completed a setting of timber. A cracking sound warned them and they escaped to the outside without injury.

I visited this mine about a month after the outburst, and found that the displacement of coal had been almost entirely from the upper or softer part of the seam, and that the cavity extended upward about 25 ft. above the top of the timber, and also into the solid coal at the face and tapered off to a point in the last 6 ft. Below that taper the cavity would be about 8 ft. square. The amount of coal displaced was 75 tons and the volume of gas given off during six hours was estimated as 750,000 cubic feet (see Fig. 3, page 445).

Decided That It Was Unsafe To Extend Mine

After this outburst an inquiry took place, and in the end the management and three Government officials decided not to advance the levels any farther as there seemed to be no certain means of anticipating these outbursts. However, the mine was not closed down immediately. Some of the upper pillars were still worked until the railway company, which was using the coal for its locomotives, found it was of too small size to suit its requirements.

Moreover, the other collieries at Coal Creek and Michel were able to supply all the coal which the market needed. The coal seams of this part of the coal field, having been much altered by crushing and heat, would not make a good metallurgical coke; and this formed a further reason why operations were suspended.

Up to the date of writing outbursts of gas of such great intensity have not occurred at any of the other collieries in this coal field, and therefore it would seem that at Morrissey the special conditions of heat and pressure to which this end of the coal field has been subjected have not yet been found in other parts of the field.

The nearest approach to these disturbed conditions has been met with in the working on the south side of Michel Creek, where the strata are much disturbed by a severe twist. In this portion of the coal field large volumes of gas are driven off almost continuously, as set out in some detail in a paper read by the Chief Inspector of Mines of British Columbia before the U. S. A. Mine Inspectors' Institute at Joplin, in June, 1916.

He then stated that in old No. 3 mine on the east side of the slope as much as 15,695 cu.ft. of methane per ton of coal mined had been given off, resulting in the whole of the return air current being charged with methane to the extent of 2.66 per cent. as ascertained in actual analysis at Ottawa by Dr. E. Haanel. In the same part of the mine, when it was not at work, the percentage of methane in the air was 2.18. In the whole of the return air current of 60,000 cu.ft. per minute when the mine was not at work the methane content was 1.83 per cent.

In No. 3 East mine it is noticeable that the greatest

*An abstract from a pamphlet entitled "Outbursts of Explosive Gases in the Crowsnest Pass Coalfield, British Columbia."

yield of methane was from the west side, and it would therefore appear that the special conditions which caused these abnormal emissions of methane must be situated somewhere between the old No. 3 and No. 3 East. On Aug. 3, 1915, while the mine was at work, the west side split contained 3.33 per cent. of methane or, as calculated, gave off 7392 cu.ft. per ton mined.

The highest reported percentage of methane per cubic foot of air, found while the mine was at work, was 3.83 in old No. 3 mine. These mines were worked by two shifts of eight hours each, and the average volume of methane per ton of coal mined, calculated from mine samples of the main returns, was 4326 cubic feet.

These figures are certainly extraordinary, and it is not surprising to find that when an explosion occurred Aug. 8, 1916, in No. 3 East mine, that so serious was the damage to the mine that the body of one of the men killed has not yet been recovered.

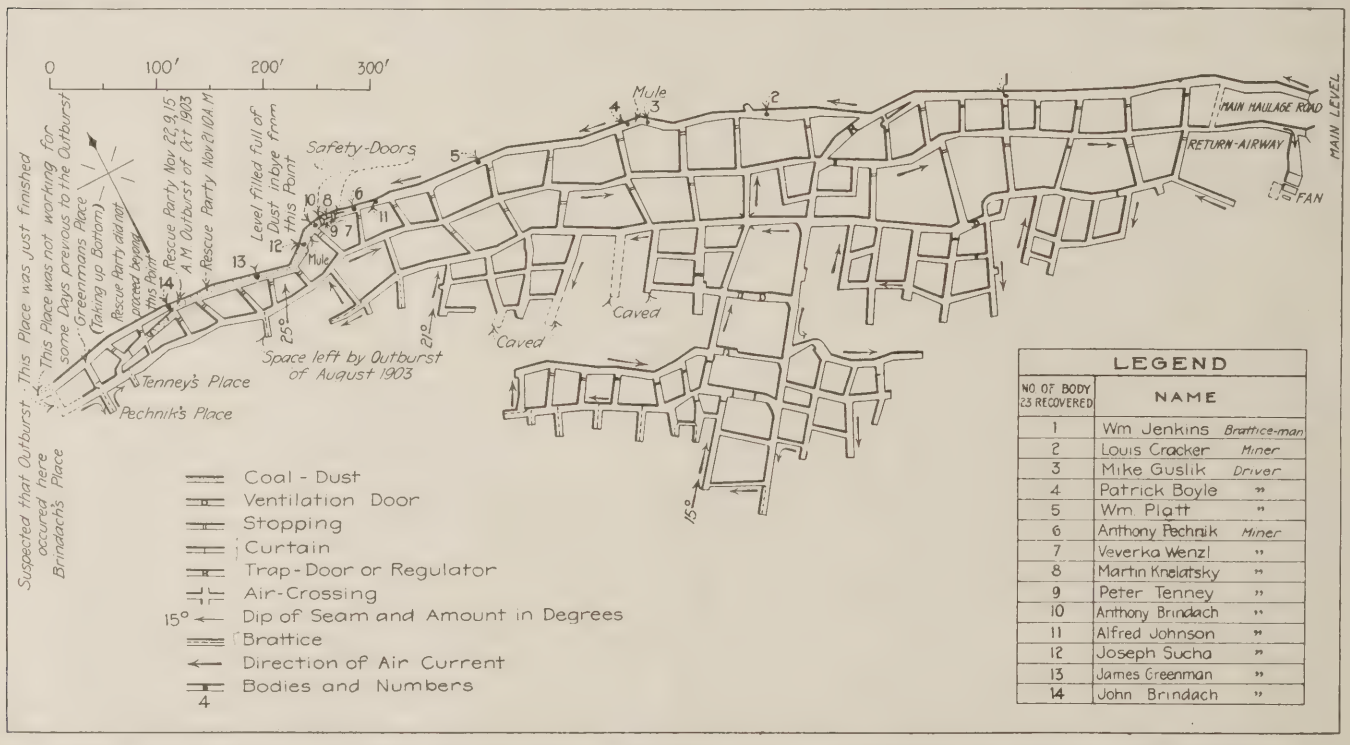


FIG. 1. PLAN OF NO. 1 MINE, MORRISSEY COLLIERIES, CANADA, SHOWING EFFECTS OF GAS OUTBURSTS

The average thickness of the coal in No. 3 mine is given as 5 ft. and of No. 3 East as 11 ft. Both seams are bituminous and will make excellent coke without washing. The analysis of the coal from No. 3 mine is stated to be: Moisture, 1.01; other volatile matter, 20.95; fixed carbon, 71.00, and ash 7.04.

Both of the coals named are very friable, and, in the mining of them, explosives can only be used in limited quantity. The cover is about 1200 ft., in which thickness there are several other workable seams. It would appear, however, from the data thus far collected that the main volume of the methane emitted is principally built up in the coal seam itself or in some part of the coal seam.

While making an analysis of the gases occluded in the coals from this coal field it has been discovered—and the point is important—that they consist in part of gases of the higher hydrocarbon series. The gas, though usually described as firedamp, is not necessarily methane only. This is an important point to take into account, and in 1904 I came to the conclusion that some part at least of the gas given off in the large outbursts is "wet" gas, and is similar in every way to the wet gas given off, say, at the Dingman oil well in Alberta. From this well a percentage of gasoline is (or was) collected.

I believe, as I did in 1904, that some of the gases in the coals are in liquid form, and thus when the restraining pressure is reduced as the covering coal is removed, they volatilize and force away the coal in the finest of dust, and in this manner file out long cavities of irregular form (Figs. 2 and 3) which remain after an outburst has been dissipated. It is very noticeable that the dust found in these mines under ordinary circumstances is of a greasy nature, and that the higher hydrocarbon gases are found occluded in it.

Sudden outbursts of gas have received comparatively little notice either in British Columbia or elsewhere, but in May, 1919, a bulletin of the Canadian Mining Institute contained an interesting paper by D. B. Dowling, of the Dominion Geological Survey staff, on "Some Possible Chemical Changes in the Formation of Coal." He says:

> Experiments with pressure alone do not give results, since great periods of time are required; but when implemented by heat, there is evidence that there is a chemical change made by which the increased percentage of carbon is attained with very little actual loss of carbon.
>
> That there is an increased tendency to throw off gas with the rise in carbon percentage is acknowledged; and when it has reached its maximum the coal might in some instances be classed almost with such unstable compounds as explosives. There are accounts of slight shocks producing "blow-outs" of large dimensions in mines working the higher bituminous coals. This liberation of gas need not be considered as coming from pockets of compressed gas; but as following much the same course as an explosion of dynamite, which is simply the rapid rearrangement of atoms.
>
> It would seem probable that the formation of gas was

accompanied by a concurrent formation of a more stable coal compound, and when the alteration was violent the stable coal was brought along with the gas as dust. Dust not formed in this way, but from the operations of mining and handling the coal, should be considered more as a series of minute particles of unstable compound borne along by a small gas atmosphere of its own making, and therefore not easily laid by sprinkling, and only to be got rid of by ventilation.

Unfortunately, this paper by Mr. Dowling, as far as regards the foregoing quotation, did not elicit the

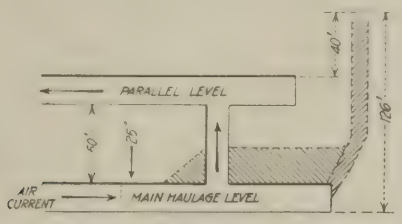


FIG. 2. COAL BLOWN INTO HEADING IN NO. 1 MORRISSEY OUTBURST OF AUG. 6, 1903

least comment and has remained as a dead letter. In the annual report of the Minister of Mines of British Columbia for 1909, the chief inspector of mines, Frank H. Sheppard, remarked on page 225:

> The question of dealing with these outbursts is the most important and difficult problem to cope with in this field. If this portion of the field is to be worked at all, it must be under conditions which will give the miner some chance for his life. Most of the outbursts in this field have been attended with loss of life.
>
> The whole question devolves upon the possibility of relieving the pressure ahead of the working face. If this cannot be done, it would be inhuman to ask or allow a miner to take chances such as are not experienced in any other industry. If the field is valuable, and this may be readily conceded, it would appear that the operator could go to considerable expense in experimental work, having for its object the safe winning of the field and the protection of the lives of those who may engage in its development, and it would be a reproach to modern engineering skill to admit that the problem will not admit of a reasonably safe solution.

When we wish to cure a disease the first and most important point is to diagnose it correctly, and similarly, in this serious problem of sudden and violent outbursts of explosive gases, we need if possible to find out when to expect them, and secondly, how to deal with them in safety. The need of experimental research into practical matters of this sort needs no emphasizing, because the lives of hundreds of miners may depend on their solution; and moreover, it may be anticipated that the problems will increase in importance as the mines extend farther away from the entries, and where large areas of goaf are closed off.

Up to the present no system of working has been consistently followed. Pillar and stall has been the usual method, and this has introduced the question of the proper size of the pillars, especially where "bumps" have been of frequent occurrence. In the latter cases it cannot be averred with any confidence that large pillars have given any better results than medium or small pillars; but there is no doubt in my mind that no system has given such excellent results as longwall.

There are many instances where pillar and stall has been the system adopted; this has later been changed to longwall, and this in its turn has been changed back to pillar and stall. In some cases the reasons given for the adoption of pillar and stall have been that this system gave the minimum of expense in moving dirt; in another case that there was not sufficient material to form substantial packs, and where there was material with which to build packs, that the cost of making them was entirely prohibitive due to the insistence of the miners' union officials that the miners should receive for "clod" a fixed price per inch thick, for each square yard removed.

It is of course possible to have a special gang of men to build the packs, but where it is possible it is better for the miners to build their own. In longwall working it is of the greatest importance to control the settling down and breakage of the roof, so as to maintain as regular a pressure as possible on the coal face.

In workings of longwall type, where gas in the floor gives trouble, it naturally escapes over a large area and does not break out in sudden and dangerous volumes, as it frequently does in pillar-and-stall working. Dangerous "bumps" seldom happen in longwall working after the first roof break has occurred, and therefore it is fair to conclude that bumps are mainly due to a combination of causes—the settling of the roof and the gas in the floor.

As there are several modes of working a mine on the longwall principle it is necessary that the management should choose that one which will give the lowest cost of extraction, and he should not be in a hurry to change the mode of working just because a few heavy roof settlings occur. The success of longwall working

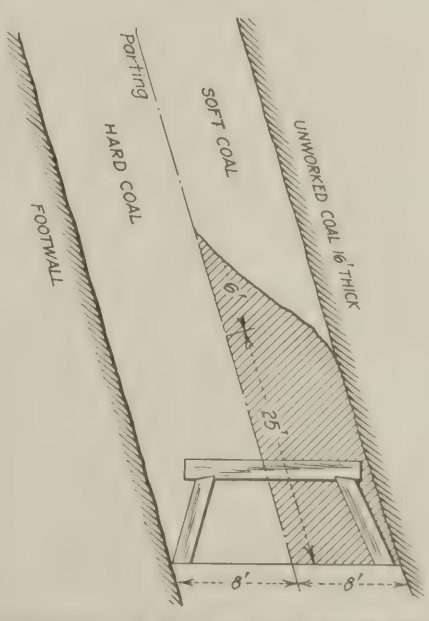


FIG. 3. OUTBURST OF MAY 19, 1909, AT MORRISSEY NO. 1

depends on the regularity of the breaking down or bending of the roof, or as it is often described, "roof control."

The longwall method of mining coal has another most important feature to recommend it, namely, that the mine is much easier to ventilate and therefore much safer and requires less brattice cloth. In longwall working the greatest trouble is experienced when the roof and floor are "very good," for they must be made to either bend or break.

In mines such as those in the Crowsnest Pass coal field it is advisable in many cases to drill holes in the floor, particularly where rolls or faults are met with, and thus relieve the tension of the floor gas.

From the soft nature of most of the coal seams in the Crowsnest Pass and the absence of "backs," "slines" and natural partings, which are common in many coal fields, these coals drain slowly, and this fact is a principle cause of the abnormal outbursts of explosive gases.

Since writing the foregoing notes the official report on the explosion in No. 3 East mine at Michel, on Aug. 8, 1916, has been published in the Minister of Mines Report for 1916. This states that the explosion occurred during a heavy thunderstorm, and shortly after the night or repair shift had gone into work at 11 o'clock. From the card that automatically records the water gage of the fan it is calculated that the explosion occurred about 11:20. No one outside the mine actually heard the explosion, or if they did, the noise was assumed to be caused by thunder. A miner who had just come out of the mine, and was on his way home, it was afterward learned, did not realize that an explosion had occurred.

Fan Engineer First to Learn of Explosion

The discovery was not made until the fan engineer, who had two fans under his care, visited No. 3 East fan and found wreckage in the engine room and other evidence of an explosion. The main entry to the mine was completely closed, and the exploration party had to go in through an old prospect opening. A fire in the main return airway from the east side was fortunately discovered and extinguished without further disaster.

The body of the fireboss was found some distance away from the remains of his safety lamp. It was assumed from this and other indications that the force had come from the main slope and not along the return airway. "The gauzes of the fireboss' lamp were badly crushed and showed evidences of alkali stain, as of the lamp having been heated." This would suggest that he had met with gas in the return air as soon as he had passed through the main separation doors; but his death was due to violence and not to burning, as his hair was only slightly singed.

The evidence showed that the miners had only just reached their working places when the explosion occurred. Thus the miners working in No. 6 slope face had undressed and put down their dinner pails and then returned to No. 13 parting to assist in rerailing a car left by the previous shift.

Careful measurements of the main return-air current from this mine showed that the air was saturated with moisture; that its volume was 120,000 cu.ft. with a velocity of 1500 cu.ft. per minute; that 2,194,560 cu.ft. of methane was given off during a working day, when 550 tons of coal were produced or at the rate of 3990 cu.ft. per ton of coal. The volume of the methane produced was calculated from the analyses of samples of air taken in the main return.

While testing samples of air from the Michel colliery, the Dominion government analyst, Dr. Haanel, has proved the presence of hydrogen and found indications which have shown "that hydrogen is not an uncommon constituent of mine airs." The presence of ethane has also been estimated as being one tenth of the methane present.

To those who have seen safety lamps tested in mixtures of hydrogen and air, it is not difficult to realize what dangerous conditions may arise when a miner entering his working place immediately hangs up his lamp on a prop without first making a test for gas. Miners as a rule do not appear to appreciate the importance of observing the law in this matter, as was shown during an inquiry into a more recent explosion in the same district.

The safety lamps in general use in British Columbia are of the bonneted Wolf-Marsaut type, burning gasoline or benzene. With regard to their safety, it is to be noted that Marsaut, while making his long series of tests by raising his double-gauze bonneted safety lamps into a quiescent explosive mixture of gas and air, did not consider such lamps as absolutely safe, and hence he added a third superimposed gauze which is the correct construction of the true Marsaut safety lamp.

It must be obvious to every reader of these notes that the necessity for devising some means to insure the better protection of miners' lives has now been amply demonstrated, and I therefore submit in conclusion that the time has arrived when these dangers ought to be carefully looked into by a special research commission or committee, and at as early a date as possible; and finally, that the system of developing and extracting such seams of coal as those referred to should be defined by such commission and strictly enforced by Act of Parliament.

Education—the Financial and Social Barometer

By R. Z. Virgin
Elkins, W. Va.

We are fighting a great war—the greatest conflict the world has ever known; and we are waging it upon a scale and in proportions greater than the most expert authority would have dared to describe a short time ago.

The corporations operating coal mines have been called upon to produce the coal necessary for the successful operation of manufactories that are working on war material; for our navy and army needs; for our transportation machinery; for our homes; and to make up the shortage in output of our Allies. All these requirements have multiplied many fold during the past year and will continue to multiply during the duration of the war. This unprecedented demand for fuel must be met, and this, too, while the supply of labor to produce it is being conscripted for war work or prompted by patriotic impulses is volunteering its services for duty overseas.

This condition, coupled with complex problems of transportation, is more serious than most readers imagine. The solution must be worked out by men of mature experience and judgment, in order to get the maximum energy and output in the minimum time, and simultaneously conserve the lives and limbs of the workmen; also to conserve our coal resources with the greatest caution.

By educators and mining men such questions as the following are asked frequently: "How can this be done?" "What would you advise?" "What are your ideas of solving this important problem?"

The answer is, "Educate the workmen." Education is the greatest producing agency in the world and makes for 100 per cent. efficiency. The days of the hill-top mines are gradually drawing to a close, and with deeper mining, more machinery, more elements of danger, a larger need for the coal, less men to get it with, and the men who would manage our mines through advancement in the regular course of promotion going to the front, we must do something, and do it quickly. Otherwise we will not have sufficient men in training to officer our mines when such officials are most urgently needed. Many of the large corporations are training their own men to officer their works; and they pay them salaries while they are learning the things necessary to enable them to properly discharge their prospective duties.

Almost every newspaper carries high encouragement to men who would make good in their particular line. The Bell Telephone Co., the Western Union Telegraph Co., and many other concerns have adopted this plan, and our Government is training thousands of men to officer the army and paying good wages for the time spent in learning. What is the mining industry doing toward educating its workmen for responsible positions?

Mines Losing Their Younger Men

The men of the mines between 21 and 30 years of age, the material for the very best officials, are gradually being called to the colors, leaving, to fill their places, men of more mature years—those past the usual age at which men attend school. These men must be educated. This is no longer a question of how it may be done; but it must be done, and at once, if we expect to get out the coal that is demanded of us and keep our death and accident rate down to a minimum. It would never do to officer our mines with inferior men and bring about an accident rate equal to the death rate in the army. Many workmen yearly meet death in our mines during normal times, and an inferior class of officials would not lessen this death rate.

It is true we have our night schools, our first-aid classes, our moving pictures, etc., illustrating the right and wrong ways to do work in our several plants. The men of the mines willingly give up their leisure time and sometimes their sleep (depending on which shift they work) in order to obtain an education along their respective lines of work. But one night a week, or perhaps one night in two weeks, is far too little to accomplish our purpose in the time at our disposal. Again, while the men discuss problems among themselves they have ordinarily no one to refer their questions to, and the result is they fail to get far in their studies.

The State of West Virginia realizes the importance of the education of her miners, and has appropriated a sum of money for the expenses and salaries of vocational teachers, who work under the direction of the officers of the State University. These instructors give lectures and practical demonstrations to workmen at about 10 different points, which they reach about twice each month.

I am of the opinion that mining companies will soon come to the point where they will follow the trend of other industries, and pick out ambitious men and school them at their own plants, five or six days a week, pay them while learning, and not require them to study on their own time after work. A large company employing several hundred men would be in a position to secure a competent teacher, who could probably visit two plants per day, holding school in the forenoon at one, and in the afternoon at the other. Thus no workman would need spend his evenings after work in school, but could rest at home with his family and have time for thought over his previous lesson, on his own porch or in the comfort of his own rocking chair.

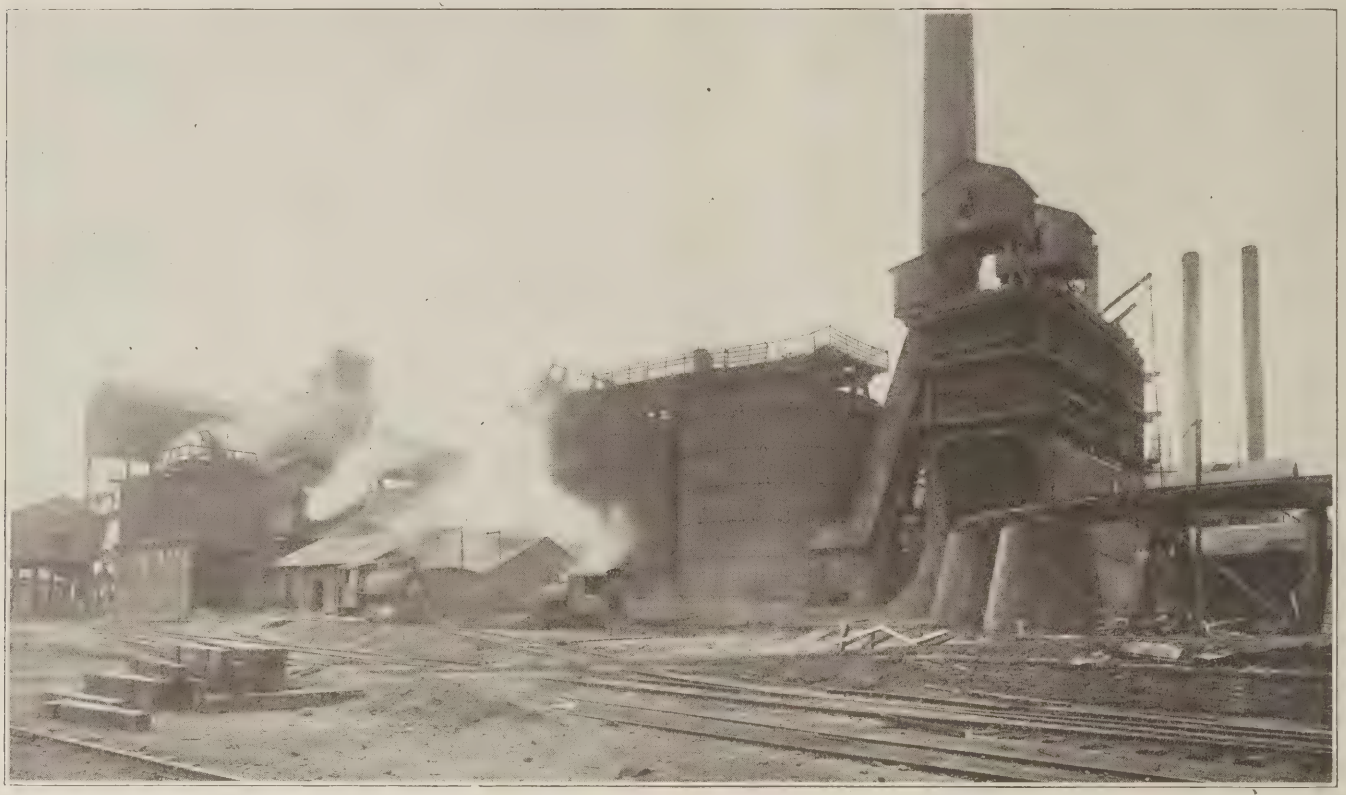
If we look at the pitiable condition of Russia, with its illiteracy in all degrees, we can judge from our own condition by comparison, that education surely pays large dividends. We can no longer say, "Look what we are doing for our workmen now, in comparison to what we were doing a year or so ago." A brand new condition is upon us. We must see things through new spectacles, and ask ourselves, "Are we doing the same, or more, for our men than other industries are doing?" We can no longer be tolerated when we say, "I did not get anything when I dug coal, unless I worked hard for it, and nobody did anything for me."

This is a revolutionary period. The foregoing statement applies in coal mining as well as in other industries, hence we are called upon to do things we never dreamed of before. We must therefore educate our men, or go backward. It would be decidedly un-American if we failed to keep pace with progress. The several responsibilities thrust upon us during this crisis must be met with the best there is in us. We will then find that the social and financial barometer is education.

Combustion in Commercial Furnaces

In commercial furnaces the combustible gases and the oxygen seldom form a perfectly uniform mixture, hence the rate of burning is not altogether controlled by the law of mass action but largely by the rate of mixing. This is especially true of the furnace gases near the surface of the fuel bed. The combustible gases leave the fuel bed in a solid stream containing little or no free oxygen. To this stream of combustible gas air is added through the firedoor or other special openings. If this air is added in comparatively large streams that are not agitated, the streams of combustible gases and the air may flow through the furnace for some distance in more or less stratified streams, and the combustion takes place only along the surfaces of contact and be slow. Such combustion makes itself evident as long flames. When the air is added in a large number of small streams, or when the large streams are agitated so that they break into a large number of small streams, the surface of contact is large and the combustion is rapid, approaching the velocity of combustion of a uniform mixture. —*Bureau of Mines Bulletin No. 135.*

SNAPSHOTS IN COAL MINING





UPPER VIEW—SURFACE PLANT OF JAMISON COAL AND COKE CO., GREENSBURG, PENN. LOWER VIEW—SURFACE PLANT OF SHERIDAN COAL CO., DIETZ, WYO.













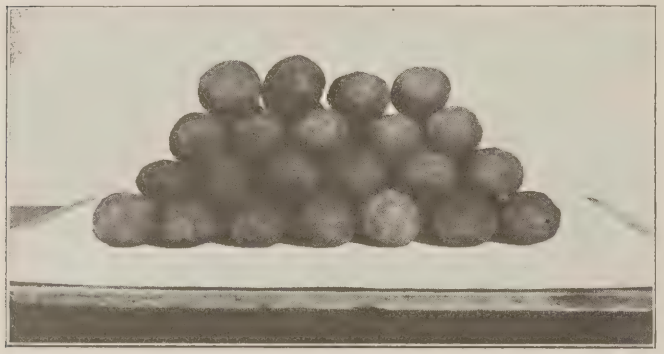
Views of H. H. McDowell Coal Stripping at Worland, Mo.

Fig. 1—View of the coal vein, showing its thickness and depth of overburden. Fig. 2—First box pit, Western elevating grader loading Western 1½-yd. wagons. Fig. 3—Same view as in Fig. 2, wagons proceeding to dump in distance. Fig. 4—Close-up view of wagons climbing hill to the dump. Fig. 5—View of coal vein, showing H. H. McDowell in position for loading Western three-wheel wagon with which coal is being hauled. Fig. 6—Car-loading platform, showing method of loading railroad cars from three-wheel dump wagons.

Homemade Fuel

The accompanying illustration does not show a tempting pile of doughnuts at some Y. M. C. A. hut "somewhere on the western front" in France. It is anthracite fuel made by hand in Wilkes-Barre, Penn. M. S. Hachita, chief chemist of the Lehigh Valley Coal Co., was responsible for this addition to the fuel resources of the region, and *Coal Age* is indebted to him for information about the manufacture of the fuel illustrated.

It seems that in Japan much charcoal is made and considerable fine powdered material results from the handling of this product. The fine charcoal is utilized by mixing it with 25 per cent. of clay and moistening



ANTHRACITE FUEL MADE BY HAND

the mixture with just enough water to permit balls to be formed by hand. The clay acts as a binder. When dry this fuel is burned similar to other combustibles. Having this in mind, Mr. Hachita experimented with the fine coal dirt which collects in streams in the anthracite field at places where pools form. At such spots in the river flowing by Wilkes-Barre, coal dirt in its finest condition may be found.

In river dredging at the place noted about 15 to 30 per cent. of clay is mixed with the fine coal. The practical point about it is that this coal is where everyone can use it and have an opportunity to secure a supply of fuel. Just as it comes out of the water it should stand for a while, to drain off surplus moisture. When it reaches the consistency of mud which can be readily shaped up by hand into balls about 2 to 2½ in. in diameter, it is ready for manufacture into fuel. When molded into shape it should dry in the air for several days, after which time it may be handled with a shovel.

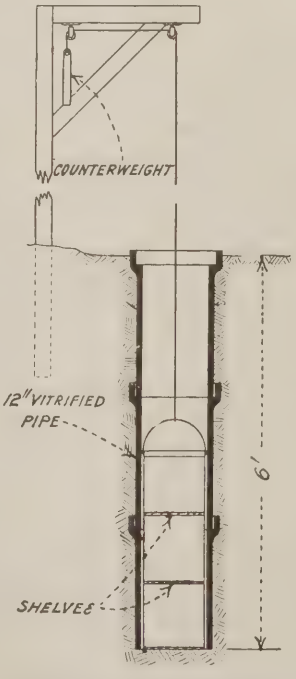
There are no special difficulties connected with obtaining a supply of this material at many of the streams throughout the anthracite region. A double purpose would be achieved in the utilization of this fine coal from the creek beds. The companies directly interested would have their creeks dredged and the people doing the work would get a coal supply for a nominal sum.

In using these coal balls in an ordinary stove, the fire can be started the same as with ordinary briquets —they burn much the same way. As the balls burn they get harder; the moisture is driven off and they harden similar to bricks under manufacture. The ashes resulting can be worked out of the fire much the same as in the case of an ordinary coal fire. The burning balls also can be stirred with little danger of their breaking. The facts noted in connection with the utilization of this creek coal mud are not merely the results of laboratory experiments. The method described, from start to finish, was worked out by Mr. Hachita and pronounced a practical success. If followed by the people who can readily obtain the raw materials, they will secure a fuel supply which can be stored against a time of scarcity of coal. It is another patriotic effort which will be effective in proportion to the amount of this waste product which is worked up into available fuel. It should not be shipped any great distance, as its high ash content would be wasteful of transportation facilities. But it will release for transportation coal needed for domestic consumption at distant points. Also it is doubtful if the balls would stand much handling in bulk.

On a large scale the material could be cut out with a shovel into cubes six inches on a side. It could be handled similar to peat, to which it approaches in regard to amount of heat available on combustion. Clay has been used as a binder in briquets, but it adds much impurity to the fuel made by this method. Therefore it would find its chief field of usefulness close to the point of manufacture. Reference to this matter is made at this time as possibly offering some suggestion as to the mechanical handling of fine coal on a commercial scale. During times of fuel famine some processes may find application which were discarded at other periods of fuel overproduction. The benefits of saving and conservation are assuming special importance at present.

To Keep Workmen's Dinners Cool

At the Dayton flood-prevention work, coolers, consisting of three lengths of vitrified pipe set vertically in the ground, are used to form a well into which a dinner pail can be lowered by a rope and pulley. This serves to meet the problem of the absentee iceman, says *Engineering News-Record.* Three lengths of drain pipe will line a well 6 ft. deep, as shown by the drawing. At this depth the ground is as cool as the inside of the ordinary refrigerator. To contain the food, a tin bucket 11 in. in diameter and 3 ft. high is fitted with shelves and a full-length hinged door. The bucket is also provided with a bail for handling. Two pulleys, a length of rope and a counterweight complete the outfit. Ordinarily the pulleys are fastened to the shed roof of the kitchen, but a post and bracket like those here illustrated may be employed with advantage. Any tinsmith can make the bucket, using inch boards for the shelves. This "iceless refrigerator" was devised by H. H. Rupe, superintendent of carpenters at the Englewood reservoir.



DINNER PAIL COOLER



Poor Car Supply Hampers Production

Efforts to stimulate coal production are being offset and hampered by irregular and inadequate car supply. While the figures from the Railroad Administration indicate a great improvement in this particular, they are misleading. After having had Saturday night, Sunday and Sunday night to handle cars, the railroads frequently are able to have on mine sidings 150 per cent. car supply. On Tuesday and Wednesday they often are able to keep the car supply above 100 per cent. By Saturday, however, car supply probably has dropped to 50 per cent. By totaling the six days, the railroads show a good percentage of cars. The figure is misleading, however, as the mine can utilize only 100 per cent. of cars and the excess early in the week is of no advantage.

Great enthusiasm has been aroused among mine workers in numerous cases recently when all previous records of production have been broken. Enthused by such a performance everything has been ripe for a determined effort to keep up the rate of production, only to have the whole plan spoiled and enthusiasm permanently dampened by a complete fall-down on the part of the railroad to supply the necessary cars.

It is noticeable that while every one concerned in the coal-mining industry is active in an effort to raise the morale of the workers to an unprecedented height, no such activity is in progress among the employees of the railroads. If every employee of the transportation lines could be imbued with earnestness to get the maximum efficiency from every coal car, it is believed that car supply would soon cease to be the principal limiting factor in the production of coal.

Coal the Paramount Lord of Industry

As a part of its effort to stimulate production, the Fuel Administration is circulating in all coal-mining districts the following extract from an address by Lloyd George to representatives of mine workers in the United Kingdom:

The blood which pulses through the veins of industry in this country is made of distilled coal. In peace and in war King Coal is the paramount lord of industry. In war it is life for us, and death for our foe. It makes the material and the machinery which it transports. It fills weapons of war. Cannon means coal. Shells are made with coal; shells are filled with coal. The very explosives inside them—coal; and then coal carries them all right into the battlefield to help our men. Coal is the most terrible of enemies, and the most potent of friends. There have been in this war 350,000 casualties of British soldiers inflicted by German coal—by the Westphalian miner working in coöperation with the Prussian engineer, without stint, without reserve, without regulation, putting their strength at the disposal of their Fatherland. It is coal that caused those casualties. Yes, and when you see the seas clear, and the ocean over which the British flag flies with impunity from realm to realm and from shore to shore, when you find the German flag vanished from the face of the seas, who has done it? The British miner helping the British soldier.

We must pay the price of victory if we mean to get it. Victory has its price. We have but one question to ask ourselves, of all ranks, of all grades and trades. Are we doing enough to secure victory? Because victory means life for our country. It means the fate of freedom for ages to come. There is no price which is too great for us to pay which is within our power to pay. Freedom implies the right to shirk. But victory is not in that road. The trenches are not all in Flanders. Every pit is a trench in this country—a labyrinth of trenches. Every workshop is a rampart, every yard which can turn out munitions of war is a fortress. Picks, shovels, lathes, hammers—they are as much the weapons of this great war of European liberty as a bayonet, a rifle and a machine gun; and the man who does not handle them with all his strength is failing as much in his duty as the soldier who runs away from the battle at the front.

Cardinal Gibbons Would Honor Miner Who Stays at Work

Cardinal Gibbons wants to see the same honor accorded to those who mine coal as is given to those who actually face German bullets. He has written a letter to Dr. Garfield which, it is believed, will have great weight with mine workers. The letter in full is as follows:

I have read with great pleasure the proclamation of the President of the United States with regard to the fuel situation. Like a great many other Americans I have been very much alarmed at the outlook for next winter. It is to be hoped that those whose business it is to get coal out of the earth will see how much depends upon their labor, and what a patriotic work they perform in providing that which is really at the present time the sinews of war.

The very fact that we have conscription puts a responsibility on every man in the country either to fight or to work, as the Government may think most necessary for the public good. The very fact that certain kinds of workers are put in a deferred classification is to my mind an indication to them that their real duty is to do that particular kind of work, because through the particular kind of work which they can perform the country will be more greatly helped and the war more easily won. But just as it is the duty of those who are called to fight to fight bravely and to allow their patriotism to be the informing principle of their courage, so is it necessary that those who work should work in the same strenuous and patriotic manner.

There are, I think, two classes of people who can help very much in this regard. The first class is composed of the families and neighbors of the men who are put into a deferred classification. As the President has so truly said, these people should treat the men who are working when often they would much rather be fighting, with the greatest respect, and should show that they recognize and honor the patriotism which holds men to their posts in the coal mine as well as the patriotism which holds a man firm in the trenches.

The other class which I think could be of very great assistance at this time is the clergy, and I sincerely hope that every minister of religion, especially in the mining districts, will put before his congregation the great principle that patriotism is devotion to country; that those who love their country must serve ther country in the most acceptable way, and must give their services, not where they would choose, but where the Government thinks they could be most useful; and that those who do stay behind to work must remember that they are working for their country and are holding up the hands of their countrymen now fighting across the seas, and that therefore they must put every ounce of energy and manhood into the work which they are asked to do.

I hope for the very best effects from the President's proclamation.

"Tuckahoe" Breaks All Previous Records

On her last trip to Boston, the "Tuckahoe" went in and out of port, discharging nearly 5000 tons of coal in 31 hours. This is several hours under the time any other collier has taken at the port of Boston during this month. The average of 19 ships discharging at Boston during the half week of the "Tuckahoe's" visit, Aug. 5-8, was 135 hours and 54 minutes. During the half week ending Aug. 15, the fastest time in and out of Boston was made by the "Lake Duncan." She was 34 hours and 8 minutes in port. The average of 25 ships discharging at Boston in that period was 124 hours and 48 minutes.

The port performances of the best colliers in the New England trade, compared with the average of all colliers in it, for the half-week ending Aug. 12, were as follows:

Loading Ports—Baltimore, average of seven ships, 60 hours, 54 minutes in port. Best ship, "Tampico," 30 hours, 54 minutes in port. Norfolk and Newport News, average of 12 ships, 34 hours, 42 minutes in port. Best ship, "Bay View," 18 hours, 42 minutes in port.

Discharging Ports—Boston, average of 21 ships, 116 hours, 30 minutes in port. Best ship, "Northern Queen," 49 hours, 54 minutes in port. Other discharge ports, average of 17 ships, 100 hours, 18 minutes in port. Best ship, "Bay State," at Providence, R. I., 42 hours, 6 minutes in port.

To Rush Supplies to Coal Mines

The extent of the difficulties being experienced by mine operators in securing supplies is being realized for the first time with the establishment of the Mine Supply and Equipment Section of the Production Bureau of the Fuel Administration. This section was recently created with Roy A. Rainey and David D. Bush in charge.

Information regarding inability to secure supplies already is reaching the bureau in large volume. The number of complaints is increasing daily, as it is becoming known more generally that the Fuel Administration is giving specific attention to this work, so that no production may be lost through delays in receiving supplies.

In addition to looking after priority matters, Messrs. Rainey and Bush are giving equal attention to matters of transportation. By their aid, supplies and equipment are moved through embargoes and otherwise expedited while in transit. Through their close coöperation with the War Industries Board and the Railroad Administration, they are able to eliminate much of the routine procedure which otherwise would be necessary.

The Mines Supply and Equipment Section can not undertake the tracing of freight. It will be incumbent upon the operator to ascertain where his shipment is being delayed and the nature of the cause for its delay.

Applications for Opening New Mines Now Being Considered

Consideration now is being given to the 700 pending applications for permission to open new coal mines. These applications are being handled by a committee headed by Frank G. Jones, of the Fuel Administration. Mr. Jones states that each application is receiving exhaustive consideration. The sole thought in their consideration, he points out, is to increase the production in the near future. Many applications can not be granted, Mr. Jones declares, because the same labor utilized in an operating mine would produce more coal than could be secured from a new mine. Another important question which has to be determined is whether the railroad serving the mine can handle a greater tonnage. These are the most important questions which must be settled after it has been ascertained with reasonable certainty that the mine to be opened is likely to become a producer. Only when convinced that a new operation surely will increase production of coal will permission be granted to open a new mine. To date, 215 bituminous applications and 9 anthracite applications have been approved.

No Pledge Required from Coal Industry

In the affidavit required for the securing of priority, reference is made to the pledge required by the priorities division of the War Industries Board. No such pledge is required from the coal industry, and no operator need hesitate in the execution of the affidavit on that ground.

Defines Meaning of Word "Replacement"

In paragraph (p) of the regulations governing priority in production, the use of the word "replacement" has given rise to misunderstanding. The paragraph reads as follows:

"(p) For the operation and maintenance (not new construction, expansion or replacement) of coke oven plants, mines, smelters, furnaces, rolling mills, wire drawing mills, pipe and tube mills, employed in the production of fuels, metals and metal products—A-6."

"Replacement" in the sense used in no way refers to repair parts. The priorities division has issued a formal ruling to that effect.

Irregular Car Supply No Excuse for Drop in Coal Production

Because car supply may be irregular and at times inadequate is not regarded at the Fuel Administration as a legitimate excuse for slowing down production. A few operators have replied to appeals to stimulate production by asking the value of trying to increase production when they are without cars so much of the time. One hundred per cent. Americans, keenly anxious to win the war, will find a way of meeting such a situation without allowing production to slow down in the least degree, says the Fuel Administration.

Anthracite Production Grows

Anthracite coal production for the week ended Aug. 24 showed an increase of 167,600 gross tons above the record for the preceding week. The total output, according to estimates of production furnished by the mines to the United States Fuel Administration, was 1,706,016 gross tons, compared with 1,538,416 gross tons for the week of Aug. 17, 1918, and 1,589,454 tons during the corresponding week of 1917. Of the total tonnage, 1,126,677 gross tons was prepared and pea sizes and 579,339 gross tons steam sizes.

The average production per working day for the week amounted to 284,336 gross tons, compared with 264,909 gross tons during the corresponding week of 1917. The estimated total production for the coal year beginning Apr. 1, to and including Aug. 24, is recorded as 33,384,380 gross tons, as compared with 32,689,219 for the same period during 1917, an estimated increase of 695,161 gross tons.

Great Fuel Saving in Connecticut

The administrative engineer of the Bureau of Conservation of the United States Fuel Administration in Connecticut reports that those industrial plants which have furnished answers to the fuel saving questionnaire are, in a majority of cases, making the changes suggested in the power-plant recommendations. Eighty plants, consuming for the year ending May 1, 1918, practically 337,000 tons of coal, as a result of the conservation changes suggested will save at least 15 per cent., or over 50,000 tons of coal, annually. This state had previously reported from similar sources an annual coal saving of approximately 31,000 tons.

The administrative engineers in Michigan, Kansas, Georgia, North and South Carolina and Florida have reported marked savings of coal in industrial plants as a result of the practical demonstrations of conservation.

Records Broken in Connellsville Region

Where the car supply has permitted, there has been marked stimulation of energy in bituminous coal-mining regions. A report recently received by James B. Neale, Director of Production of the United States Fuel Administration, is to the effect that for the week ending Aug. 23 the Connellsville field showed a production of 716,954 net tons, breaking all previous records for output for this district.

Coal Mines to Receive Necessary Power

Coal mines in the Pittsburgh district will not have to accept their pro rata share of the power curtailment. An order to this effect has been issued by the War Industries Board at the suggestion of the Fuel Administrator. Industry had expanded in the Pittsburgh district until the West Penn Power Co. was overloaded. This was followed by a breakdown in generating machinery. While coal mines are allowed their full quota of power from the West Penn Co., other war industries have had to curtail their outputs.

A questionnaire will be sent to coal operators within the next few days with the idea of ascertaining specific information with regard to those who derive their power from central electric power plants.

To Conserve Mine Material

Along with his efforts to secure priority for all needed supplies for coal mines, D. D. Bush, of the Fuel Administration, is taking steps looking to the closest conservation of mine materials. Information in his hands indicates that many wasteful practices are being permitted. In addition to stopping wastes, he is calling to the attention of mine operators the good results which will follow the substitution of the less needed materials for those needed in the war program. Priority will not be granted for steel ties, if wooden ties are obtainable. The use of substitutes for steel roofing is being urged. An asbestos composition weather boarding, which can be used in place of galvanized iron or other more needed material, is suitable for covering and other buildings, it is being pointed out. Mr. Bush also is asking the operators to clean up their scrap piles and salvage every available pound of metal obtained.

Brief Washington Notes

R. R. Horner, C. L. Colburn and W. J. German, of the Bureau of Mines staff, have been commissioned captains in the engineer corps. Mr. German already is in France.

M. D. Edmonds, one of the editors of the Philadelphia *Public Ledger*, has agreed to give three months of his time to the Fuel Administration to assist in the campaign looking to increased production.

Saving of coal, running as high as 15 per cent. of the state's consumption, is being reported from several states as a result of economies effected at power plants, it is reported by the Fuel Administration.

E. E. White, production manager for the New River and the Winding Gulf fields, reports to the Fuel Administration that farmers in the territory under his jurisdiction are spending their days in the production of foodstuffs and are working overtime at night in the mines.

Vague reports from Europe indicate that after the war the world will be informed of some extraordinary developments in the utilization of bituminous coal in certain countries, and that these developments will become of pressing importance to manufacturers in the United States.



High Lights in the Coal Situation as Seen by the Cartoonist

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The union leaders are not disposed to let the wage-scale question die. It will be recalled that the district presidents of the United Mine Workers of America met on Aug. 22 and requested the Fuel Administration's approval of the reopening of the wage question in all mining districts. The petition said: "Again and again we will come to you in behalf of the mine workers." The union in effect put itself in the position of the creditor in Hindustan who sits on the debtor's doorstep till payment of the sum demanded is fully made.

The Fuel Administration promptly replied that it could not allow an increased wage. Dr. Garfield said that he had informed President Wilson, when the last increase was granted, that there would be no more during the war, and in reply to what was said about bonuses he declared that he would correct the evil, where proved, by reducing the price limit. As a start he announced his intention of lowering the rate 20c. in the Ohio and Hocking fields and 5c. in all the other fields of Ohio except the Eighth district. He did this because it was from these points that he received most complaints about bonuses.

LABOR LEADERS EMPHASIZE HARD-COAL WAGE

At first the leaders appeared disposed to regard the decision as final, but pressure from the anthracite region developed, and on Aug. 26 they made representations to Dr. Garfield urging that the hard-coal mine workers deserved consideration even if the scale in the bituminous region was not to be revised. They pointed out that the rate of pay in the anthracite field was lower than in the bituminous region.

There is some humor in the situation. The miner in the bituminous region got an increase in his wage rate because he could not live with unsteady work—two or three days a week—if he were merely accorded a fair fate of pay. Now the anthracite mine worker edges up and says that the bituminous mine worker is getting more pay per day than has been granted to him. Soon we will hear from the bituminous mine worker. He will assure us that as his work is irregular his monthly wages are less than the monthly wages in the anthracite region and are therefore too low.

LABOR PROGRESSES BY DRIVING SALIENTS

In this way wages work their way upward. The man with the low daily rate believes he is wronged, and as soon as that is corrected the man with the lower monthly rate is heard from. So it goes. A similar seesaw is found in the payment according to the difficulties in coal extraction. For hard or thin coal a differential is demanded, because the miner cannot make a living in such a tough or tenuous measure. Then when he has obtained the increase demanded the man who has the softer, thicker coal cannot see why the operator with coal having such advantages cannot afford to pay him the higher rate per ton.

The mine workers in this way drive salients into the line only to consolidate them later into a continuous front. If, by its unrest, labor only fought a real enemy it might be congratulated. But when it bites, it bites itself, as spiders are said to sting themselves to death. The consumer must pay the increased cost of production, and, as workingmen are themselves consumers, in the long run the workingman must pay the increased wage demand.

The anthracite union leaders declare that the mine production will suffer if work in the mines is not made more profitable. If only the munitions industry would bear more kindly with irregular workers it would get quite a few of the less diligent who now stay at the mines largely because of the laxity of mining rules. Unfortunately, the steady work at higher pay is a great incentive to the steadiest of men, whom the coal companies are trying most earnestly to keep on their pay rolls.

The Federal and state employment bureaus are trying to save the day in the anthracite regions by hunting up the loafers and sending them to the mines for work. Men who have been getting their living by their wits or have depended on their relatives for their subsistence have been carefully listed, and they are being diligently rounded up by the authorities. The coal company officials have declared their intention to accept the men as fast as they are escorted to the mines. All who fail to turn up at work will be reported to the proper authorities.

"WORK OR FIGHT" BEGINS TO HAVE MEANING

The Philadelphia and Reading Coal and Iron Co. has appointed men to visit the homes of the company's employees whenever the men are idle. They will ascertain just why they fail to report at the mines. Where the only reason is dissipation that fact will be reported to the proper authority. It is said that if labor cannot be recruited around the hard-coal regions, men will be imported from such Western States as have no labor shortage at the present time.

At the Sandy Run colliery of M. S. Kemmerer & Co. 75 men struck on Aug. 22 to induce the company to pay their daily transportation charge between Freeland and the mine workings. Sandy Run is in the southern part of Luzerne County.

The day before the strike just mentioned saw the end of the strike at Williamstown, which, as will be recalled, is in the Lykens Valley region to the southwest. The mediators of the Bureau of Labor on Aug. 20 visited this mine with the intention of ending the strike. As stated last week, the drivers at this colliery were asking wages equal to those accorded to drivers in bituminous mines. The difference had closed down the mines for a full week. The compliance with the demands of the Bureau was immediate. The men went back to work on Aug. 21. Promise was made that a conference at Washington between the drivers' representatives and the operators would occur sometime during the present month.

MORE DISSATISFIED MINE DRIVERS STRIKE

The driver boys at the Pine Brook Colliery, Scranton, Penn., of the Scranton Coal Co., have also been on a strike for a higher wage of 15c. per hour, and this has interfered with the production of the miners of that colliery, reducing the output 3000 tons per day. The miners are able to work only about half time.

A native of Germany, Werner Nowak by name, who after nine years had reached the position of mine engineer and superintendent of the Edwina Coal Co., of Garret, Somerset County, Penn., was arrested recently and confined in the Allegheny County jail as a dangerous enemy alien. It is charged that he alleged that "America will be glad to kiss the Kaiser's toe before the war is over. I am a German and will never take out naturalization papers."

At turbulent Colliers, a mining town in Brooke County, and in the West Virginia Panhandle, 275 mine workers recently went on strike. They were employed at the Locust Grove mine of the West Virginia-Pittsburgh Coal Co. The miners were formerly paid by the car and not by weight, at least each car regardless of its actual loading was paid for as having a certain number of pounds

loaded on it. The men demanded that they be paid by the actual weight each car contained and that a check weighman be placed on the tipple, all of which was done. But the foreign miners did not like the weight that the weighman entered. A series of tests by inspectors, union men and miners did not satisfy them, and they went on strike despite the orders of the union officials, who denied the allegations of the miners and forbade the resort to a strike.

Frank Ledvinka, the president of the subdistrict, announced during the strike that "there is no strike at Colliers as far as the United Mine Workers of America are concerned. The men are out in direct violation of our agreement. The strike has no sanction from the United Mine Workers." James H. Dahm and William C. Liller, of the Bureau of Labor, brought the mine workers around when the efforts of the union failed. The mediators made the mine workers sign a resolution pledging loyalty to the United States in the war.

Earn Labor Day by Working Overtime

At the opposite end of the state is the mine of Monongah, operated by the Consolidation Coal Co. There the miners had a much different spirit from the men in the neighborhood of Colliers. They felt they wanted to keep Labor Day and also that they did not want to see the tonnage suffer, knowing how badly it is needed by the transports, battleships and cruisers on the ocean. They agreed to accept the company's offer and they worked overtime on Friday and Saturday of last week, thus making up their full quota.

A different story comes from the same region, the Fairmont district. After reciting what the Monongah men have done we hesitate to tell the other story because it can apply to only a few men. It appears that a small minority of the men in the Tygart's branch of the Monongahela River have found life somewhat unendurable since West Virginia became bone dry and they have been distilling a spiritous liquor out of raisins. It is known by the euphonious name of "Old Hen." In order to stop this misuse of so harmless a comestible, the Food Administrator has been asked by the Harrison County Council of Defense to regulate the sale of raisins and grapes in the Fairmont region and provide for their sale in small quantities and for strictly household use.

Mines Too Near Benighted Pennsylvania

But this trouble is a mere circumstance to that in Monongalia County, for while Harrison County is well south of Pennsylvania, being protected by the width of two bone-dry counties, Monongalia County is so handy that wetness and even a genuine "soak" is attainable at the expense of a few cents for railroad fare or a few dollars to a jitney driver. The men of Monongalia County, of which Morgantown is the principal city, make weekly and even daily trips across the line to purchase intoxicants at Point Marion.

The prosecuting attorney is securing data to see just what effect the shocking wetness of Pennsylvania is having upon the production of Monongalia County.

From these men who have more interest in Old Hen and John Barleycorn than in the waging of the war, it is a pleasure to turn; for there are a number of extremely patriotic people in West Virginia. The Italians at Hepzibah, just north of Clarksburg, the principal town in that Harrison County where Old Hen is wont to be brewed, have contributed money each month to enable W. R. Butts, the president of the local, to tour the country and address meetings urging the miners everywhere to produce maximum tonnages. W. R. Butts has a son in the service and he loses no opportunity to preach the gospel of large production.

The funeral question has come up for solution at Page, W. Va., a village on the Virginian R.R. in Fayette County. The miners have adopted a resolution pledging themselves to produce as much coal as possible and to encourage others to do the same. They further resolved not to let a fatal accident in one mine affect the operation of another mine, and ruled that the death of a miner or a member of a miner's family, not due to a mine accident, shall not affect the operation of the mine. However, funerals are to be attended, as before, by a burial committee.

A. W. Calloway's mines in the Upper Potomac region have done their level best since the United States went into the war. Nowhere perhaps is the spirit of service more hearty than at the mines of which he is (or perhaps rather was) general manager, for he is too busy now to give them much care. Sergeant Lee Manchel of the British Army has been speaking at Thomas, Coketon, Bencush, Davis, Pierce, Henry and Kempton. Democratic, earnest and patriotic, the purposeful spirit of Mr. Calloway has done wonders to make the workmen of the Davis Coal and Coke Co. put their every effort into a support of the war.

Shorter-Time Strike in New River District

Before leaving West Virginia, a strike has to be recorded, this one in Fayette County. Somehow it is impossible to get along without these troubles. This strike is at the Kilsyth mine of the McKell Coal and Coke Co. At last report it has lasted seven days and had withstood an attack from the Fuel Administration without settlement. Apparently the miners want to change or, would it be more correct to say, to shorten the hours of work?

In Illinois, the Tuxhorn Mine, at Springfield, is still working irregularly because of the factional fights between the black and white members of the local union. Some time ago the local had an election and a negro was elected. The whites complained that the election was conducted unfairly, and a clash between the miners resulted. For a while work at the mine was stopped, but District Attorney Knotts urged the men to return to work. Then there was another election, and a claim was made that this was illegal, and the men quit work again. Part of them have returned to the mines pending a settlement of the controversy, the dispute being referred to State President Farrington.

Frank Farrington, who was invited to form one of an American labor body to visit England, France and Italy, has declined, believing he can do greater good boosting the production of coal and maintaining goodwill at home than by going abroad, pleasant, as he says, the trip would be. Alexander Howat, the president of the Kansas mine workers, is in Europe as a representative of the Socialists who favor the continuance of the war. A service flag with several hundred stars representing the mine workers in the tenth subdistrict of Illinois who have joined the army and navy was dedicated at the Labor Day demonstration at Johnson City. The Divernon, Ill., local of the United Mine Workers has received a banner from the state organization in recognition of its having made the largest contribution to Red Cross work in Sangamon County. The union has 78 members in the army and navy.

We are informed that the operators in Illinois have been asked by the local administration to keep close track of all absentees from the mines and of the reasons for deficient tonnage from whatever source.

From Alabama comes the grateful news that the miners worked on Labor Day. For many months the Alabama men have been disposed to work irregularly, but at last they have arrived at such a state of patriotic resignation that they are willing to work even on that labor festival.

Wanted Four Bosses To Stay in the Union

On Aug. 16 the Dominion Coal Co., at Sydney, Nova Scotia, offered to pay a bonus to shippers and loaders. The announcement was made to the Amalgamated Mine Workers' Union. On Aug. 25 the mine workers of the Nova Scotia Steel and Coal Co. in Sydney mines went on strike to compel four deputies to retain their affiliation with the union. The employees demanded that the deputies be discharged. These deputies formerly occupied an unofficial position and when raised to official rank they decided that membership in the union would prevent a proper discharge of their duties. They accordingly resigned. The company, through the general superintendent, Thomas O. Brown, stated that it was opposed to deputies remaining in the

union ranks, but did not recommend these men to resign. In fact, Mr. Brown rather blamed them for doing so. In consequence of a conciliatory letter from the management the men returned to work.

At the Brule coal mines of the Canadian Northern, near Edmonton, Alta., a strike occurred on Aug. 21 as a protest against the alleged unsanitary condition of the washhouse. The chief mine inspector, who visited Brule, is said to have confirmed the charges of the miners.

Miners Deny That They Are to Blame

Six hundred miners of Belleville, Ill., recently protested by resolution against the charge that the miners are to blame for the present coal shortage which threatens to become acute during the coming winter. The action was based on the report of a committee which had made an investigation of the car supply, and which reported that ten mines were idle in the Belleville field as a result of car shortage. The closing of the mines laid 1500 miners idle and cut the output for that day 15,000 tons. The committee reported that in the past month there had been a loss in output of 100,000 tons in the Belleville field, due to car shortage. The resolution concluded: "We, the miners of Local No. 99, consisting of 600 members, go on record as resenting all accusations and insinuations that tend to reflect upon our loyalty and patriotism and we brand our accusers as the instruments of disruption whose aim it is to fan the flame of disloyalty and sow the seeds of dissatisfaction among our ranks. Those who make such charges are in short spreading German propaganda."

John F. McAuley of West Frankfort, Ill., has written to a St. Louis newspaper complaining that the men working at that place have been able to work only 27 days since May 1 and on these days the time of working has been restricted running only two, four or five hours. The last day they were able to work was July 26. The cause of the irregular work is the lack of sufficient electric power to operate machinery. Yet most of the mines could have been working, he says, with or without electricity. "We could shoot our coal from the solid," he adds, "as we did before machinery came into existence and as they are now doing in smaller mines where the companies have not the capital to install machinery. Our mines are equipped with steam hoists. Our fans are run by steam, and at some of the mines mules haul the coal cars. Those who have electric locomotives could have purchased mules and the coal would cost only a few cents more. No changes would be necessary in the haulage road or in any other part of the workings." He concludes by saying that with facts as they are the coal companies cannot avoid the charge that they are slackers.

Some Howat Understudies in Kansas

In August the placidity of the Kansas mining situation was broken and Kansas became Kansas once more. More matters were brought up for adjustment than in any similar period for several months. Fortunately, most of these matters have been settled amicably, and all of those which have been brought up in regular procedure are in process of adjustment.

The first strike for several weeks occurred Aug. 16 at No. 9 mine of the Girard Coal Co., near Pittsburg, Kan. This mine has a long record for strike activity. The demand was for the discharge of a mine foreman. After two days, the men went back to work under orders of the officials of the United Mine Workers; but one day they failed to work, the next they let the mules run away and work had to be suspended, and on the two following days the miners alleged that the air was insufferably bad, although inspectors had approved the condition of the mine.

The miners are back at the Howat tricks. It is wrong to strike and a violation of the contract, but you cannot work if there are no mules or if the air is bad, so if you can arrange the first and plead the second it is quite easy to shut down the mine. Alexander Howat is in Europe, but his understudies apparently are still in Kansas.

Wages Adjusted to Living Costs

A commission was appointed some time ago in Alberta, Canada, to ascertain every four months the change in the cost of living, the wage of the miner being made dependent on their findings. This commission is composed of W. F. McNeill, representing the coal operators; Frank Wheatley, representing the miners of District 18 of the United Mine Workers of America; and F. E. Harrison, representing the Department of Labor. It takes sworn statements regarding the cost of certain necessities and staple commodities and ascertains in like manner the increase in rentals, fuel and light. It has held sittings at Calgary, Lethbridge, Blairmore, Edmonton and Drumheller in Alberta, as well as at Fernie in British Columbia. Prices of commodities were also taken at Nordegg, Mountain Park, Canmore, Bankhead, Coleman, Hillcrest, Pocahontas and Brule. As the last increase was given Apr. 1, the new rate dates from Aug. 1. The schedule of costs is given below.

Commodity	Expenditure per Week Apr. 1	Aug. 1	Change, Per Cent.
Meats	$5.0241	$5.3458	+6.403
Produce	3.9040	3.8538	—1.286
Groceries	6.6560	7.4986	+12.659
Clothing, etc., boots and shoes	5.9579	6.3605	+6.7574
Rent	2.25	2.25	Unchanged
Light	0.50	0.50	Unchanged
Fuel	1.4520	1.4520	Unchanged
Coal bill	0.3208	0.3208	Unchanged
	$26.0648	$27.5813	+5.818

The weekly increase is $1.5165, and that is roughly 25c. per day. This was the increase awarded.

Relationship of Coal to Ships

The Fuel Administration must depend upon ships to supply two great and important sections of our country with coal to keep the people warm and to maintain the constantly increasing industrial activities necessary to the proper prosecution of the war. New England, crowded with great war plants which are turning out a multiplicity of material for our army and navy, must be supplied to a large extent by ocean shipments from southern tidewater ports. The overburdened railways cannot carry more than approximately one-third of New England's coal supply for the year. The remainder demands ships. Without them the wheels of New England's war industries must stop, and New England's people must suffer.

The great section of our country at the northern end of the Great Lakes must likewise depend upon shipping for its coal supply. A great fleet of coal-carrying vessels must be in constant service from the lower lake ports to the great coal docks of Lake Superior and Lake Michigan, throughout the open season, if the great Northwest is to secure its winter coal supply. The enormous tonnage of coal demanded by this section cannot be imposed upon the already overburdened railroads. It must move by water and it must move while the Great Lakes are open for navigation.

All of this means ships, and as the program of the Shipping Board continues to be worked out, ships, sufficient to carry the coal supply, become available. Today ships are available to move the constantly increasing coal production. But railroads, ships and coal must grow together in order that a coördinate machinery may be always at hand to keep the nation supplied with fuel.

Fuel is a vital factor in maintaining the nation's shipbuilding and in moving the nation's ships after they are built. As the armies of the United States in France are enlarged, which enlargement is steadily going on, the materials to support them will have to be increased correspondingly. This means more ships to move the commodities of warfare; it means more materials which have to be manufactured; it means increased railroad capacity to forward raw materials and finished products; it means more factories to produce more materials. All of which, depending on ships for the final transportation over three thousand miles of ocean, likewise means more coal.—*Dr. H. A. Garfield, United States Fuel Administrator.*

EDITORIALS

Education and Labor Unrest

MANAGEMENT has taken two views of education. One view is that the workman should know as little as possible and then he will calmly accept what is offered. He will not know any better. The plan really doesn't work so badly till a little light, by some chance, leaks in. Then the trouble begins—the workman, realizing his power but not knowing that it is hedged around by economic limitations, is inclined to demand all that he desires. He believes that the reason he has so little is because he never made a concerted demand before, and it takes some years of social unrest and discomfort to make him realize that a capacity for protest may exist without a power of fulfilling all that the protestant seeks. He has never thought seriously about social affairs, so he has no balance when he does begin to think.

The stablest condition is when every man is thinking and has been trained to think. When a man thoroughly understands how the people around him are thinking and acting, he is quite apt to appraise them and himself with something approaching justice. He is not likely to be hurried into courses which he and everyone else would have reason to regret.

Schools, therefore, that are true schools, that mirror the affairs of the world with a large degree of truth and completeness, are the safeguards of democracy. They assure us of social freedom, but they also in a very real sense give us every protection against social license, and they make it possible for everyone to exercise all the duties of citizenship, which, we take it, is as much to work and produce as to nominate candidates and vote.

Few necessities around the mines are so important as schools, and yet in most cases the payment of teachers is far too low. The teachers in the schools are too often chosen from the families of school directors. As a result they have not had the advantage of an outside environment. They do not mirror the outside world to the scholar, but rather show him the community which the scholar already knows. They are therefore too often narrow in their views and to that narrowness they frequently add the grossest incompetence.

Nothing matters more than the school. It should be taught by bright and intelligent instructors. It should put the seed of thought into the minds of future workers and give them a power for intelligent action in all their future work. There is a great advantage in having a workman who can understand and expand an idea, who can fit in with a new method, who can use a new machine or make a record of performance An educated man is interested in new development and new plans, but an unschooled man who has never been taught that there is anything in life but eating and working has no conception outside of these things. The school should give him new aims and purposes and raise the scholar from the rut of circumstance onto a highway of progress.

But especially are schools needed for foreigners. We complain about their stupidity and disobedience to orders, but we cannot hope that they will understand what we say or rightly evaluate its importance till they can speak our language with facility. They will never enter American life till they learn the native tongue. Every mining village should have its English night school taught by the most competent teacher available, with dumb show, illustration, and a clear enunciation of the sentences taught.

These matters cannot be left to chance. Some employee of the company in every mining town should be elected to the school board and daily agitate for improved conditions—adequate schoolhouses, suitable curricula and competent teachers. An operator is just as much responsible for seeing that he has the right personnel at the mine as that he has the right water in his boilers or the right oil in his cylinders. He cannot get the right kind of employees unless he interests himself in the schools where the coming men are trained. If he cannot look so far, he can at least see that a good school will attract to his mine those persons who have sufficient intelligence to seek a good education for their children. Such persons have doubtless endeavored to secure what education they could for themselves.

Do Mine Workers Drink Too Much?

A QUESTION which has aroused heart burnings throughout the mining regions is whether the mine workers imbibe too freely, and rightly or wrongly every mine worker in the industry immediately and uncompromisingly denies that the mine worker is more intemperate than any one else. After all, is the necessity for an answer imperative? If there is any intemperance, large or small, the result will be decreased production. A little, therefore, is too much. We must rid ourselves of that little by every means in our power, and to aid us in ridding ourselves of it we must appeal to the union leaders for their assistance.

It is no empty flattery to congratulate the mine worker on the sobriety of the men he puts in charge of the union. If the mine workers as a whole were as temperate as their district presidents, vice presidents, secretaries and members of their international board, the question of temperance would never have arisen.

In fact, when the National Coal Association declared for temperance the temperate men in whose hands the mine workers have placed their affairs did nothing to antagonize the movement. It appeared to appeal to them. Some said something that sounded

so like "Aye, Aye," that they were recorded as being entirely in favor of the proposition.

The nonbibulous majority of the mine workers, busy at the mine, engrossed in their work, which is also the work of the nation, had nothing whatever to say. The bibulous, however, always the loudest of talkers, made such a stir that the union leaders were practically obliged to take up the cudgels for the "workingman's beer," whether they so desired or not, and now most of them are lined up on the side which they do not favor. It remains now for the patriot mine worker to assure the union leaders of the strength of the temperate men and to convince them that whether drunkards be few or many, such men are not willing to do their duty as citizens and so need to be restrained by the temperate majority.

The mine workers who believe that the necessities of the war demand national sobriety must not keep their opinion to themselves. It is a belief to be emphasized as strongly as the belief in the importance of buying Liberty Bonds. If men who fail to subscribe to a national loan may be ducked in a pond or ostracized from society, the same may be done to the miner who fails to dig his quota and regards his daily turn as less important than his daily tipple.

Protect Equipment from Lightning

ONE source of considerable needless trouble and loss at coal-mining plants is the injury and burning out of various electrical equipment by lightning. This source of difficulty is most acute and annoying in the spring and early summer. Seldom in the latitude of central and northern United States do violent thunder-storms occur before the vernal equinox, neither are they numerous after the autumnal equinox.

As a general rule, atmospheric electrical disturbances are most numerous between the vernal equinox and the summer solstice, or roughly between April 1 and July 1. On the other hand, such phenomena seldom occur between about December 1 and March 1. The late summer and early fall are by no means devoid of electrical storms, but these storms are as a rule neither as numerous nor as violent electrically as those of the spring and early summer.

The transmission lines from a power plant form excellent conductors for the induction of electrical potential from lightning. As is well known, the phenomenon of lightning is merely the discharge of electric energy of small amperage but extremely high potential from one object or region to another. Thus lightning may flash from one region or locality in the air to another, apparently from cloud to cloud or from a cloud to the earth.

When the difference in potential between two localities is thus relieved by a discharge of lightning, any and probably all conductors in the vicinity are subject to the flow of an induced current. Almost every one has at some time or other received a more or less severe shock from some ordinarily harmless conductor from an induced current of this kind, and other things being equal the longer the conductor the more severe the shock. Thus a stove, particularly if it have a long stovepipe, a line shaft, a wire fence, the eave spouting of a house or a telephone are all well known sources of such shocks. Many a farmer has lost cattle or horses through their being in close proximity to or in contact with a wire fence during a thunder shower.

Various pieces of electrical apparatus such as generators and rotary converters are probably quite as sensitive to such induced currents as are animals or human beings. Suitable protective devices properly installed will protect such equipment from harm, but many operators either do not provide lightning arresters at all, or if they do provide them they permit their installation in so careless a manner as to defeat the purpose for which the arrester is provided.

A large and well known manufacturer of electrical equipment recently wrote *Coal Age* upon this subject in part as follows:

> We are being caused a great deal of extra work, most of it entirely unnecessary, due to the failure of users of electrical machinery to provide proper lightning protection; or, having provided same, to have it properly installed and kept in good condition. During the early spring we sent out a circular letter to a vast number of our customers urging them to install ample lightning protection so that we would not be called upon at all hours of the day and night to perform all kinds of repair work in order to keep up coal production, which was being retarded because of lightning damage to motor-generator sets and direct-current engine-generator sets.
>
> We have no interest whatever in the sale of protective apparatus, but do have use for every minute of our workmen's time without having any of it spent on repair work which could and should be avoided by the proper installation of lightning protection. It is, in fact, a conservation of resources which we wish to secure.

It would appear that no intelligent coal operator would need to be urged to protect his electrical apparatus, any more than he would need to be urged to insure his boilers or place safety valves upon them. Such neglect may or may not result disastrously to the unprotected equipment. The chance for a burnout is present with every thunder shower; the means for adequate protection is comparatively inexpensive, while a mishap of this kind means much more than the cost of repairs. The logical course to pursue would thus appear to be clear and plain. Why not follow it?

Coal Mining and Three-Inch Shells

IT IS sometimes hard to bring people to a realization of the duty which they owe to one another, and to the nation in particular. A case in point is the apathy with which the coal miner has responded to the many efforts made to speed him up, by the urgent pleas on behalf of necessity and patriotism for more regular labor and greater efficiency during working hours. Nothing, perhaps, will aid more in bringing the miner to a full conception of his manifest duty toward the country, at the present time, than the translation of his endeavors into terms of ammunition, ships and supplies. For example, the statement that four shovelfuls of coal mean a three-inch shell for use against the Hun is one that every miner can comprehend—in fact, he can almost visualize shells as he blasts and loads his coal. When all the miners in America begin to dig coal on the basis of so many shells for every mine car full of coal, it won't be long before the Kaiser begins to sue for peace.

He Is Writing To You!



YOUR BOY IS WRITING TO YOU ABOUT HIS GLORIOUS WORK IN THE TRENCHES-FOR YOU. CAN YOU WRITE TO HIM ABOUT THE PATIENT WORK YOU ARE DOING IN THE MINE-FOR HIM; THE TONS OF CLEAN COAL YOU ARE MINING; THE BONDS YOUR WORK IS BUYING; THE SAVING STAMPS THE CHILDREN ARE SAVING AND THE FLAG YOU SALUTE AS YOU GO TO YOUR WORK? BE AS BIG A PATRIOT AS YOUR BOY!

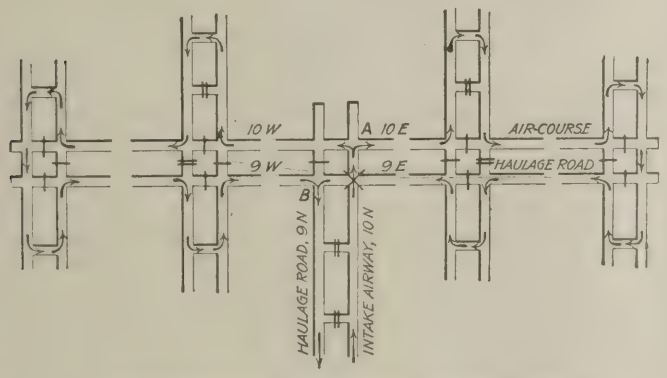
COAL AGE

DISCUSSION BY READERS

Use and Location of Booster Fans

Letter No. 1—Kindly permit me to refer to the question asked by "Mine Superintendent," *Coal Age*, Aug. 8, p. 287, regarding the placing of a booster fan to assist the circulation of air, which has become inadequate, owing to the increased development of the mine. While the answer given to this question appears to be correct, there is room for a little discussion, and I want to ask for a further explanation in regard to the suggested location of the booster "on the return end of the air circulating in that section."

From the description given and the Figs. Nos. 1 and 2, showing the present and the proposed circulations of air, I understand that the prime mover or ventilator is located at the surface and is unable to furnish sufficient air under existing conditions. Now, referring to the proposed circulation, as shown in the second figure, which is repeated here, the main air current is split at



SHOWING THE PROPOSED CIRCULATION

A, being divided equally between the two sections of the mine, and the two currents are again united when they reach the main return airway and haulage road at *B*.

While agreeing with the statement made in the editorial reply and knowing from experience that results will be more satisfactory when a booster is placed at the return end of the air, it is not clear to me how that can be done in the present case, where there are two separate air-courses to be considered.

I assume that it would not be practicable to place the booster on the main return air-course, which is the haulage road in this case. It is possible, however, that the intention is to use two boosters, one in each split. Otherwise, I do not see how it is possible to avoid locating the booster fan in this case on the main intake airway, outby from the split *A*, so as not to interfere with haulage operations.

Permit me to say that my experience is that boosters are a great help located at any point in the circuit. At the same time, I admit that a booster fan located on the intake will increase the leakage through faulty stoppings; but, is it not true that the depression caused by a booster located in the main return airway will produce the same result? I should be glad to be enlightened further and hope to see this question thoroughly discussed, as it is a practical one in the ventilation of mines.

WILLIAM LAWTON.

Seattle, Wash.

This correspondent has offered some very pertinent suggestions in drawing attention to the fact that the wording in the editorial reply to the question, on page 287, inadvertently conveyed the wrong impression and did not express the meaning intended in regard to the proper location of the booster.

The words "on the return end of the air circulating in that section," should have read, *at the inby end of the air current in that section.* It is true that whether the booster is located on the intake or the return airway, in any section of the mine where the circulation is deficient at the face, its action would have the same effect to increase the leakage in poorly built stoppings, since this leakage is determined by the difference of pressure between the intake and return airways. The action of a booster located at the inby end of the air, in any section, however, is to cause a *depression* on the intake and a *compression* on the return airway, in that section, which will result in decreasing the leakage through stoppings. We shall be glad to have this question fully discussed.

Dealing with Slackers in Mines

Letter No. 2—There are many ways in which the half-hearted citizen can dodge his obligations to the Government, but all who do so belong to the same class and can justly be called "slackers." It would seem that fitting punishment, in one form or another, should be dealt to all whose waning patriotism would cause them to be numbered in this class.

In coal mining, the man who loads dirty coal because of neglect, indifference or greed of gain is as much a slacker as the miner who absents himself from his place without excuse, or who fails to put forth his best efforts to increase his daily tonnage. There is no room in the mines, today, for the idler or the careless or indifferent worker.

THE UNSCRUPULOUS SLACKER

The sale of Liberty Bonds and War-Savings Stamps, by the Government, however, has developed another form of slacker, who fills a unique and unscrupulous rôle. This man willingly pledges himself to buy War-Savings Stamps, or signs an application for one or more bonds. In the solicitation for the purchase of bonds he is the acme of generosity. Realizing that the man who can give no reasonable excuse for not buying a bond, either for cash or on the installment plan, will win for himself the name of "slacker," he does not refuse to

pledge himself to purchase untold amounts of stamps and bonds, taking care to parry the question of payment, which down in his heart he has not considered seriously and even has an ill-defined intention of not meeting when due.

Behind this thin badge of dishonor this type of slacker has inspired the faith, praise and admiration of patriotic workers who have devoted much of their time to the solicitation of subscriptions to bonds. Perhaps he can best be compared with the perjurer who, by his false testimony, is the cankerworm to justice in the courts. It is fortunate, at this stage of the war, there are comparatively few of this kind.

Calls for Prompt and Decided Action

In respect to dealing with the slacker, let me say that his little game of evading directly or indirectly the obligations that the war imposes on every citizen should be nipped in the bud, lest the slacker become bolder and his number increase. In my opinion the Government should arouse itself to the full appreciation of the importance of dealing firmly with these men wherever they may be found.

The slacker who fails to meet his obligations in respect to the purchase of War-Savings Stamps and Liberty Bonds should be followed up by an unrelenting and uncompromising collector authorized by the Government to exact the payment pledged. The mine official who canvassed the employees of his company, in the drive, should not cease his service to Uncle Sam until each man has redeemed his pledge. He should keep a delinquent in mind of his deferred payments. It might be better to exact an initial payment of every would-be purchaser of a bond, who would then feel a deeper interest to complete his payments and secure the bond in which he has invested. W. H. Noone.

Thomas, W. Va.

Hindrances to Coal Production

Letter No. 1—I have followed with interest the discussion of the many questions bearing on the production of coal, which is a most vital subject at the present time. Attention has been drawn, by the different writers, to various things that interfere with the regular working of the mines. In the same connection, I want to set forth a few of the hindrances that have impressed themselves on my mind as matters that should be regulated.

In the first place, I want to say that, in my opinion, there is no shortage of mine labor, today, that would warrant the assumption that the mines cannot produce the coal the country demands. I believe a more serious hindrance to coal production is the lack of railroad cars at the mines.

Car supply is a question that the Government must solve if there is to be no coal shortage next winter. Adequate coal production means the prompt loading of cars at the mines. Further, to enable each mine to operate to its full capacity, the cars when loaded must be shipped to market, unloaded, and returned promptly to the mines.

Another hindrance to the work of the miners, which is of quite a different nature, is that presented by the various show attractions, which draw numbers of good miners from their work in the mine. Only the past week a carnival was held in one of the largest towns in this section, with the result that not less than 300 men absented themselves from the mines where they should have been loading 8 and 10 tons of coal apiece each day.

The previous week the mines ran full time and made a record output, while this week all have been forced to run shorthanded, which has greatly reduced the tonnage in this section. The comparison shows the evil effect of permitting frequent shows and other attractions that interfere with the regular working of mines. It would seem to be a matter that should receive the serious consideration of the Fuel Administration.

Referring to the draft and the suggested claims of exemption for coal miners, let me say that I am in the draft myself and expect to be called soon; but another good fellow, perhaps one who is unfit for military service, will take my place in the mine, where he will serve his country as well and as truly as at the front. The call to the colors must consider no one *class* of men as being exempt because they are in that class. The duty of every living soul is to win the war and to serve in the place for which each is best fitted.

Reasons Why There Should Be No Class Exemption for Coal Miners

While exemption for coal miners would affect me, I am not in favor of an order exempting miners as a class. My reason is that there are many men now in the mines who are wholly unfit for and unacquainted with mining work. Under a ruling exempting all coal miners, others would flock to the mines to secure the desired exemption from the draft law.

Let me urge, here, that the administration of the draft should be such that every man will be compelled to answer the call and fill the place where he can best serve. There are men now in the deferred class as being able miners and who, yet, do not work regularly as they should. As a coal miner, I favor any ruling that will assist the work in the mines; but, first of all, I am an American.

Before closing, allow me to mention one other matter observed in this section of our state, which it is to be hoped is not to be found in other states. Here, it has always been the custom for a county assessor to list all the property in the county. This year, the authorities have seen fit, in the interest of economy (?), to cut out the expense of employing an assessor. Every man owning property is compelled to go personally to the county seat and arrange for the assessment of his property and his personal taxes.

The effect of this ruling on the coal production of the county is evident and by no means inconsiderable. A man must absent himself from the mine for a day and possibly two days, in order to go to the county seat and arrange his matters. Others, who are only too willing to avail themselves of any excuse, absent themselves from the mine where they should be loading coal and, perhaps, take much more time to transact their business than would be required if they were more industrious.

The question arises, and may well be asked, whether there is any economy to the country at large, in this

saving to the county the expense of employing an assessor. Again, is the state performing its whole duty to the country by adopting such a system? This, also, is a matter that should receive the attention of the Fuel Administration. I believe the Government should appoint inspectors to investigate not only cases where miners absent themselves from the mines, but such matters as interfere with the working of every mine to its full capacity. OSTEL BULLOCK.

Cleaton, Ky.

The Miner and His Pleasure

Letter No. 2—I have read with deep interest the many letters regarding the miner's relation to the war, particularly the letter of Thomas Hogarth, *Coal Age*, Aug. 15, p. 329, in which he states that the miner "needs all the pleasure he can get." Like Mr. Hogarth, I feel that there is no class of industrial workers who are more entitled to the pleasures of life than the coal miner, so long as he does not allow them to hinder him from attending to his daily work, which is so important at the present time.

It is a pleasure to observe that many mine owners and operators enjoy nothing more than to see their workmen partaking of the same pleasures that are theirs. It is true that, in some districts, there are those who regard the miner and his family as requiring no time for recreation and pleasure. However, these are the exception, rather than the rule. In my opinion, there is nothing more essential to the successful operation of a mine than that the workers shall be given the opportunity to enjoy the pleasures of life. I believe the day has passed when men can be forced to work for a mere living.

It was not long ago that I heard a general manager, in addressing his men at one of their meetings, say that he was proud to see so many of his miners holding $500 Liberty Bonds, and he only wished that he knew how to enable them to buy many more. Expressions of that kind are often the means of tiding a company over a time when labor is scarce. When a company values a man for what he is worth, there is always someone ready to fill the vacancies as they occur, and the ranks of that company are seldom depleted.

COMPARING CONDITIONS IN TWO MINING CAMPS

Compare, for a moment, the conditions in two mining camps, in one of which many of the miners have been able to save a few hundred dollars with which they have bought their homes, and are still laying by something in store for the future. Compare, I say, this condition with that in a camp where hard working miners have been able to lay nothing by, not even enough to educate their children, to say nothing of buying a home.

In the former instance, the children as they grow up stay at home, and the reputation of the place is such as to draw the best class of miners to its vicinity. In the second instance, few of the children, as they become grown, care to remain where their fathers have done so miserably. The place runs down rapidly, and the mines have difficulty in holding their men or securing others to fill the places made vacant by their leaving.

The day is fast passing, I am glad to say, when the mining classes are regarded solely as a means of contributing to the wealth of their employers, and are restricted in their rights to the full enjoyment of life. The cases are rare, now, where the miner is compelled to trade at the company store and to live in a company house, in order to secure the favor of petty bosses and obtain a good working place in the mine and other privileges that it is in the power of the boss to grant.

Welfare work among miners has emphasized the fact that they can and do appreciate the efforts of honest officials in their behalf. Where the miner can take his family out to see some enjoyment after his day's work is completed, he is more satisfied and will do better work the following day for his season of recreation. On the other hand, where no such privileges are at hand who can blame the miner for becoming discouraged, and when in that frame of mind the saloon often proves too strong a temptation for him. The result is that he goes home late and the morning finds him unfitted for his work in the mine.

While these considerations appear to many to be small and of minor importance, they are great and, perhaps, the *greatest* factors in the successful operation of the mines and increasing the production of coal to meet the present demand. Let me say that it is up to all of us, who are a part of the official family of the company who employs us, to make every effort to increase the pleasures and enjoyment of the miner. Let us regard him as on an equality with that of any other industrial worker. By this means will the production of the mine be increased and the living conditions of mine workers be made better. JOSEPH R. THOMAS.

Plymouth, Penn.

Intemperance Hampers Production

Letter No. 1—Referring to the Foreword in *Coal Age*, Aug. 15, p. 297, by R. Dawson Hall, on the subject of intemperance in its relation to the production of coal, permit me to say that while the main issue presented by Mr. Hall cannot be refuted—namely, that many of the miners in the anthracite region are prone to go on a more or less prolonged spree just after every payday—it occurs to me that the greatest harm to the anthracite industry is the steady consumption of poor whiskey and beer, by the *majority*, I might say, of the miners in that region.

While in the vicinity of Scranton, about two weeks ago, I observed some 200 or 300 able-bodied men whose appearance proved that they worked in the mine and who were loitering on the sidewalks, in the vicinity of a number of saloons. Within these saloons and hidden from the observer were, undoubtedly, an equal number of men who should have been at work in the mine.

The particular day in question was not an off day, but one when the mines should have been running at their full capacity if it had not been for the number of men out of their places. The car supply, at the time, was all that could be desired. I cannot say, now, as my recollection does not serve me, whether a payday had just occurred or not; but I know from my observations that these men were the victims of the lure of the occasional drink in the saloon, probably six or eight drinks a day.

While it may prove a difficult proposition to enforce absolute prohibition in the anthracite region, I certainly

agree with Mr. Hall's suggestion, in reference to restricting the hours in which the saloons can ply their deadly trade. It is my opinion that this should be done at the earliest possible moment and that mine operators should get squarely behind their state governments or their county judges and insist, in the cause of humanity, that the hours in which saloons may remain open be greatly reduced.

On the occasion of numerous other trips into the anthracite region, I have observed the same conditions and believe that they must prevail constantly. Medical authorities agree that alcoholic drinks of any kind, whether they contain a large or a small percentage of alcohol, if consumed freely will do more harm to a man than will an occasional debauch.

The result is that the efficiency of the miners, wherever liquor in any form is sold, is severely handicapped. Intemperance on the part of coal miners helps to prolong the period of German atrocities, and every miner, mine official, banker, merchant, clerk and farmer should coöperate to the fullest extent of his ability in getting the Huns and bringing this terrible war to a close.

Philadelphia, Penn. OBSERVER.

The Wagon Mine a Menace

Letter No. 2—Kindly permit me to refer to the letter of H. E. Gray, *Coal Age*, Aug. 8, p. 282, and to say that my experience convinces me that wagon mines are not the menace to the coal industry that Mr. Gray claims. In his letter he likens the enormous growth of smaller mines to that of a "gigantic cancer that is slowly but surely sapping the vitality of the industry." On the contrary, to my mind the growth of the smaller mines is a blessing and should be encouraged, particularly at the present time.

Notwithstanding the fact that every coal miner and operator is being urged, today, to do his utmost to increase the output of coal, and every paper and magazine voices the same sentiment to avoid the shortage in the fuel supply next winter, Mr. Gray would have us close down the small mines. Not only does he charge them with being unsafe and unsanitary, but seems to regard them as the source of the impure coal that has been shipped to market as fuel. Let me remind him, here, that every ton of coal produced, whether from a large or a small mine helps to win the war.

Charged with Shipping Impure Coal and Lack of Sanitation

In regard to the shipment of impure coal, the charge will apply equally to both classes of mines. While it is true that there have been *hundreds* of tons of impure coal dumped on the market, the output of small mines, there have been *thousands* of the same kind of material loaded for market by the large mines. My observation leads me to state that the purity of the output of wagon mines, or "country banks," as they are often called, compares favorably with that of large operations. In the small mine the owner visits every man's working place, each day, and pays particular attention to the loading of clean coal. The miner who is caught loading dirt with his coal is first reprimanded and, if the offense is repeated, he is docked, which is the same penalty as is applied at the larger mines.

Allowing that the equipment for screening and preparing the various sizes of coal is not as complete in the small as in the larger mines, let me ask if the proper sizing of the coal necessarily means cleaner coal. At the country bank the coal coming from the mine is dumped on a platform. Most of this coal is sold for domestic use. The teamster pays close attention to what he loads into his wagon, knowing well that if he takes a load of dirty coal to a customer he will stand a good chance of losing him. This does not apply with the same force to the coal loaded at the larger mines.

In respect to safety and sanitation, I believe that small mines compare favorably with large ones. In the former the ventilation does not have as far to travel and there is generally better air at the working face than in many larger mines where the air current is heavily ladened with smoke and gases. If a person travels a few of the air-courses in many of these larger mines he will be convinced that there is ample room for improvement, both in respect to safety and sanitation.

Again, in the small mine, the miner has less difficulty in securing promptly his needed supplies, which are often brought to him by the next trip into the mine, while in large mines the miner must often wait a day or more and work under bad top until he gets the needed timber to make his place safe. Speaking of safety, it is a fact that miners often leave the larger operations for work in a smaller mine, for reasons of safety only. Reference to the coal report of Illinois will prove that a much larger percentage of accidents happen in the larger than in the smaller mines in that state.

Government Inspection of Small Mines in Illinois

In speaking of Government regulations, Mr. Gray seems to imply that the mining law is not enforced in respect to small mines, which is not the case in Illinois, where the state mine inspectors see that the provisions of the mining law, in respect to ventilation, drainage, shotfiring, etc., are obeyed in large and small mines alike. Old miners often prefer to work in small mines because they are afraid to travel the haulage road in the larger mines, where they must continually seek safety in refuge holes to avoid motor trips.

Finally, another reason for encouraging the smaller mines is that they enable the poor to get coal, when they would be unable to pay the price asked by the middleman or dealer, who must have his profit for handling the product. This is not to say, however, that small operators are cutting the price, which is the same at the small mines as at the large mines; but the output of the former is sold direct to the consumer and escapes the profit made by the middleman.

In closing, let me say that many of our present-day operators would still be digging coal had it not been for the start they got in operating a small mine. I know several such personally who are today among our largest operators. Why then rob the man of limited means of this opportunity to rise and improve his condition?

Moreover, the closing of the small mines would result in hundreds of acres of coal being lost, because the property would not warrant installing a large equipment, or the coal is thin and may lie too far from the railroad to permit of its coming into successful competition with other coal in the same market.

West Frankfort, Ill. GEORGE BOWKER.

INQUIRIES OF GENERAL INTEREST

Improved Coal Equipment

As a student of the University of Southern California, I have been an interested reader of *Coal Age*, which has been helpful to me in my investigation of coal-mining methods and equipment in the United States. At present, I am seeking information in regard to the most improved methods of burning coal, in the production of *power*, and the most up-to-date equipment for loading coal, both in the mine and for shipment. I understand there have been rapid strides made recently in these respects. Unfortunately, I have found there is little information generally available along the lines, which leads me to ask *Coal Age* and its readers the following questions: 1. What are the names of engines that use a powdered coal? 2. What is the most up-to-date coal-loading machine used in this country? 3. Kindly explain the utility of forwarding coal by compressed air.

Los Angeles, Calif. G. HOSOVO.

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1. This question may refer to an internal-combustion engine, using gas or some form of liquid fuel. The answer to that question is: No attempt to utilize powdered coal as fuel, in an internal-combustion engine, has proved successful, owing to the difficulty of eliminating the ash resulting from the combustion of this fuel in the cylinder.

On the other hand, the question may refer to the railroads that have successfully used powdered coal as fuel for their locomotives. In answer to that question, we would refer the correspondent to the Report of the Committee on Pulverized Coal, as published in the proceedings of the Chicago meeting (1917) of the International Railway Fuel Association. The report of the committee gives a brief résumé of the fuel situation at that time (May, 1917), and emphasizes the growing need of fuel economy. It states that "the burning of pulverized fuel in suspension in the locomotive firebox has passed beyond the experimental stage."

The principal railroads using this fuel in one or more of their locomotives are the following: Delaware & Hudson; New York Central; Chicago & Northwestern; Missouri, Kansas & Texas; and Atchison, Topeka & Santa Fé. This report of the committee to which we have referred was widely discussed by the railroad officials present, and their comments and suggestions afford much valuable information on the subject.

2. A machine has recently been designed by the Jeffrey Manufacturing Co., Columbus, Ohio, for loading coal at the working face in a mine. This machine, which was described in *Coal Age*, July 20, p. 104, is both light and portable and its use has demonstrated the fact that two men can load from 50 to 80 tons of coal in an eight-hour shift, depending on the conditions existing in the mine. In seams where this device can be employed, it will undoubtedly largely increase the tonnage per man. As far as our knowledge goes, this is the only machine designed for this purpose.

In regard to loading coal on the surface, whether in bins, railroad flats, box cars or ships, there are numerous types and kinds of machines employed and it would be difficult to say which of them is the most up-to-date. A loading machine must be always adapted to the particular conditions under which it is required to operate, in order to secure the best results and the highest efficiency. A machine that would give excellent results in the handling and loading of anthracite would, perhaps, prove an absolute failure when employed to load soft coal. It is necessary, therefore, to study carefully both the nature of the material to be loaded and other conditions that must be met.

3. It is difficult to understand to what particular operation in the coal industry this question refers. About 1910 the United States Coal and Coke Co. experimented at one of their mines, Gary, W. Va., with a scheme for transporting coal from the working face to the tipple by what might be styled a "compressed-air system," but which was, in fact, an exhaust or vacuum system.

The scheme contemplated consisted of a pipe line extending from a hopper at the working face, through the mine entries to the surface, where a Root blower was located whose operation produced a strong depression or suction in the pipe line. The coal was mined and broken into fragments by a machine at the face and delivered to the hopper. The suction produced by the blower was such as to draw large lumps of coal through the pipe to the suction head, where the action of gravity separated it from the air and it fell into the chute.

We understand that, later, the same company drove a length of entry that was to be especially adapted to the scheme of transporting coal in this manner to the surface. But thus far there has been no application of the method in practice.

Calculation of Sines, Cosines, Etc.

We are often asked questions, in examination, that require the use of sines, cosines, and tangents. In many cases, the values of these functions are not given, and the candidates are not permitted to bring books or tables to the examination. Can you give me a formula for calculating the natural sine, cosine or tangent, for any given angle? Those whom I have asked seem to be unable to give me a satisfactory answer.

Divernon, Ill. STUDENT.

This question was asked some time since and was answered quite fully in *Coal Age*, Vol. 5, p. 102.

Whenever the answer to a question requires the use of a sine, cosine or tangent, the examining board should either give the required value, or permit candidates to use tables and textbooks. *Coal Age* has always urged that the examination is more practical when candidates have the same access to books in a technical session as they have in practice.

EXAMINATION QUESTIONS

Miscellaneous Questions

(Answered by Request)

Ques.—A gangway is being driven in the Skidmore vein, which has a dividing slate 2 ft. thick; the bottom bench of coal is 3 ft. thick and the top coal 1 ft. thick. How would you proceed with the work in regard to safety? The pitch of the vein is 25 deg.

Ans.—Experience in the mining of this coal and a knowledge of the conditions must alone dictate the safest method to pursue. The general plan to be advised, however, would be to mine a safe distance in the bottom bench of coal which is 3 ft. in thickness. Before doing this, it may be necessary to sprag the dividing slate to give it the needed support while dropping the lower bench of coal. When this coal has been removed, the dividing slate can be dropped by wedging or blasting, after which the upper bench of coal is taken down.

A better knowledge of the character of the underlying and overlying strata will determine whether it will be better to lift bottom on the high side of the gangway or to break the roof on the low side.

Ques.—What safety appliances should be kept and maintained at the surface landings where miners are being lowered into and hoisted out of a mine?

Ans.—Such landing should be protected by safety gates operated by the movement of the cage in the shaft and which are always closed except when the cage is at the landing. The landings should also be protected by safety blocks and derailing switches to prevent cars from running into the shaft. The cage, in addition to automatic safety catches and devices for the prevention of overwinding, should have a hood.

Ques.—In case you should find the water very low in a boiler, what would you do?

Ans.—When the water level in a boiler has fallen below the lower gage-cock, there would be extreme danger in feeding more water into a boiler. At once, throw open the furnace doors and bank the fire, using for that purpose ashes or moist earth, if immediately available. Otherwise, cover the surface of the fire with fresh coal, taking care not to disturb the bed of coals, which would increase the heat of the fire. Avoid disturbing the safety valve, as the sudden escape of steam from the boiler might cause the water remaining in the boiler to vaporize suddenly. Having banked the fire, allow the pressure to drop and the boiler to cool before making any attempt to fill the boiler.

Ques.—Find the piston area of an engine delivering 50 theoretical horsepower, when the stroke is 3 ft. long, the mean effective pressure 30 lb. per sq. in., when the engine is making 30 strokes per minute.

Ans.—50 theoretical horsepower is equivalent to $50 \times 33{,}000 = 1{,}650{,}000$ ft.-lb. per min. Since the length of stroke is 3 ft., and the engine is making 20 strokes per min., the piston speed is $3 \times 20 = 60$ ft. per min.; and the total pressure on the piston, in that case, is $1{,}650{,}000 \div 60 = 27{,}500$ lb. Again, the mean effective pressure in the cylinder being 30 lb. per sq.in., the area of the piston is $27{,}500 \div 30 = 916\frac{2}{3}$ sq.in.

Ques.—Explain fully the essential points in building and erecting mine doors.

Ans.—A mine door should be hung so as to close with the air current and should be given a slight fall so that it will not stand open unless it is propped back or held open. The door should be made of double boards cut on the bias and nailed together firmly to resist sagging. It should be hung in a substantial frame that will not be readily displaced by any ordinary jar. Canvas flaps should be nailed to the edges of the door in such a way as to prevent the leakage of air. Mine doors should never be located at the foot of a grade. Whenever a door requires an attendant, a refuge hole should be cut in the rib to protect him from accident.

Ques.—If you found one split passing more than its share of air, how would you remedy the defect?

Ans.—If a foreman finds the quantity short in one district while another district is receiving more than its requirement, the quantity is regulated by changing the regulator door, or moving the slide in a box regulator, until the desired proportion of air is obtained.

Ques.—When two kinds of powder are used in the same hole, what is likely to be the result?

Ans.—It may be assumed that the two kinds of powder have a different rate of burning, or in other words, one is quicker than the other, in which case the slower powder will be blown from the hole by the explosion of the quicker one. The slower powder being exploded on the air produces a windy shot, which is always dangerous, in coal mining, because of the cloud of dust that it raises. If a second shot follows the first, its flame will be projected into this dust cloud and cause the ignition of the dust, producing a local dust explosion.

Ques.—What conditions make the use of permissible explosives necessary in a mine, and why are they safer than black powder?

Ans.—The generation of gas in considerable quantities at the working face in a mine should make the use of permissible powders advisable if not necessary. Also, such powders should be used in a mine where the coal is highly inflammable and much fine dust is produced. In many mines where these conditions do not prevail, however, a permissible powder will be found to give better results than black powder and should be used because of its greater economy.

Permissible powders are always safer than black powder, in blasting coal, because they produce less flame when exploded. The charge of a permissible powder is limited to $1\frac{1}{2}$ lb., whereby the excessive use of powder by the miner is prevented. When a greater charge is used, th powder ceases to be permissible. A permissible powder is fired by a detonator, thus avoiding the use of fuse or squibs.

COAL AND COKE NEWS

Harrisburg, Penn.

Provost Marshal General Crowder, through Adjutant General Murdock, of the State Department, has overruled the opinion of George R. Stevenson, of Scranton, chairman of the district board covering the anthracite counties, relative to the latter's decision on deferred classification for men employed in and about the coal mines. General Murdock has sent a circular letter to all local draft boards in the matter, in which he quotes abstracts of Stevenson's letter, and does not mince matters in saying that the findings are not correct and that Stevenson has no business anyway in making rulings, that this work is up to the State Department, and that the statements made are "improper" and "unauthorized." Mr. Stevenson resigned his position as Chairman on Aug. 30.

Flotation among coal companies of a loan of almost $1,000,000 to the Luzerne County Gas and Electric Co., and linking together in one huge system of all the electric power-generating plants of the Wyoming coal fields, was planned at a meeting held at Wilkes-Barre on Aug. 28. Present at the session was the head of every coal company from Forest City to Shickshinny, the manager of every power company, public or private, and E. C. Cole, Pennsylvania state director of conservation for the Fuel Administration; G. R. Henderson, administrative engineer of the Fuel Administration, and other engineers connected with the Government.

The meeting, called at the instance of the National Fuel Administration, had the purpose of finding some means of alleviating a power shortage which is being acutely felt in the coal regions. The shortage is made more menacing because at this time it is practically impossible to secure machinery or parts for repairs and enlargements. It is because of this fact that the loan to the Luzerne County Gas and Electric Co., which supplies current for power and light to the greater part of the valley, was projected. This company has the materials either on hand or in course of construction which would make possible a great extension of its capacity. But, like other public utilities the country over, states Mr. Henderson, the Luzerne company finds it practically impossible to secure in the open market the funds necessary for this extension.

The matter of financing the Luzerne County Electric Co., however, remains unsettled, the coal companies showing no great enthusiasm for such investment. A committee of engineers from the various coal companies and the engineers of the electric companies are making an investigation of the entire proposition, and the matter will come up for final settlement at a meeting to be headed by Charles F. Huber, president of the Lehigh and Wilkes-Barre, who will be the spokesman for the coal companies.

Uniontown, Penn.

The program of the Production Department of the Connellsville regional fuel administration calls for a weekly output of 800,000 tons of coal, according to an announcement made by Production Manager W. L. Byers, who is now shaping up details for a "fuel drive" by which it is hoped to increase the region's production the necessary 15 per cent. to realize that goal.

As the opening shot in the production stimulating campaign a message from Charles M. Schwab, director general of the Emergency Fleet Corporation, and one of the dominating figures in the steel and iron trade, was circulated among the coal and coke workers. In that statement Mr. Schwab declared that "the miner who puts in a full day six days in the week is a true patriot and entitled to every credit." He says that "coal miners are doing very necessary and patriotic work, as without coal ships are useless," and that "they should be encouraged, therefore, to strive in every way to produce the maximum tonnage to keep up with the ever-increasing demand."

To pound home to the workers the necessity for full time in the mines and coke yards Production Manager Byers in a statement to the workers in connection with Mr. Schwab's statement declared that "the amount of coal loaded by one miner in one day, if burned in byproduct ovens, will produce enough of the best explosive to charge 160 three-inch shells and make enough coke to produce steel to make 2000 of the shells themselves."

Mild weather and a better car supply worked hand in hand this week with the patriotic coke workers to increase the production, which has dragged for several weeks. The car situation now has been solved, and the region is getting better than an average of 80 per cent. cars. On one day last week the Pennsylvania R. R. placed 100 per cent. cars both for coal and coke loading.

While there was a slight increase in coke production, two holidays and booze consumed following the semi-monthly holiday were factors in preventing a greater increase. The local fuel administration is now working on the liquor problem as it affects the region, but action must necessarily be restricted because of the limited authority on that subject.

Reports are current in both the coal trade and in railroad circles that an order will be issued shortly by Director General McAdoo diverting a goodly portion of coal shipments originating in the Fairmont region from the Baltimore & Ohio R. R. to the lines of the Monongahela R. R. By that arrangement the coal will come down the Monongahela Valley to Fayette City and over the Whitsett Junction branch, connecting with the Western Maryland lines to the seaboard. The advantage of diverting the heavy coal shipments would be to dodge the heavy grades between Uniontown and Morgantown on the Baltimore & Ohio.

Birmingham, Ala.

Despite an improvement in transportation conditions in the Birmingham district the coal output for this section is running short of expectations. Mine-output statistics, however, might be regarded as encouraging, and with better freight-car service from the mines production is expected to show up more satisfactorily.

Coal produced for the past four weeks, according to Government statistics compiled here, is on a basis of 22,000,000 tons a year, which will place 1918 production over that for 1917. The latest official statistics, however, show a most pronounced slump in output. There is a difference of 16,683 tons in the production for the week ending Aug. 17 as compared with the week ending Aug. 10. During the week of Aug. 17 the tonnage totaled 411,035 tons, as against 437,718 tons for the preceding week.

The general situation in the coke field is relatively unchanged, with production at about 90 per cent. of maximum. The coke producers are doing their utmost with the ovens available. All development work in this particular field is being rushed. A casual survey of the general situation, both as regards coal and coke production, shows that in Alabama fuel administration officials are directing production so that the output both at ovens and mines will go to essential industries, to meet the demands of domestic consumers and keep nonessentials from drawing supplies needed elsewhere.

Charleston, W. Va.

Coal production in West Virginia suffered a drop during August because operations were without a supply of cars commensurate to the capacity of the mines. Some districts not heretofore affected suffered from a poor supply, during the last week of the month, the New River District being an instance. There was almost a paralysis in the Kanawha district, where nearly half the mines were shut down, throwing 2800 miners out of work. In other words, 62 out of 132 mines were unable to operate, having no cars. What with a strike in one mine, numerous funerals and the poor car supply, there was mined in the New River district during the week ending Aug. 24, 7548 tons less than during the preceding week; or, in other words, 161,870 tons one week and 169,418 tons the other week. Indifference among miners as to whether they worked or not entailed further losses in the New River district. The percentage of miners not working in some of the mines is running as high as 30 to every 100 miners employed, or approximately 33⅓ per cent. The figures given for production cover the production of 66 out of 71 mines reporting. In the opinion of T. L. Lewis, Secretary of the New River Association, there is room for at least an increase of 20 per cent. in the output without any additional miners being required.

Though contiguous to the New River district, the Winding Gulf district, in the same period that the former region was falling behind, was able to forge ahead in the quantity of coal produced. The increase in the Winding Gulf section amounted to 15 per cent., which is regarded as a most gratifying increase in view of the fact that adjacent districts fell behind.

For the last week or so production has been virtually at a standstill in the Tug River and Pocahontas districts in so far as any increase or decrease is shown. There has been a gain but this was so small as to depress the operators, who know just what could be done under more propitious circumstances. While the car supply showed a decrease of 25 cars, there was on the other hand an increase in the number of hours worked. Miners working 7315 hours produced 437,546 tons. Mine disability resulted in a loss of 6823 tons. In the two districts combined the total production of coke was 43,330 tons for the week.

Cars furnished the Fairmont district during the last week of August were still short of requirements. As 1800 cars on an average are needed to keep all the mines in the district busy, the 1429 cars furnished early in the week were inadequate for all the mines. According to the best information obtainable 7500 more cars could easily have been used last week for loading coal out if these had been placed earlier. Though managing to secure a change in the regulations prohibiting the shipment of coal to New England points in box cars, the team track operators in the Fairmont district are now confronted with another difficulty—they cannot get cars of any description. According to statistics compiled, the Fairmont district needs nearly 1300 more miners.

Though regarded as a part of the Fairmont district, mines in Randolph County and along the Coal & Coke Ry. are not supplied from the cars allotted to that district. The mines in Randolph receive their cars from the Western Maryland, the Western Maryland having taken over the operating of the Belington and Coalton branches of the Coal & Coke.

Dallas, Tex.

Attention of large industrial concerns is being directed to the vast beds of lignite in eastern and northeastern Texas, and many large concerns have already made plans for erecting additions to their plants or instituting the necessary changes for using lignite as fuel instead of coal. Announcement has been made by the United Verde Extension Co. of Jerome, Ariz., that its reverberatory furnaces and boilers of its smelters can be operated successfully and economically by using ordinary lignite in a finely powdered form for fuel, but using this under strong air pressure. The Texas Light and Power Co., which furnishes electric current for numerous cities and towns in all parts of Texas, has stated that it will erect its central power plant on the lignite beds near Rockdale, Texas, from which current will be distributed over high tension lines. These and other developments in Texas at this time point to a greatly increased use of lignite for fuel. There is an unlimited supply of lignite and iron ore in Cass and Bowie Counties, in northeastern Texas, and steps are now being taken toward organizing a company which will erect a furnace and develop the vast iron ore beds, using lignite as fuel. Unlimited deposits of limestone and cement rock can be had from White Cliffs, Ark., 20 miles north of Texarkana, and as the iron ore and lignite beds lie about a like

distance south and southwest of that city, it is proposed to erect the furnace in the vicinity of Texarkana, or nearer the ore beds, so that long hauls may be eliminated.

PENNSYLVANIA

Bituminous

St. Mary's—Owing to car shortage on the Pittsburgh, Shawmut & Northern R.R., approximately 1000 miners are idle and as a consequence the loss in coal tonnage will be in excess of 4000 tons daily. The Pittsburgh, Shawmut & Northern R.R. owns 2500 coal cars, but under the car-pooling system these cars have been diverted to all parts of the country. The Shawmut is not a Government controlled road, and for this reason the operations along its lines are handicapped. The miners and coal operators are much discouraged over conditions.

Uniontown—Development of the Elliott coal field, located along the Monongahela River near Fayette City, has been commenced following the consummation of a $1,000,000 transfer. The tract, for which many prominent operators have endeavored to acquire title, was purchased by Julian Kennedy, of Pittsburgh, and R. C. Crawford, of McKeesport, for a consideration said to be $2500 per acre. Involved in the deal also was the surface of an adjoining farm and right-of-way for a tramroad over several other farms to the river. The development of the tract is being done by the Lowler Gas Coal Co., in which Kennedy and Crawford are reputed to be interested. The plotting of a town has already been laid out and 75 dwellings for the employees will be erected.

Anthracite

Mount Carmel—The Lehigh Valley Coal Co. has completed a new electric washery at Centralia, which will have a daily capacity of 1200 tons.

Hecla—Hecla is a poor place for slackers to hold out in. Seventy-three sympathizers were arrested for attempting to cripple the coke-making business of the village. Four Austrians, who declared they would work only when they felt so disposed, were also arrested.

Mount Carmel—To have been terribly roasted after he had been burned in an explosion of gas was the experience of Joseph Corbett, 43, a miner at the Reading Coal and Iron Co.'s Reliance colliery. Corbett was at work in a breast and ignited a body of gas with a naked lamp. The explosion set fire to his clothing and he was roasted to death. His fellow workmen, Adam Moran, was also badly burned.

Pottsville—The Harleigh-Brookwood Coal Co. has commenced operations for the reconstruction of its coal breaker near Hazleton recently destroyed by fire, with loss estimated at approximately $200,000. The proposed new structure will be of steel construction, to have a capacity of 1000 tons daily. At the present time the company's mines at this point produce about 500 tons per day, and it is said that plans are under consideration for an extensive increase in this output.

Pottsville—Production of coal is not being curtailed in order to force an increase in wages of miners, nor will the miners resort to such unpatriotic devices, declared leaders in this section. The miners declare they feel virtually certain of an increase, and say the only manner in which the coal production will be affected, if an increase of wages is not granted, is that many miners will leave for other occupations.

Hazleton—Announcement is made by the Lehigh Valley Coal Co. that the Buck Mountain workings, which have been abandoned four times as being worked out, are to be reclaimed. It is hoped to obtain thousands of tons of anthracite from the culm dumps.

ALABAMA

Haleyville—The Glen Mary Coal Co. has acquired the extensive coal properties near Delmar, Winston County, owned and operated by Mrs. Mary A. Gamble and sons, comprising approximately 440 acres. It is understood that the new owner is planning for the early operation of the plant.

Birmingham—The Champion Coal Co., recently incorporated with a capital of $20,000, is planning for immediate development work on 600 acres of coal properties acquired in the Boaz district. It is expected to have an initial capacity of about 300 tons daily. W. C. Rust, of Birmingham, is president and manager.

WEST VIRGINIA

Bluefield—In an explosion in a powder magazine owned jointy by the War Creek and Johns Branch Coal companies, two men, whose names could not be secured, were killed last Friday. They attempted to knock the top off a barrel of powder with a pick, while inside the magazine. A spark from the pick set off the power. An explosion followed, the detonation from which could be heard for many miles around.

Whitesville.—The Mordue Collieries Co. is preparing to begin the mining and shipment of coal from the mines it has just opened in the Coalburg seam, where coal will be taken from a 14 ft. seam. The company is under the management of C. L. Allen.

Carbondale—By installing new equipment at Carbondale, where it has acquired the No. 6 plant, the W. P. Price Mining Co., a Dayton concern, expect by the middle of next month to be in a position to ship coal on a large scale.

Ansted.—Operations have been resumed at the Hawk's Nest plant of the Mill Creek Coal Co. which was put out of commission early in the spring by a flood. Then general manager of the company is W. H. Evans, of this place.

Clarksburg—The Mt. Clare Collieries Co. has arranged for motor haulage at its Mt. Clare plant, and at the same time will make other improvements.

The Thermal Coal Co. has extended its operations at Lost Creek by opening another mine there, coal being taken from the Red Stone seam. The company will open two more mines in the same vicinity, where coal will be mined from the Pittsburgh seam. A fan has been installed at the company's No. 2 mine and many dwellings for miners have been erected.

Bazel—In addition to adding many new mine cars to its equipment, the Fort Clark Coal Co., at its plant here, is also installing fans, having driven a 600-ft. airway through the coal. The superintendent of the company is D. F. Gandy.

Fairmont—The old Aurora mine near here has been acquired by Clarence Robinson, of this city, preparatory to resuming operations there. A number of improvements will be made with a view to getting the mine ready to produce a fairly large tonnage, these improvements being made under the direction of Doney Pople. Within a very few weeks Mr. Robinson expects to have the mine in operation.

The reopening of Mine No. 7 of the Jamison Coal Co. this week near this city was rather a noteworthy event in coal circles. Foollowing an explosion two years ago a fire started in the mine, which has been out of commission since then. Sam McMann started the work of reopening the mine and lost his life in doing so. J. C. Davis, ex-chief mine inspector of Ohio, and J. C. McDermott, chief inspector of the Jamison mines in Pennsylvania, were also called into consultation together with W. J. Heatherman, present chief of the West Virginia Department of Mines, who finally gave his approval to the reopening of the mine, delegating District Inspector Regglemen to supervise the work. Two fans—a Robinson and a Clifford—have been installed, and a new ventilating system provided for. An inspection of the mine has revealed that there had been three fires burning after the explosion. Sixty steel cars a day was the capacity of the mine before it was put out of commission.

Elkins—While the West Virginia Coal and Coke Co. expects to open another mine at its Norton operation, above the present mine, the company instead of changing the present siding leading to the mine now in operation, which would necessitate a heavy outlay, will build a tramway from the opening of the new mine to the tipple of the older mine, where the coal will be run over the tipple. The West Virginia Coal and Coke Co. is now loading out on an average of 35 cars of coal a day.

OHIO

Nelsonville—The Standard Coal Co., of which D. F. Shafer is the head, is opening another mine near Nelsonville on the Hocking Valley Ry. It will be the third opening in that immediate vicinity. It is a drift mine into No. 7 seam. The company is now loading 50 tons daily, which will soon be increased to 200 tons. The new mine will develop a tract of 97 acres.

Moxahala—The Roberts Coal Co., Columbus, will soon open a new mine on the Toledo & Ohio Central in a tract of 100 acres, part of which is owned in fee simple and the other controlled by lease. It is No. 6 seam. The work of driving entries has started and a tipple will be erected. It is expected to produce 200 tons daily in about four months. Leo L. Roberts is at the head of the concern.

INDIANA

Sullivan—The residents of Carlisle, Ind., have petitioned the Indiana Public Service Commission to compel the Chicago-Carlisle Coal Co., which operates a mine at Carlisle, to sell coal to the wagon trade there in order to assure a supply of fuel locally for the coming winter.

Terre Haute—Production of coal in the Indiana field for the week ended Aug. 17 was below normal, according to reports made by mine operators to the Federal Fuel Administration. The 204 mines hoisted 399,315 tons as against 638,830 tons the preceding week. The decrease is due chiefly to car shortage. The annual picnic on Saturday also caused a loss of 24,000 tons. The total loss of time because of labor was 3.94, as against 2.38 per cent. the preceding week. The car shortage for the week was 9.23 per cent. as against 8.34 per cent. for the preceding week. The Pennsylvania had the greatest shortage, it being 21.68 per cent. The Chicago & Eastern Illinois had a shortage of 4.83 and the Chicago, Terre Haute & Southeastern of 9.07 per cent. The Monon road had a shortage of only 1.85 per cent. in serving 21 mines.

ILLINOIS

Carlinville—The first coal in the three new mines being opened near here by the Standard Oil Co. was struck recently in Mine No. 4, just north of the city, at a depth of 295 ft. The shaft was started May 1. It is expected that coal will be hoisted about Oct. 1. The hoisting of the first load will be made an event. It will be auctioned for the Red Cross. The three mines will be among the largest in the world, employing several thousand men. The company is erecting large brick office buildings and 250 one-story houses for the miners. Its power plant at Shoper will have capacity for all the requirements of the three mines and more.

Marion—A new coal-mining town being established by the Old Ben Corporation on the border of Franklin and Williamson Counties is to be named Pershing. The company is sinking a shaft for a new 5000-ton mine. It is expected that the vein, 420 ft. down, will be reached and coal hoisted by Dec. 1. Eighty acres has been purchased for the town site.

West Frankfort—Mines Nos. 18 and 19 of the Peabody Coal Co. will soon be equipped with individual electrical units. At Mine No. 19 a 450-kw. generator will be installed, to be connected with Corliss engines. Two new boilers will also be installed. Automatic hoisting cages were installed in this mine during the lull in business this summer. Mine No. 18 will be equipped with the same or a larger generator than Mine No. 19.

Galesburg—B. F. Stanforth has purchased the Davis coal mine from Jesse Hillier, who has been conducting it since 1904.

Duquoin—Evan D. John, Director of Mines and Mining, has announced that an examination for state mine inspector, mine manager, hoisting engineer and mine inspector will be held at Springfield Sept. 10. All applicants for state mine inspector and first-class mine manager must have completed a course in first-aid work at a mine-rescue station.

KENTUCKY

Louisa—The Louisa, Fort Gay Torchlight Coal and Development Co. plans coal land developments at the mouth of Lick Creek, near here. This company was recently organized with C. E. Stafford as president. Its plans provide for opening 10 collieries, building a central power plant and constructing a 10-mile railway.

Whitesburg—The Elkhorn & Jellico Coal Co., recently incorporated with a capital of $500,000, is planning to commence operations at an early date on the development of about 550 acres of coal properties recently leased. The company is planning for the immediate installation of the necessary equipment. M. K. Marlow is president and manager.

Henderson—The Hayes Coal Co. is opening a new mine at Zion, and has fired its first shots. The shaft is 120 ft. deep. The mine so far has proved very dry. The company will build a tipple at once and install equipment to facilitate handling.

OKLAHOMA

Tulsa—J. A. Brantley, of Sand Springs, Okla., expects to start the opening of a coal mine near here some time during the month of September.

Foreign News

Tokio, Japan—Serious disturbances are reported among the miners in the Kyushu coal district. At one colliery the miners set fire to the mine buildings. Fifty houses were destroyed.

Ottawa—The Lignite Utilization Board, which will have charge of the establishment and operation of the plant to be constructed in Saskatchewan for the carbonization and briqueting of lignite coal to produce a domestic fuel, has been appointed. It comprises R. A. Ross, consulting engineer, of Montreal, chairman; J. M. Leamy, of Winnipeg, Man., provincial electrician; and J. A. Sheppard, a leading business man of Moose Jaw, Sask. The cost of the plant is estimated at $400,000, of which the Canadian government will furnish $200,000; Saskatchewan, $100,000; and Manitoba $100,000. The recovery of oil, pitch, ammonia, etc., as byproducts will be an important feature of the undertaking.

Personals

W. J. Freeman, of Terre Haute, Ind., president of the Indiana Coal Operators' Association, and president of the Green Valley Coal Co., has been appointed coal production manager for the Indiana coal district by James B. Neale, director of production for the Federal Fuel Administration at Washington. Mr. Freeman is also a member of the Indiana State Council of Defense.

Coming Meetings

New York State Coal Merchants Association will hold its annual convention Sept. 5-8 at Saratoga, N. Y. Secretary, L. V. Shepard, Elmira, N. Y.

Indiana Retail Coal Merchants Association will hold its annual convention Sept. 25 and 26 at Hotel Severin, Indianapolis, Ind. Secretary, R. R. Yeagley, Logansport, Ind.

National Safety Council will hold its seventh annual safety congress Sept. 16-20 at Hotel Statler, St. Louis, Mo. Secretary, W. H. Cameron, Continental & Commercial Bank Building, Chicago, Ill.

Publications Received

Fuel Facts. United States Fuel Administration, Washington, D. C. Unillustrated, 64 pp.; 6 x 9 inches.

Report of British Columbia Minister of Mines, 1917. Printed by authority of the Legislative Assembly. Illustrated; 557 pp.; 7½ x 10½ inches.

The Diffusion of Oxygen Through Stored Coal. By S. H. Katz, Department of the Interior; Bureau of Mines. Technical paper 170. Illustrated; 44 pp.; 6 x 9 inches.

Monthly Statement of Coal Mine Fatalities in the United States, April, 1918. Compiled by Albert H. Fay. Department of the Interior: Bureau of Mines. Unillustrated; 21 pp.; 6 x 9 inches.

Analyses of Canadian Fuels; In Five Parts; Part I—The Maritime Provinces. Compiled by Edgar Stansfield, M. Sc., and J. H. H. Nicolls, M. Sc. Bulletin No. 22. Canada: Department of Mines. Unillustrated; 28 pp.; 6½ x 9½ inches.

Trade Catalogs

McGraw-Hill Books. McGraw-Hill Book Co., Inc., 239 W. 39th St., New York. Catalog. Pp. 226; 5¼ x 8¼. This catalog is classified by subjects, is indexed by authors, titles and subjects, and lists the McGraw-Hill engineering, scientific and business books.

Williams Digging Buckets. The G. H. Williams Co., Erie, Penn. Catalog. Pp. 48; 5¼ x 7¾; illustrated. Lists the Williams clam shell buckets and material handling machinery. Accompanied by a separate data supplement.

Vertical Triplex Power Pumps. Worthington Pump and Machinery Corporation, 115 Broadway, N. Y. Bulletin D-702. Pp. 56; 6 x 9 in.; illustrated. Gives a clear insight into the details of the construction of the Deane of Holyoke triplex power pumps, single and double acting.

Magnet-Operated Brakes for Direct-Current Service. Cutler-Hammer Manufacturing Co., Milwaukee, Wis. Booklet G. Pp. 4; 8½ x 11 in.; illustrated. Makes mention of the operating features of these brakes. Ratings, dimensions, engineering data and the formula for determining the retarding torque required for any brake installation are given.

Westinghouse Instruments and Relays. Westinghouse Electric and Manufacturing Co., East Pittsburgh, Penn. Catalog 3-B. Pp. 103; 8½ x 11; illustrated. A departure from the original edition of the same catalog, in that wherever possible each particular type of apparatus is listed on only one page. Where more than one page is required, the several pages necessary are confined to a description and listing of only the one particular type—so that it is very easy to find what one is looking for in this catalog.

Industrial News

Chattanooga, Tenn.—The Such Creek Coal Co. has filed notice of an increase in its capitalization from $50,000 to $200,000, to provide for business extensions.

New York, N. Y.—The Scranton & Wyoming Coal Co., Inc., East River and Thirtieth St., has filed notice of an increase in its capitalization from $100,000 to $190,000, to provide for business extensions.

Washington, D. C.—An examination of the business records of about 265 coal producing companies by experts of the Internal Revenue Bureau has disclosed unreported profits yielding more than $5,000,000 additional tax revenue to the Government.

Providence, Ky.—L. Sornborger & Co. have taken over the mines of the Washington Coal Co. L. Sornborger will be general manager, and Joe Jennings will continue as superintendent. The new company plans enlargement of its capacity and additional holdings.

Curtis Bay, Md.—The Baltimore & Ohio R.R. has awarded a contract to the Surety Engineering Co., 30 Church St., New York, for the construction of a new one-story reinforced-concrete and steel addition to its local coal-thawing plant, to provide for increased operations.

Chicago, Ill.—The Chicago Great Western Railroad Co., West Harrison St., has awarded a contract to the Railroad Water and Coal Handling Co., 608 South Dearborn St., Chicago, for the construction of a new coaling station at Kansas City, Mo., to have a capacity of 100 tons. The estimated cost of the structure is $20,000.

Wheeling, W. Va.—The Hall Brothers Coal Co. is a new Ohio County company which has secured a charter authorizing a capital of $50,000, it being the purpose of the company to produce coal in the Northern Pan Handle. The incorporators of the company are John D. Hall, James B. Hall, Henry K. Hall, R. W. Hall and Martha Hall.

Birmingham, Ala.—The Champion Coal Co. has increased its capital from $2000 to $75,000, and will take steps to materially increase the production from Champion mine. W. C. Rust, of Birmingham, is president of the company. Other coal companies incorporated were the Shinbone Valley Mining Co., with a capital of $10,000; Evans Fuel Savings Co., $25,000, and Piedmont Coal Co., $15,000.

Clarksburg, W. Va.—The Baltimore & Ohio R.R. has placed an embargo against box-cars of less than 40 tons capacity going east, and such an order was sent to operators by D. R. Lawson, district representative of the fuel administration for the Fairmont-Clarksburg region. The order makes it plain that box-cars can be shipped into Ohio and points reached by Lake Michigan ferries.

Columbus, Ohio—Ohio operators in the Southern Ohio district have received a circular from W. D. McKinney, representative of the Federal Fuel Administration, urging them to cease the marketing of dirty coal. In the circular it is stated that much dirty coal is still being marketed in Ohio and that the practice should stop at once. It is asserted that some producers are marketing bone coal with the other parts of the vein.

Greenville, Ill.—State's Attorney Meyer, under orders of Attorney-General Brundage, has filed suit in the Bond County Circuit Court against the Mulberry Grove Mining Co., the Smithboro Coal Co., the Bond County Prospecting and Mining Coal Co., the Choctaw Coal and Mining Co., and the Toncars Coal Co., asking that they be dissolved for failure to file annual reports in compliance with the law under which their charters were granted.

Jefferson City, Mo.—State Fuel Administrator Crossley has issued an order that dealers must not supply coal to domestic consumers outside incorporated towns of about fifty counties of Southern and Southwestern Missouri, unless it is shown that the consumers cannot obtain wood for fuel. Local fuel committees are directed to take systematic steps to see that rural domestic fuel consumers supply themselves with wood for the winter's needs.

Toledo, Ohio—Considerable activity prevails in the lake trade as far as the Toledo docks are concerned. During the week ending Aug. 24 the Hocking Valley docks loaded 20,000 tons as compared with 198,000 tons the previous week, making a total of 2,681,411 tons for the season. During the same week the Toledo & Ohio Central docks loaded 90,000 tons as compared with 92,000 tons for the previous week. The total for the season is 1,210,000 tons.

Louisville, Ky.—The City of Louisville has paid the Louisville & Nashville Railroad Co. $7000 for a coal site on Logan St. and will spend $7000 more upon installation of switching facilities for the operation of a municipal coal yard which will supply city buildings, including schools, institutions, etc. The city has already purchased ten cars of coal direct from the mines. It is planned to use the yard in critical periods of the winter to supply coal for domestic use.

Columbus, Ohio—W. D. McKinney, Federal representative for southern Ohio and Mason County, West Virginia, is authority for the statement that 130 mines in the southern Ohio field have secured permits to ship lake coal while 170 have not received such permits. But the number which have not secured permits are generally the smaller mines, and thus the reduction in lake tonnage is not so much as might be expected from a casual examination of the figures.

Milwaukee, Wis.—The Cutler-Hammer Manufacturing Co., manufacturer of electric controlling devices and allied apparatus, announces the opening of a branch office in the Union Trust Building, 15th and H Sts., N. W., Washington, D. C. H. W. Knowles and C. W. Yerger, engineers, who are entirely familiar with the company's products, will be located at this new office. It will be operated entirely for the purpose of giving service to the Government and others having occasion to require information regarding the company's products, orders, contracts, etc.

Louisville, Ky.—Wiley B. Bryan, fuel administrator for Kentucky, has issued notice to the effect that all dealers must fill out triplicate registration blanks, showing extent of their coal business, and general particulars, filing these papers with the administration for reference. Certificates of registration will be issued to all registering dealers, and are to be posted in a conspicuous place. Dealers failing to register will be punished, also jobbers selling to such dealers. The department figures on breaking up the practices of small crooked dealers in this way.

Dallas, Texas—Wiley Blair, Federal Fuel Administrator for Texas, has issued an order directed to 152 Texas counties prohibiting the sale, shipment or distribution of coal for domestic uses within these counties. This order was issued as a means for conserving the coal supply of the state for war purposes, and the 152 counties affected are directed to depend entirely on wood and other fuels for domestic uses. The order was issued after careful investigation made by field agents of the fuel administration disclosed an abundance of wood in these counties that can be used for domestic fuel.

Indianapolis, Ind.—P. H. Penna, secretary-treasurer of the Indiana Bituminous Coal Operators' Association, has made the following statement regarding allegations that Indiana operators were paying bonuses to coal miners: "These assertions are not true. The Indiana Bituminous Coal Operators' Association has for two years been investigating reports that bonuses were being offered or paid, and thus far it has been able to prove conclusively that bonuses were paid in only two instances. It is a fact, however, that the practice of paying bonuses is not generally indulged in in this state and that the number of operators who have been guilty is negligible."

MARKET DEPARTMENT

Weekly Review

Bituminous Production Again Picking Up—Railways in Need of Stimulation—Total Soft Coal Tonnage This Year Ahead of Last Year's Output—Anthracite Shipments Show Increase

DURING the week ended Aug. 24 the production of bituminous coal showed the first improvement in five weeks, due to a slight betterment in the car supply. The output for that week totaled 12,603,000 net tons, and would have been much greater if the car allotment had been regular and the loaded cars had been speeded away from the mines. In fact, the erratic car supply during the month of August was at once the despair of the Federal Fuel Administration—which sees the demand for coal growing larger and larger—and a stumbling block to the operator—who wishes to keep his laboring forces intact and instead finds his men leaving for industries that promise more steady employment.

Attempts to speed up the miner—through the formation of production committees, the holding of patriotic meetings and the other many schemes resorted to by those interested in greater coal production—all go for naught when there is an insufficient number of cars furnished the mines. Without cars the mines cannot work. It is not alone the miners who need stimulating. A little of the energy now expended to boost coal output could profitably be devoted to inciting the railway men to greater efficiency.

However, it should not be overlooked that the production of soft coal so far this year is far ahead of the quantity mined during the same period of last year. If sufficient cars had been placed at the mines there would now be plenty of coal to meet all demands, for even with the handicap of inadequate and irregular labor the operators could have flooded the country with coal.

Anthracite production is not only keeping up, but shows an increase in output for the week ended Aug. 24 with the shipment from the mines of 2,134,000 net tons. The total production of anthracite for the coal year to date is estimated at 41,768,000 net tons, an increase over 1917 of 869,000 net tons.

The Lake trade is active. Under governmental stimulus a larger tonnage is being moved from Ohio and West Virginia to the lower lake ports. Shipments are still behind pre-season estimates, however, and in order to enable the Pittsburgh region to meet its quota coal is being withheld from all nonessential industries in that district, while plants on the preference list which had been receiving only 50 per cent. of their requirements are to be still further reduced. There is strong basis for the feeling that the Northwest will be supplied before the close of navigation.

Market conditions show no radical changes. So much domestic anthracite has already been placed in the bins of consumers that there is little reason to fear a serious shortage in that quarter. Demand is greater than the supply in all grades of coal, with the exception of certain steam sizes on the Atlantic Seaboard and screenings in the Middle West.

COAL PRODUCTION

Recovery from the slump of the past five weeks marked the production of bituminous coal during the week ended Aug. 24. The output during that week (including lignite and coal made into coke) is estimated at 12,603,000 net tons and not only exceeded the production during the week preceding by 669,000 net tons, or 5.6 per cent., but exceeded the production during the past three weeks. Production during the current week of 1918 was 1,852,000 net tons, or 17 per cent. in excess of the production during the corresponding week of 1917. The average production per working day during the week of Aug. 24 is estimated at 2,100,000 net tons, as against 1,989,000 net tons during the week preceding, and 1,792,000 net tons during the week of Aug. 24, 1917.

Production of anthracite in the United States during the week of Aug. 24 is estimated at 2,134,000 net tons, as against 1,924,000 net tons during the week preceding, an increase of 10.9 per cent., and as against 1,988,600 net tons during the corresponding week of 1917, or an increase of 7.3 per cent. The average daily production during the week of Aug. 24 is estimated at 355,667 net tons, as against 336,839 net tons during the coal year to date, and as against 329,831 net tons during the same period of 1917. Total production for the coal year to date is estimated at 41,768,000 net tons, an increase over 1917 of 869,000 net tons, or 2.1 per cent.

Shipments during the week of Aug. 24 increased from all districts with the exception of the district including northeast Kentucky, high volatile and the smokeless fields of West Virginia, and from the Rocky Mountain and Pacific Coast states. Material increases occurred in central Pennsylvania, where shipments increased 3102 carloads or approximately 8 per cent.; in Ohio, where shipments increased 2823 carloads, or 11 per cent.; and in the district including Illinois, Indiana and western Kentucky, where shipments increased 2299 cars or approximately 5 per cent. All districts, with the exception of northeast Kentucky, high volatile of south West Virginia and smokeless fields of West Virginia, report shipments considerably in excess of the performance during the corresponding week of 1917. For the coal year to date all districts, with the exception of Michigan, show increased loading.

Lake Shipments—Bituminous coal loaded on vessels at lake ports (including vessel fuel) during the week ended Aug. 24 is estimated at 1,151,744 net tons, an increase over the week preceding of 3.8 per cent., and over the weekly average during months of July and August of 11.8 per cent.

Shipments of bituminous coal to New England during the week ending Aug. 24 are estimated at 641,592 net tons, an increase over the week preceding of 59,474 net tons, or approximately 10 per cent., and over the weekly average during the coal year to date of 83,000 net tons, or 14.8 per cent. Rail receipts through the New England gateways during the current week increased 25,824 net tons or 13 per cent. over the week preceding, and tidewater shipments increased 33,650 net tons or 8.8 per cent. Shipments also increased from all harbors during the week.

Tidewater Shipments—Shipments of bituminous coal from the North Atlantic harbors and Hampton Roads, during the week ending Aug. 24, amounted to 986,797 net tons, an increase over the week of Aug. 17 of 64,967 net tons or 7 per cent., and over the weekly average for the coal year to date of 89,445 net tons, or an increase of approximately 10 per cent. Shipments from New York and Philadelphia declined slightly during the week, while shipments from Baltimore increased 21 per cent. and from Hampton Roads 12 per cent. Shipments from all harbors, during the current week, were considerably in excess of the weekly average to date.

Beehive Coke—The production of beehive coke in the United States during the week ended Aug. 24 is estimated at 592,000 net tons, as against 575,000 net tons during the week preceding, or an increase of approximately 3 per cent. The average production per working day is estimated at 99,000 net tons, as compared with 96,000 net tons during the week of Aug. 17. The operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania report production during the week of Aug. 24 at 402,807 net tons, and operation of their plants at 74.6 per cent. of their present capacity, as against 71.7 per cent. during the week of Aug. 17. Yard labor and car conditions improved slightly during the week.

Byproduct Coke—Operating conditions in the byproduct coke industry improved slightly during the week ended Aug. 24. The plants of the country produced 546,058 net tons, operating at 89.6 per cent. of their present capacity, as compared with 88.3 per cent. during the week preceding. The improvement during the week is attributed by the operators to better labor conditions and to repaired plants. Losses of time due to lack of byproduct coal remained constant at 2.9 per cent. Material increases in production during the week were recorded in Alabama, Maryland, Pennsylvania and Tennessee. In Alabama the improvement was brought about by repairs to plants; in Maryland and Pennsylvania by better labor conditions, and in Tennessee by other causes. The placing of new ovens in operation by the Carnegie Steel Co. at Clairton, Penn., accounts for the increase in capacity in that state during the current week.

BUSINESS OPINIONS

American Wool and Cotton Reporter—Manufacturers are not hurrying to buy cotton at present prices. It is understood that the Government desires for the mills to anticipate their wants up to Apr. 1, 1919, and if possible to make their purchase for that period by Nov. 1. It will be possible to buy the cotton, but the United States Government must of course see that the cotton is shipped, and that seems to be the difficult part of it.

Bradstreet's—The broad tendency is to buy goods only as needs require, there being enough uncertainty ahead to cause chariness. Some sections are more cheerful than others, the South, Northwest and far West being conspicuously optimistic, and even where conservatism prevails, complaints are not serious. In the Southwest, where

drought has struck hardest, the big wheat crop, activity in oil, and vigorous operations in mining afford compensatory advantages.

Dry Goods Economist—Cotton and cotton-goods prices continue to hold the chief interest in all discussions of conditions in the textile world. During the week disturbing reports as to the weather in cotton-growing districts were prevalent in New York, and each new report was followed by new and higher prices for cotton on the New York Cotton Exchange. Because of the high cost of cotton and uncertainty as to the prices that will prevail at the time when the cotton now being contracted for is made up, manufacturers are not seeking future business with the same eagerness as in former seasons. Some, in fact, refused to make any quotations on certain goods this week, while others merely state that "Government prices" will prevail.

The Iron Age.—A swelling of overseas demand, due to the aggressive activities of the Allied forces, has changed greatly the operating schedules of the mills. Urgent calls have been received for rails, rolling stock and shell steel and temporarily some home needs, even cars for our own roads, may have to stand aside. Coming immediately after a heavy distribution of 82 mm. shell bars, an emergency order for 140,000 tons more of this steel, with the same amount to go each month up to February; the allocation of 75,000 tons of rails for France, and the orders now being distributed for 122,500 tons of plates and shapes for new construction in Japan for the Emergency Fleet Corporation, have already made the expected larger purchases of cars for France a matter of the farther future. Rush construction will be given 4000 narrow-gage cars for the Army abroad, following the placing last week of the 20,000 additional 30-ton cars; and many more of these larger size cars are wanted. In order that more ship, shell and rail steel may be turned out, pipe, sheet and wire mills will be cut down further in output. Some wire plants are now on a 50 per cent. basis and may be reduced still further.

Atlantic Seaboard

BOSTON

Awkward situation continues. Fuel authorities are kept busy finding places for coal and still keep within limits imposed by Washington. Belief that ruling is only temporary. Otherwise New England may lose ships that will be vitally needed later on. Hampton Roads piers show average dumping, but delay of 3 to 4 days is usual. Baltimore dispatch somewhat improved. All-rail movement has increased over July figures. Railroad fuel still greatly needed. Rumored that all-rail shipments from Pennsylvania will now be reduced to leave room for increased volume to New York piers. Queried whether pier conditions will admit of much increased tonnage, but coal is needed at points not accessible to steamers. September likely to show important developments. Anthracite rail shipments sag somewhat. New York movement of Reading barges gives no better service as yet.

Bituminous—The state of coal congestion referred to last week continues, although in somewhat modified form. It is very much the result of unequal distribution. If in the first quarter of the coal year there had been normal deliveries instead of arrears to the extent of 2,000,000 tons or more, we should not now have the pressure to unload coal that is a feature in several of the larger New England centers. The car service section of the Railroad Administration is following these instances closely, and every effort is being made to unload both cars and steamers with utmost dispatch. Unfortunately, this all reacts to the disadvantage of New England because at once the impression gains ground that this territory must be stuffed with coal. This certainly is not the fact; it is only our facilities that are congested. Labor is short, repairs are extremely hard to make, never was coal moved from the scales to the consuming territory with the expedition that obtains now. Even the railroads whose reserves are below last year's marks find themselves with much more coal at their terminals waiting to discharge and on cars at their stocking plants than at any time in their history.

It is therefore a condition awkward to handle. The New England Fuel Administration at Boston is doing its best to provide uncongested destinations for the volume of coal now coming forward. This is difficult to do and still comply with the recent ruling from Washington allowing but 60 days' supply for preferred industries. Never before has New England been limited as to the reserves to be taken on during the summer and fall, except purely by the shortage of coal, and there is increasing concern over the situation that this ruling may cease when the winter is upon us. It makes a tremendous difference to consumers in this quarter of the country whether it takes 15 days for a car to come through all-rail from the mines, or whether it takes 45 days.

The stock limits Washington has imposed are so arbitrary, and so out of line with the needs of the case that there is a well-defined feeling here they will be only temporary. State administrators have the right to recommend exemptions in what to them seem special cases. A case like Bangor, Maine, for instance, where the usual channel of supply is by water and navigation closes by Dec. 1, would probably be dealt with in this way. Otherwise, if there are no exemptions, it will soon be physically impossible to load and unload the ships with customary dispatch, and New England would then be in the position of declining the ships that were represented to be so urgently needed last spring. Once the steamers were withdrawn from this trade it would probably be most difficult to secure their return. This territory has had the advantage of continuous service for several months now of two large 12,500-ton colliers belonging to the Panama R. R., but all the time they have been running to Boston there has been but one dock where they could unload satisfactorily. Now as the result of the continuous work at that one plant, day and night, two of the large bridge towers are undergoing repairs, and it will not be possible now to unload either of the colliers mentioned in less than 90 hours, where 25 hours was a normal performance.

Dumping at Hampton Roads has somewhat improved during the past week. Coal is in better volume, and the average detention to bottoms has been reduced. Three to four days is now the usual delay, although the demands for Government service still have a most important bearing. It is understood that the line points and by-product plants are coming in for strong shipments during this month, and it is probable therefore that the movement to tidewater will soon be cut down. It has been allowed to come forward at the present rate longer than was anticipated, but even at that the detention at Hampton Roads would have been more in evidence had there not been a considerable diversion of steamers to Baltimore. At the latter port, through more careful planning, the dispatch has somewhat improved.

The average receipts at the New England gateways during August were nearly 50 cars more per day than during July. The largest part of this extra movement is due doubtless to wagon coal in box cars, the volume of which for New England has continued about 600 cars weekly, or three-fourths of the total number available from central Pennsylvania. Railroad fuel receipts all-rail were slightly less than during July.

One of the interesting facts is that the New England railroads, by several hundred thousand tons, are lacking the stocks on hand they had accumulated by Sept. 1 last year. Were there adequate berth room there is no question but the Boston & Maine and the New Haven between them could absorb whatever extra tonnage may be sent New England the next 30 days, were labor conditions easier and steamers not required to discharge at relatively so few places. The fuel authorities have resumed diverting coal at the gateways to the railroads, and it is probable that an increased movement all-rail for these requirements will be started direct from the mines.

Anthracite—All-rail receipts of domestic sizes fell off during August to a marked degree. The daily average was but 439 cars as compared with 600 during July. The sag has been felt by retailers who are getting increasingly anxious over the small progress made in filling spring orders from householders. The fuel authorities are being asked rather pointed questions as to how to proceed the balance of the season. Coal burning weather will soon be upon us, especially in the Northern section, and it will not be enough to tell consumers they will be served "in turn."

A large number of the Philadelphia & Reading Ry. barges are being sent to Port Reading to load, rather than at Port Richmond as heretofore. This is the result of action by the Railroad Administration, the effort being made to increase the movement of these barges to New England. The difficulty is that the pier facilities are inadequate for all the extra tonnage being thrown in that direction, and it is quite likely that delays in loading will more than offset any gain in movement at sea.

NEW YORK

The anthracite situation not so promising to retail dealers as it was a few weeks back. If coal is available they will concentrate efforts on small orders this month. Producers put winter prices into effect. Dumpings at the local docks fall off for both anthracite and bituminous. Manufacturers kick at maximum storage order from Washington. Public service corporations may be hard hit.

Anthracite—The situation does not look so promising as it did two weeks ago. Coal is not moving as freely and the dealers, now that September is here, are worried over the prospects. In their efforts to aid the consumer as much as possible, plans are under way to concentrate work on delivery of the one and two ton orders now on the dealers' book. Dealers are only waiting assurances from the Fuel Administration that they will get the coal, and then they will go ahead with their plans, which in part include the setting aside of one week for the delivering of these small orders.

The producers and shippers are now receiving the full winter prices for the domestic sizes of anthracite, the 30c. per ton which was deducted by Dr. Garfield on Apr. 1, from the prices for egg, stove, nut and pea having been automatically restored on Sept. 1.

The heavy production figures issued by the producing interests are not borne out by the cars dumped at the local docks during the seven days ending Aug. 30, as compared with the previous week. Reports show 7188 cars dumped as against 7616 cars, a falling off of 428 cars. For the month of August, lacking the last day, there were 31,321 cars dumped, compared with 31,284 cars dumped in July and 30,719 cars dumped in June.

The dealers in the Bronx have had a conference with representatives of State Fuel Administrator Cooke and have been assured of an increase in their tonnage of 13 per cent. over the 1916-1917 allotment. The allotment for the county is figured as 850,975 tons, while the total receipts during the current coal year—Apr. 1 to Aug. 24—have been 257,646 tons, or about 30 per cent. of the total. In order to prevent a serious situation it is claimed by the dealers it will be necessary that an average of 3297 tons daily must be received there for the next 180 days of the coal year.

Dealers throughout the city continue to call attention to the vast number of unfilled orders, but admit that the majority of these would not have been received so far in advance were it not for the urgency of the authorities. There is more coal in the house bins at this season of the year then probably ever before, and in that respect the consumer is much better off. However, many inland yards are entirely clear of supplies while others are said to have good stocks.

The movement at the docks is free. Not much delay is occasioned in loading, with boats plentiful although carrying charges are stiff. As has been the case for a couple of weeks, chestnut is running easier than either egg, stove or pea coals. The steam coals are easy. Some retail dealers have so much rice and barley on hand that they are letting the public know about it through advertising in the daily papers. Buckwheat is in good demand but there is no rush in buying.

Current quotations, per gross tons, f.o.b., tidewater, at the lower ports are as follows:

Circular	Individual	Circular	Individual
Broken..$6.75	$7.50	Buck...$5.10	$5.90
Egg.... 6.65	7.40	Rice.... 4.65	5.10
Stove... 6.90	7.65	Barley.. 4.15	4.30
Chestnut 7.00	7.75	Boiler.. 4.60	
Pea..... 5.50	6.25		

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates. Prices for buckwheat, rice, barley and boiler are not fixed by the Government.

Bituminous — Conditions in the bituminous situation are not so encouraging as the trade would like them. Receipts do not increase in keeping with the demand, due in most part to enlarged consumption by war and other industries which is more than likely to increase now that fall and winter is upon us.

The new fuel ruling fixing maximum limits for storing bituminous coals has not pleased everybody, and some manufacturers near New York claim it will cause hardship. Public service corporations will be hard hit, and already steps are being taken to have the order modified.

The falling off in production is accentuated in the number of cars dumped at the local docks during the week ending Aug.

30, the reports showing 6582 cars dumped as against 7091 cars the previous week. For the first 30 days of the month 30,126 cars were dumped as compared with 30,372 cars in July and 31,129 cars in June.

There has been a good movement of commercial coals and regulars are getting all they need for current uses, with some left over for stocking. In certain instances shippers have been instructed to stop shipments to non-essential industries and to concentrate their shipments to plants on the preferred lists. Coals for the spot buyer are just as scarce as ever, and there is little to be had.

Bunkering continues to be heavy, with plenty of coal for the purpose to be had.

Current quotations, based on Government prices at the mines, net ton, f.o.b., tidewater, at the lower ports, are as follows:

	Mine Gross	F. o. b. N. Y. Gross
Central Pennsylvania:		
Mine-Run, prepared or slack.....	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of-Mine.....	3.08	5.23
Prepared.....	3.36	5.51
Slack.....	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite situation gives indication of improvement. Increased allotment to be made now. Retail labor shortage coming. All sizes active, with stove in strongest demand. Preparation is good. Steam sizes fully taken. Bituminous shortage still exists.

Anthracite—As fall approaches we are becoming convinced that this city will avoid many of the anticipated coal troubles. Each week the feeling of optimism grows among the larger buyers. At the office of the largest shipping company the same confidence is expressed and the reason given is that they will have a substantial tonnage to distribute on account of the prohibition of shipments to numerous points formerly supplied with anthracite. While many complaints continue to come in most of them are from small communities where a few thousand, or even a few hundred tons, will fulfill the shipper's obligations.

Locally the shipments were quite heavy during the last half of the month, and a number of dealers have fair stocks because they were unable to deliver the coal as rapidly as it came in. Yet even with this condition we are safe in saying that the city has not reached the quota allotted to it, and that is one reason why the dealers are expecting particularly heavy shipments during the early fall.

The increased allotment of 18 per cent. to the state was only officially announced recently, and now the increased proportions to each community are awaited with more than ordinary interest. These figures have been decided upon by the Anthracite Committee on Distribution and in many instances are known, but until each shipper is notified as to his quota they are not considered official. There are some shippers who will be unable to furnish any substantially increased tonnages to their trade for the reason they have already been called upon to accept business not formerly cared for by them.

The advance of the wholesale circular on domestic sizes provoked quite a little discussion before it was officially announced. Of course, the advance of 30c. at this time was fixed last spring by the national authorities, but during the past week there was a persistent rumor that the increase was even to be greater than this. To most people, however, this was felt to be purely conjecture, as it was hardly thought that the Government after once fixing the price would take the opportunity to advance it at this time. It seems likely that the rumor has grown out of the fact that the miners are asking for an increased wage schedule. Even though this has been denied by Dr. Garfield, the men still feel confident that their appeal to President Wilson will not be without result. Even in the event of a favorable outcome of their request it was not expected that the new schedule would become effective before the first of the year.

Naturally, just before an advance in prices all family sizes were in great demand, but if there is one size any shorter than the others it is stove coal. Before many weeks the dealers expect to persuade their customers to accept any size they may have on hand, but up till now the buyer of family coal insists on having what he is used to burning. This is the cause of much complaint to the dealers whose trade is not familiar with conditions.

Once more the dealers have been urged by outside organizations to expedite unloading of coal. There is hardly any question that the anthracite trade releases railway equipment about as promptly as any industry. The latest plan is to have them unload on Sunday, which many of them have done for months. However, it is planned to have a force of laborers go from yard to yard on that day and thus effect an economy in labor and at the same time release cars promptly. So far as can be learned the dealers are willing to cooperate in the movement.

The question of preparation came to the fore recently due to the fact that several cars of river coal were condemned in the region for containing at least 50 per cent. foreign matter, such as stones and dirt. On the average, however, the production of both colliery and washery coal is well up to the average of preparation and there can be no real complaint on this score. The double check inspection is still effective in the region whereby inspectors of the Fuel Administration pass upon the coal after the colliery inspectors examine it.

There is no change of any moment in the steam trade. Buckwheat if anything has tightened up a trifle; at least less of this size is coming to the retailers for domestic trade. Barley and rice are also eagerly sought, mostly of course by those concerns who are stocking it for the future. Culm also showed a little increased activity, due probably to the slight decreased shipments of bituminous lately.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.25	Buckwheat	$3.40	$4.45
Egg	4.80	6.15	Rice	2.90	3.80
Stove	5.05	6.40	Boiler	2.70	3.70
Nut	5.15	6.50	Barley	2.40	3.30
Pea	3.75	5.00	Culm	1.25	2.15

Bituminous—No improvement can be noted in bituminous coal. The mines continue to report a shrinkage of production, due to the unequal car distribution. Nothing that the operators have done seems to make any impress upon the railway authorities as to a change in the method. There does not seem to be any actual lack of cars along the line, it simply being a question of giving them to the mines at the time and in the number in which they are needed.

As a consequence of the somewhat shortened production the distribution committee has started to cut down some plants which have been getting quite heavily stocked ahead. They have taken the stand that many plants with at least a 60-day supply ahead can easily stand having their receipts cut to at least sufficient for current use for a while.

BALTIMORE

Bituminous coal being more evenly distributed as to quantity, but kicks being made as to quality and prices because of box-car shipments. Hard coal men unable to get action so far on price increase and are hard hit by labor deflections.

Bituminous—Under the Government plan limiting coal storage for both essential and nonessential industries, and for all even within the preferred classes, the Maryland fuel administration is now able to make a more equitable distribution of coal here—at least as to amount. It is for the moment not so much a question of supplying coal to a particular consumer who is running low as it is to satisfy him with the kind of coal that is on hand to distribute, and to keep him cool in spite of the fact that his shipment is in many cases in box cars and will cost him around $2 above the ordinary Government price—when the 75c. extra for this coal to operators and the additional costs of unloading per ton are figured.

Some kicks are being made about the quality of the coal received. Much of that coming in box cars, and for which the fancy Government price with additions is paid, is of wretched quality. Some who have received it say that it will not burn at all unless it is mixed with coal of a better quality. The electric power company is still curtailing power, even to war plants, claiming that it cannot get enough coal from the National Fuel Administration, or the quality of coal required to give boiler efficiency. The public service supply was some time since taken out of the hands of the Maryland administrator and the Washington administration undertook to handle the situation direct.

Anthracite—Receipts here continue light despite the fact that there is now reported to be a good flow of coal into the Washington district, so liberal recently, it is understood, that district dealers were unable to handle it promptly and much went into storage in the larger yards. Appeals from the Baltimore section for an increase in movement have not been met as yet. In the meantime dealers find it difficult to keep things going because of labor defections to higher paying Government and war work, which is advertising wages above the coal-yard limit. Despite the fact that dealers have been unable to get action on their appeal for an increase of 20c. a ton in hard coal to cover a wage-increase plan to hold drivers and yard helpers, a number have individually been forced to jump pay rates from 30 to 35c. an hour on a ten-hour day to hold their workers.

Lake Markets

PITTSBURGH

Special attention to byproduct coal. No stocking in district. No open market.

The order of the Federal Fuel Administration upon the distributor of Pittsburgh district coal to curtail shipments to line trade on the preference list to 50 per cent., has just been rescinded. Records of lake shipments for the month of August are not yet available, but it is thought possible that the other districts are doing better so that Pittsburgh need not exceed its quota as much as was expected would be necessary.

The matter of coal for byproduct coke oven continues to receive close attention by the Fuel Administration, it having been made perfectly clear that the chief limiting factor in steel production, or rather the chief factor that can be eliminated, is the supply of coke for blast furnace use, and that depends upon coal supply as there is ample coke-oven capacity. The chief shortage in byproduct coal has been at Youngstown.

The Fuel Administration is considering the starting of Connellsville ovens closed by the Steel Corporation as a result of its inaugurating byproduct coke manufacture at Clairton. The coke produced would be at the disposal of the Fuel Administration, which would be under obligation at the same time to find coal for operating the Clairton plant. It is not known yet whether the proposed arrangements are practicable.

The schedule of quantities of coal that consumers are permitted to stock, expressed in terms of 20, 30 and 45 days' consumption, is not interesting to the Pittsburgh district, seeing that stocking is entirely prohibited in the case of this district, except perhaps of byproduct coal.

There are no open market transactions, all production going out on contracts or being taken by allocations. Maximum prices remain: Slack, $2,10; mine-run, $2.35; screened, $2.60, per net ton at mine, Pittsburgh district, brokers being allowed to charge 15c. for brokerage in addition.

BUFFALO

Coal embargoes are disturbing certain classes of consumers. Others found with big stocks are also cut off. General situation not much changed. Anthracite receipts in the city light.

Bituminous—The authorities have been looking into the local coal needs and have made up a list of certain manufacturers who are considered non-essential at the present time. These will have to suspend. All effort is being made to get coal to the farthest outlying districts that are adjudged entitled to it. So much Pittsburgh coal is going to the lakes that shippers here who have always had plenty to distribute are looking elsewhere for a supply.

It is the aim of the authorities to cover all remote all-rail territory as soon as possible. It is said that a coal car can make the round trip to northern New York or New England in about 21 days now, but that it will take 55 days in severe winter weather and that is the reason why Buffalo, which is comparatively near the mines, is getting so little just now of either bituminous or anthracite.

The demand for bituminous is not heavy. If the coal did not go out of its regular territory so much on special orders it would be quite sufficient for all needs. When the lakes close, which will be three months hence, the increased flow to this territory ought to satisfy us, especially since Canada has been cut down in its supply.

Bituminous prices are mostly made up at the mines, but the delivered prices are still $4.65 for thin-vein Allegheny Valley, all sizes: $4.45 for Pittsburgh lump; $4.20 for mine run and slack; $5.60 for smokeless

and smithing; $6.20 for cannel, all per net ton, f.o.b. Buffalo.

Anthracite—The trade is still much distressed by shortage and certain restrictions and allotments, which do not at all agree with the wishes and apparent needs of the consumers. What they want is the filling of their orders, and some of them cannot see why it is not done. Many of them will accept all the coal they can get, even if it may be, by some mistake or carelessness of the distributor, much more than they need.

Lake shipments have improved again, which may account for the small amount allotted to Buffalo. For the week the loadings for the upper lakes were 119,500 tons, of which 46,200 tons were for Duluth-Superior, 19,300 tons for Fort William, 17,800 tons for Milwaukee, 10,000 tons for Sheboygan, 8900 tons for Chicago, 8000 tons for Racine, 6500 tons for Green Bay, 1600 tons for Depere and 1200 tons for the Sault. Lake freights remain at 48c. to Duluth and Fort Williams, 50c. to Sheboygan and Green Bay, 55c. to Milwaukee, 60-65c. to Chicago, $1 to Racine, Depere and the Sault.

CLEVELAND

Lake shipments of bituminous have been greatly augmented in the last ten days and the movement now is approximating the mark it should have attained by the first of July. The movement in the week ended Aug. 24 was the largest of any week so far this season—1,136,033 tons. Industrial consumers known to have fair stocks or better on hand have been absolutely denied shipments. The retail trade is suffering severely because of concentration on the lake trade, but domestic users are repeatedly promised that their needs will be amply supplied before cold weather sets in.

Bituminous—Announcement that industrial users with fair-sized or better stocks on hand were to be cut off to accelerate the lake movement has been carried out to the letter. Many industrial users claim to be fast approaching the time when their stocks will have to be replenished, but so far not a minute has been lost in any plant because of a shortage of fuel. Retail coal dealers are receiving even less attention than they were a few weeks ago, the whole trend of the coal movement being toward the lake trade.

Labor conditions and the poor car supply have coöperated greatly to reduce output last week in the No. 8 district of southern Ohio. In the week ended Aug. 21, the latest for which the Pittsburgh Vein Operators' Association of Ohio has issued a report, operators belonging to the association forwarded only 4303 carloads of bituminous, divided as follows: 922 cars to railroads, 2367 to the lake trade, 774 to Ohio, 150 to Michigan and Indiana and 90 to Canada. This is only about 70 per cent. of the usual weekly production. Dilatory labor, even more than inadequate car supply, is blamed for this showing. A great many miners now are working only four days a week, operators are complaining, and some go so far as to hint that there may be a connection with the present agitation of the mine workers for increased wages. Car supply for the week ended Aug. 24 to members of the association was 27.86 per cent. short, while in the week ended Aug. 17 it was only 23.08 per cent. short. Though the rating for the week ended Aug. 24 was 8355 cars, the supply was only 6026. The tonnage lost accordingly was 116,450, of which 103,000 tons are blamed directly to car shortage and 13,450 to mine disability, labor shortage, etc. Car supply for the week ended Aug. 24 was 33.49 per cent. short on the Pennsylvania, 28.08 per cent. short on the Baltimore & Ohio, 25.78 per cent. short on the Wheeling & Lake Erie and 11.44 per cent. short on the New York Central.

Lake Trade—The week ended Aug. 24 saw lower lake docks load 1,136,033 tons for the Northwest, a record for the season to date. In the first five days of the week ended Aug. 31 the docks loaded approximately 1,020,500 tons, so the high mark will be approximated, if not exceeded. Supplies are coming forward in better shape than at any time so far this season, due mainly to the restrictions placed upon industrial stocking. High hopes are held that in September, which is only a 3,500,000-ton month on the Federal Fuel Administration's schedule, a gain of about 500,000 tons on the deficit will be possible. The first week of September, however, will do well to show more than 900,000 tons of bituminous loaded, say vesselmen, because of Labor Day and the usual delayed pickup bound to occur on Tuesday and Wednesday of the week. Some coal docks worked Sunday in order to get freighters out of the way. Available tonnage remains all that can be asked.

DETROIT

Shipment of bituminous show a slightly larger proportion of domestic sizes. Receipts of anthracite continue light. Lake movement is still below schedule.

Bituminous—Jobbers and wholesalers in the Detroit market, as well as the consumers of domestic coal, are still taking an apprehensive view of the present situation and future outlook as regards supply of fuel for household heating. While there is said to have been a small improvement in supply of domestic stock within the last few days, the increase in supply is not yet sufficient to relieve uncertainty.

With the short interval remaining in which to provide winter fuel to something like 88 per cent. of the city's population—the proportion which a Board of Commerce investigation discloses is still unsupplied—it is pointed out by jobbers that the movement of coal of domestic type to Detroit must proceed in much larger volume than at present or many families will be obliged to suffer from unheated homes when the frosty weather arrives. There is an impression among some of the operators of large manufacturing plants that unless the outlook for adequate winter fuel supply becomes brighter swiftly, there will be a considerable exodus of workers from Detroit, seeking employment in other cities where there is a better outlook for keeping homes warm during the winter.

The supply of steam coal is fairly satisfactory in volume and seems to meet present needs of consumers, though little is left for adding to stock piles and no free coal is to be found on tracks. Quite a number of the steam plants in previous years have been wholly dependent on track coal for filling their requirements.

Anthracite—Seemingly there is no chance that Detroiters will be able to obtain a larger allotment of anthracite. The city's allowance of 601,000 tons for the year is little more than one-half the quantity actually consumed in Detroit homes last year, and besides suffering this drastic reduction in supply of anthracite the household consumers are also deprived of smokeless and are receiving little coke. Both coke and smokeless have been used extensively in Detroit in past years as substitutes for anthracite. The movement of anthracite into Detroit is small, and jobbers can see no indications of improvement in the near future.

Lake Trade—Shipments of coal by lake routes are not yet coming up to the schedule fixed by shippers. Many boats available for coal cargoes are being sent up light.

COLUMBUS

Special efforts are being made to stimulate production in Ohio in order to avoid coal shortage. A large tonnage is moving via the Lakes to the Northwest. There is also a good demand, both for steam and domestic tonnage.

The feature of the coal trade in Ohio is the effort being made along patriotic lines to stimulate production in every mining field of the state. The lake trade is one of the most active departments of the industry. Under governmental stimulus a larger tonnage is being moved from Ohio and West Virginia mines to the lower lake ports. Reports show that the vessel movement is generally good and that little time is lost at either end of the journey. The lake tonnage is still behind pre-season estimates, but there is a feeling that the Northwest will be supplied before the close of navigation. Lake prices have been affected by the recent reductions announced in Ohio fields. The upper lake docks are generally free from congestion and that is aiding the movement.

The steam trade is strong, although the tonnage available for steam consumers is not large. A considerable amount of screenings is available. Surplus stocks are being called upon to supply factories and public service concerns. Railroads are taking a big tonnage as the freight movement is generally large. On the whole the steam trade is rather active and no one is especially suffering for fuel.

The domestic trade is also strong and some tonnage is available to take care of private users. Retailers are generally short of stocks, however, and strenuous efforts are being made to secure coal. Mine-run is one of the principal grades now delivered. Pocahontas is practically off the market and there is little anthracite available. Retail prices are strong at the new levels occasioned by the reduction in Ohio prices.

Production is rather good and reflects the special pains put forth by interested officials to uphold the output. Car shortage is appearing in some sections, some time before it was expected. There is a shortage of motive power on some of the coal-carrying railroads. In eastern Ohio the output is good and is estimated at 75 to 80 per cent.

Prices on short tons f.o.b. mines are as follows:

	Hocking Thin Vein	Hocking Thick Vein	Pomeroy	Eastern Ohio
Sized grades.....	$3.00	$2.75	$3.00	$2.60
Mine-run.....	2.75	2.50	2.75	2.35
Screenings.....	2.50	2.25	2.50	2.10

CINCINNATI

Inadequate car supply is reported from several districts, cutting down shipments and bringing the Lake movement below the schedule. Otherwise conditions are excellent, including labor.

With reports indicating that the Lake movement is not quite up to the volume scheduled for it by the Fuel Administration, it is evident that the trouble lies principally with the shortage of cars, of which complaints have been numerous and vigorous during the past week. From sections shipping coal into this vicinity—the Kanawha district on the one side and the Knox County district of Indiana on the other—have come assertions that in each case 4000 men are out of work for at least two days a week on account of the inadequacy of the car supply, resulting in a proportionate loss of production. When it is considered that there is a keen demand for labor among manufacturing industries, and that there is also fear of a shortage of labor at coal mines, it can be seen that the car shortage, with its tendency to result in men going elsewhere to work, is serious in more ways than one. There is no apparent remedy possible for the limited car supply, as the Railroad Administration is said to be doing everything in its power to insure an equitable distribution of the cars available, and deliveries of new cars are not progressing with sufficient rapidity to make any appreciable difference. Operators and miners alike are working hard to keep production up to the maximum, but they are of course absolutely limited as to loading by the car supply.

LOUISVILLE

Somewhat better movement of eastern Kentucky mine-run coal to Louisville section. Both western and eastern Kentucky lump scarce. Domestic demand taking care of all receipts of lump coal. Nut and slack showing slight accumulation, consisting of western Kentucky grades.

The situation has shown slight improvement during the past few days. There has been a better car supply in eastern Kentucky, and the western Kentucky supply has been holding up fairly well. Labor has been uncertain, with good supplies one day and poor supplies the next, due to the fact that much part-time farm labor is employed in the mines. However, production in both fields has been somewhat better, with a better movement of eastern Kentucky coal to the lakes, and slightly more coal available for the retailers and jobbers as well as industrial consumers.

The stocking demand continues good, and retailers are still delivering all the lump they can secure without accumulating any yard stocks. A good deal of lump has been going to industrial plants during the past few days, reducing the available supply for domestic stocking. Retailers are fairly well caught up on western Kentucky domestic stocking orders, but are far behind on deliveries of eastern Kentucky coal in cases where people have absolutely refused to accept western.

The steam demand is well taken care of with ample supplies on hand to keep all industrial concerns well supplied. Steam buying has been fairly active, but has not shown near the activity that domestic demand has shown, as industrial concerns are relying on priority needs, and not stocking to any great degree.

No anthracite coal can be sold in Kentucky, but under the regulations Indiana is open to such coal. However, local dealers who have been endeavoring to secure anthracite coal in car lots for deliveries to southern Indiana consumers have been unable to secure supplies, there appearing to be some sort of a mix up in interpretation of the regulations.

Few local retailers are in position to take advantage of the present opportunity to secure eastern Kentucky mine run, not having screens or facilities for sorting the coal, except by hand. Such concerns as have screening plants are managing to secure plenty of coal, and are being offered more business than they can begin to take care of.

BIRMINGHAM

Demand good, but a little easier in steam grades. Domestic sizes strong. Production will probably show some increase over last week, better time being made by mine workers and car supply more liberal.

Reports indicate that steam coal users in some sections have got a little ahead in their supply and are not pushing the mines so strongly for shipments. Inquiries are more than sufficient, however, to take every ton of coal produced at the mines, the output continuing to lag unduly on account of the time being lost by mine workers from their duties, and a slightly crippled car supply.

The domestic market continues brisk, receipts at the yards being about normal with those of the past few weeks. Many unfilled orders are in the hands of the dealers and coal received by them is promptly applied against the business in hand and stocks on the yards are at a low ebb.

Coke

CONNELLSVILLE

More byproduct ovens. Coke supplies fairly adequate. Old screenings advanced.

The Carnegie Steel Co. is now operating about 350 byproduct ovens at the Clairton plant, where the first coke was made late in June. Output, however, is much below rated capacity and partly, it appears, by reason of coal scarcity. Ovens still to be completed at the plant this year will make a total of 640. Present output is a trifle more than 10,000 tons weekly, but full output for the 640 ovens is estimated at about 50,000 tons weekly. The Steel Corporation has recently closed some beehive ovens in the Connellsville region, in connection with its increased byproduct production elsewhere, and the necessity for using the coal in the byproduct ovens. The Fuel Administration now has a project which would involve resuming operations at the closed beehive ovens and would distribute the coke where needed. To put the project through it is necessary for the Fuel Administration to provide a supply of coal for the byproduct ovens, which would be deprived of their present supply from the Connellsville region.

Coke supplies at western Pennsylvania and Ohio blast furnaces are fairly adequate, although there are occasional slight shortages. A considerable tonnage of Connellsville coke continues to be diverted to eastern consumption. There continues to be a good supply of foundry coke offered, and indeed some blast furnaces assert that the operators are offering 72-hour coke for foundry purposes beyond what is needed, and should sell the coke for blast furnace use. Sellers of the best grades of crushed coke recovered from old dumps have advanced their price from $6.50 to $6.75 and state that they have no difficulty in securing the higher price, the material going for household consumption. This is clean prepared coke, over ⅝-in., the official limit being $7.30. Various other descriptions are offered at lower prices. Set prices remain: Furnace, $6; foundry, 72-hour selected, $7; crushed, over ⅜-in., $7.30, per net ton at oven.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended Aug. 24 at 337,705 tons, an increase of 11,095 tons. Raw coal shipped out of the region amounted to 214,000 tons, an increase of 24,000 tons.

Buffalo—The demand is always in excess of the supply. This is likely to continue till the war is over. Coke is needed about as much as steel and iron, so that the consumers are able to get together just barely enough to keep in operation. The ovens, byproduct as well as beehive, are coking all the coal they can get, and every effort is being made to increase the capacity of the city coke plants, apparently with the idea that the coal will be forthcoming somehow. Gashouse coke is chiefly used by the gas company to fire its own boilers, and the rule is not to quote it to anybody.

Middle Western

MILWAUKEE

Receipts by lake during August the heaviest of the year. Not much more of the better grades of coal expected, however. Illinois screenings being pressed for use.

The month of August has been prolific in coal receipts at Milwaukee, the record being the highest of any like period since the opening of navigation. With three days to hear from, the total receipts of hard coal for the month aggregate 110,200 tons and of soft coal 684,654 tons. This makes the totals for the season thus far 355,684 tons of hard and 2,040,556 tons of soft coal.

While the foregoing figures have a reassuring influence, State Fuel Administrator Fitzgerald says Wisconsin is much better supplied with coal than any other state and that it is probable not a great deal more of the better grades of coal will be allowed to come here. In view of this prospect, he urges that conservation be practiced in every possible line. Manufacturers are requested to use as large a proportion of Illinois screenings as is possible during the remaining summer and fall months in order to preserve the supply of lump coal for winter use. In the opinion of Mr. Fitzgerald the supply of Hocking and Youghiogheny coal for the West will be cut down because of the necessity for diverting more of it to the East to make up for a shortage in anthracite in that section. In corroboration of this situation he points to the fact that 100,000 tons of screenings from Illinois mines is being shipped to Sandusky, Ohio, by rail and thence by lake to the Canadian Northwest.

Dockmen gave the retail middlemen a rude jolt this week by summarily making an additional cut of 50 per cent. in their allotments of anthracite. This means that many of the smaller dealers will not be able to supply their customers. Many desk-room dealers are being forced out of business by inability to obtain supplies of hard coal.

ST. LOUIS

A continued quiet market with the domestic demand easing up. Very little steam business, excepting railroad orders, which are light, and a surplus of steam coals, with an increasing car shortage. Transportation poor and light country demand.

Conditions continue extremely easy. The retail dealers have at this time no unfilled orders for Standard coal, practically none for Mt. Olive, but the tonnage unfilled for Carterville is greater than they will be able to take care of for the next couple of months. That element of the population that are able to buy storage coal in the summer months seem to have been pretty well taken care of, and it is estimated by the Fuel Committee that 75 per cent. of the residences and homes in St. Louis that could buy coal in the summer time of the Mt. Olive and Standard grade have their coal in.

The retail trade is not pushing orders right now with any undue haste, for fear that later on there will be no business at all and their equipment will be idle. They would rather have a scattered business from this time on rather than have it all now and none later, and that is having some effect on the market.

In the Carterville field the car supply is extremely poor, especially on the Iron Mountain. This road seems to have gone to pieces in the matter of equipment and transportation. The Illinois Central seems to be in the best shape of any for this field.

The operators here are making strenuous efforts to keep their tonnage up, but everything seems to be against them. A good portion of this tonnage still continues to go for railroad purposes, and the output of some small mines is going exclusively for railroad in the form of mine-run. The same condition applies in a general way to the Duquoin field. This territory is in somewhat better shape now as regards water, inasmuch as there have been several rains in the last week or two.

The conditions at the present time in the Mt. Olive field have changed somewhat. Transportation and shortage of cars and the new Illinois draft is the cause of some uneasiness, although miners are supposed to be exempt, but there is a tendency on the part of many miners to enlist in the Navy or the Marines rather than take a chance of not being exempt. In a general way, however, the tonnage from this field is just about equal to the demand.

The Standard field has its ups and downs and some mines have been idle for three days straight on account of no equipment. The Louisville & Nashville seems to have blown up right, and the Illinois Central is in a deplorable shape for equipment.

There has been a surplus of screenings and the operaors have tried to unload as much of their coal in the form of mine-run on railroads as possible; 2-in. lump is not moving well, while the demand for nut and 6-in. is greater than can be taken care of. In a general way, however, there is a surplus in the field of steam coal, and were the market in shape to anywhere near absorb the screenings there would be a surplus of domestic sizes.

There has been no change in the retail prices for some time. They are for all sizes: Carterville, $6.20, Duquoin district, $5.95, Mt. Olive, $5.70, and Standard, $5.45.

The Mt. Olive and Standard prices have been cut, however, to the extent of 50c. a ton in many cases to move the tonnage.

In a wholesale way the Standard market is slightly under the Government maximum. Screenings are around $1.50 to $1.60 and mine-run at about $2.10 to $2.20.

The Government maximum here is:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump...	$2.55@2.70	$2.55@2.70	$2.40@2.70
3x6-in. egg..	2.55@2.70	2.55@2.70	2.35@2.55
2x3-in. nut..	2.55@2.70	2.55@2.70	2.35@2.55
No. 2 nut....	2.55@2.70	2.55@2.70	.....
No. 3 nut....	2.55@2.70	2.55@2.70	.....
No. 4 nut....	2.55@2.70	2.55@2.70	.....
No. 5 nut....	2.05@2.20	2.05@2.20	.....
2-in. scrgs...	2.05@2.20	2.05@2.20	1.25@1.50
3-in. lump...	.....	.....	2.25@2.40
2-in. lump...	.....	.....	2.25@2.40
Steam egg...	.....	.....	2.25@2.40
Mine run....	2.35@2.50	2.35@2.50	1.85@2.00
Washed:			
No. 1.....	2.75@2.90	2.75@2.90	.....
No. 2.....	2.75@2.90	2.75@2.90	.....
No. 3.....	2.55@2.75	2.55@2.75	.....
No. 4.....	2.55@2.75	2.55@2.75	.....
No. 5.....	2.05@2.20	2.05@2.20	.....

Williamson and Franklin County rate is $1.10; Duquoin field, $1; Standard and Mt. Olive fields, 95c.

SEATTLE

Washington mines fall behind in output owing to disastrous fire and shortage of men. Advance in wage scale expected to prevent shipyards taking miners. Large exports being made to South America.

Figures compiled by the state fuel administration disclose the fact that for the month of June the coal mines of the state were 29,000 tons short of their expected production. Of the shortage 16,000 tons was lost by the mines in the Kittitas County district, due in part to the fire at Cle Elum. The fuel administration estimates the state is short 738 miners, and the loss in coal as a result approximates 4800 tons a day. Within a year the draft has taken 320 men and a further loss of 150 is expected in the September call. Many miners are going into war industries and shipyards where the basic pay is higher than in Washington mines. It is expected here that wages will be raised in the state fully 20 per cent., in which case a big increase may be expected in the price of coal. On Jan. 1 of this year there were 5914 men employed in the mines of the state. By June this had dropped to 5250, and today stands at 5176. If the present rate of decrease keeps up there will be less than 5000 men in the mines by Christmas.

The men needed immediately for Washington mines are listed by D. C. Botting, district representative for the Federal Fuel Administrator, as follows: Miners, 528; outside men, 107; inside men, 46; timber men, 15; helpers, 5; timber packers, 8; drivers, 4; rope riders, 1; rock men, 5; track men, 1; coke drawers, 5; motormen, pump men, electricians and other mechanics, 13. The King County district needs 181 men; Kittitas district, 462 men, and Pierce County district, 85 men.

As a means of relieving the pressure upon eastern coal, Washington coals will be tested in South American industrial plants. Heretofore the coal for South American export has been taken from the mines of West Virginia, Pennsylvania and Maryland, but the mines there are now bearing the heaviest burdens in producing coal for Government uses. About 100,000 tons of coal will be shipped from this port during the rest of 1918 to Peru and Chile.

General Statistics

NORFOLK & WESTERN

Below is given a statement of the coal tonnage from mines on the Norfolk & Western R. R. and from other railroads for the month of July, 1918.

From:	Net Tons
Pocahontas field	1,459,618
Tug River district	297,291
Thacker district	283,564
Kenova district	104,374
Clinch Valley district	170,550
Other Norfolk & Western Fields	16,976
Total Norfolk & Western fields	2,332,373
Williamson & Pond Creek R.R.	195,769
Tug River & Kentucky R.R.	62,992
All other railroads	118,752
Grand Total	2,709,886

CURRENT PRICES—MATERIALS & SUPPLIES

IRON AND STEEL

STEEL SHEET PILING—The following price is base per 100 lb. f.o.b. Pittsburgh, with a comparison of a month and a year ago:

Current	One Month Ago	One Year Ago
$4–5	$4–5	$3.60

PIG IRON—Below are the present quotations, with a comparison of a month and a year ago:

	Current	One Month Ago	One Year Ago
CINCINNATI			
No. 2 Southern foundry	$36.60	$36.90	$49.90
No. 2 Northern foundry	.....	36.26	56.20
NEW YORK †			
No. 2 X Northern foundry	34.40	34.40	54.25
No. 2 plain Northern foundry	33.90	33.90	53.75
No. 2 Southern foundry	40.70	39.00	52.75
BIRMINGHAM			
No. 2 Southern foundry	33.00	33.00	47.00
CHICAGO			
No. 2 Northern foundry	33.00	33.00	55.00
No. 2 Southern foundry	38.00	38.00	.....
PITTSBURGH			
Bessemer iron *	36.60	36.60	55.95
Basic iron *	32.00	32.00	53.00

* These prices include the freight charge from the valley to the Pittsburgh district. † Delivered Tidewater, New York.

STRUCTURAL MATERIAL—The following are the base prices, f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

	Mill, Pittsburgh	—New York— Current	One Year Ago	St. Louis	Chicago
Beams, 3 to 15 in.	$3.00	$4.245	$5.25	$4.27	$4.27
Channels, 3 to 15 in.	3.00	4.245	5.25	4.27	4.27
Angles, 3 to 6 in., ¼ in. thick	3.00	4.245	5.25	4.27	4.27
Tees, 3 in. and larger	3.05	4.245	5.30	4.27	4.27
Plates	3.225	4.745	9.00	4.52	4.52

BAR IRON—Prices in cents per pound at cities named are as follows:

Pittsburgh	St. Louis	Denver	Birmingham
3.50	4.24	4.60	4.75

NAILS—Prices per keg from warehouse in cities named:

	Mill Pittsburgh	St. Louis	Denver	Chicago	Birmingham	San Francisco	Dallas
Wire	$3.50	$4.50	$5.05	$4.32	$5.00	$5.95	$4.75
Cut	4.00	5.50	.....	4.47	....	6.40	.....

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh	Cincinnati	Chicago	St. Louis	San Francisco	Birmingham	Denver
Standard railroad spikes ⅝-in. and larger	$3.90	$6.00	$4.50	$5.30	$6.70	$6.00	$5.30
Track bolts	4.90	8.90	5.50	Prem.	8.00	8.25	6.30
Standard section angle bars	3.25	....	4.45	Prem.	5.15	....	6.65

COLD DRAWN STEEL SHAFTING—From warehouse to consumers requiring fair-sized lots, the following discounts hold:

Cincinnati	Cleveland	Chicago	St. Louis	Denver	Birmingham
17½%	List	+10%	+15%	+40%	+30%

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill Pittsburgh	Cincinnati	Chicago	St. Louis	Denver	Birmingham
Straight	$5.75	$7.00	$6.50	$6.25	$8.00	$7.50
Assorted	5.90	7.00	6.50–7.00	6.40	8.25	7.75

Cincinnati—Horseshoe nails sell for $4.50 to $5 per 25-lb. box

CAST-IRON PIPE—The following are prices per net ton for carload lots:

	—New York— Current	1-Month Ago	One Year Ago	Chicago	St. Louis	San Francisco
4 in.	$64.35	$64.35	$68.50	$64.80	$63.00	$80.50
6 in. and over	61.35	61.35	65.50	61.80	60.00	77.50

Gas pipe and 16-ft. lengths are $1 per ton extra.

STEEL RAILS—The following quotations are per ton f.o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

	—Pittsburgh— Current	One Year Ago	—Chicago— Current	One Year Ago
Standard Bessemer rails	$57.00	$38.00	$67.00	$38.00
Standard openhearth rails	55.00	40.00	65.00	40.00
Light rails, 8 to 10 lb.	*3.135 (100 lb.)	83.00	*3.135 (100 lb.)	68.00
Light rails, 12 to 14 lb.	*3.09 (100 lb.)	82.00	*3.09 (100 lb.)	67.00
Light rails, 25 to 45 lb.	*3.00 (100 lb.)	75.00	*3.00 (100 lb.)	65.00

* Government price per 100 lb.

OLD MATERIAL—The prices following are per gross ton paid to dealers and producers in New York. In Chicago and St. Louis the quotations are per net ton and cover delivery at the buyer's works, including freight transfer charges:

	New York	Chicago	St. Louis
No. 1 railroad wrought	$30.80	$31.00	$34.00
Stove plate	26.20	25.00	19.00
No. 1 machinery cast	34.00	29.50	21.50
Machine shop turnings	16.25	17.00	19.00
Cast borings	16.25	17.10	18.50
Railroad malleable cast	31.20	29.00	25.50

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Cincinnati	Birmingham	St. Louis	Denver
$0.12	$0.16½	$0.18	$0.19	$0.17½

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis	Birmingham
Solid	15c.	16c.	15c.
Hollow	24c.	....	....

PIPE—The following discounts are for carload lots f.o.b. Pittsburgh; basing card of Nov. 6, 1917, for steel pipe and for iron pipe:

BUTT WELD

Steel Inches	Black	Galvanized	Iron Inches	Black	Galvanized
⅛, ¼ and ⅜	44%	17%	¾ to 1¼	33%	17%
½	48%	33½%			
¾ to 3	51%	37½%			

LAP WELD

2	44%	31½%	2	26%	12%
2½ to 6	47%	34½%	2½ to 4	28%	15%
			4½ to 6	28%	15%

BUTT WELD. EXTRA STRONG PLAIN ENDS

⅛, ¼ and ⅜	40%	22½%	¾ to 1½	33%	18%
½	45%	36½%			
¾ to 1½	49%	36½%			

LAP WELD. EXTRA STRONG PLAIN ENDS

2	42%	30½%	2	27%	14%
2½ to 4	45%	33½%	2½ to 4	29%	17%
4½ to 6	44%	32½%	4½ to 6	28%	16%

From warehouses at the places named the following discounts hold for steel pipe:

	—Black— New York	Chicago	St. Louis
⅜ to 3 in. butt welded	33%	43%	37%
3½ to 6 in. lap welded	15%	39%	33%
	—Galvanized— New York	Chicago	St. Louis
⅜ to 3 in. butt welded	16%	28%	22%
3½ to 6 in. butt welded	+3	25%	19%

Malleable fittings. Class B and C, from New York stock sell at list price Cast iron, standard sizes, 5%.

SHOP SUPPLIES

NUTS—From warehouse at the places named, on fair sized orders, the following amount is deducted from list:

	—New York— Current	One Year Ago	—Cleveland— Current	One Year Ago	—Chicago— Current	One Year Ago
Hot pressed square	2.50*	List	$1.20	$1.65	$1.05	$3.00
Hot pressed hexagon	2.50*	List	1.00	1.50	.85	3.00
Cold punched square	2.50*	List	.75	1.25	1.00	2.00
Cold punched hexagon	2.50*	List	.75	1.25	1.00	1.60

* List plus.

Semi-finished nuts sell at the following discounts from list price:

	Current	One Year Ago
New York	40%	50%
Chicago	50%	50%
Cleveland	60%	50%

MACHINE BOLTS—Warehouse discounts in the following cities:

	New York	Cleveland	Chicago
⅜ by 4 in. and smaller	30%	45%	37½
Larger and longer up to 1 in. by 30 in.	15%	37%	25—5%

WASHERS—From warehouses at the places named the following amount is deducted from list price:

For wrought-iron washers:

New York..... $2.50 Cleveland..... $1.50 Chicago..... $2.50

For cast-iron washers the base price per 100 lb. is as follows:

New York..... $5.00 Cleveland..... $4.00 Chicago..... $3.50

RIVETS—The following quotations are allowed for fair-sized orders from warehouse:

	New York	Cleveland	Chicago
Steel ⅞ and smaller	30%	45—5%	45%*
Tinned	30%	45—5%	45%*

Buttonheads, ¾, ⅞, 1 in. diameter by 2 in. to 5 in. sell as follows per 100 lb.:

New York..$5.65 Cleveland...$5.15 Chicago....$5.67 Pittsburgh...$4.65

Coneheads, same sizes:

New York..$5.75 Cleveland...$5.25 Chicago....$5.77 Pittsburgh..$4.75

MISCELLANEOUS

GREASES—Prices are as follows in the following cities in cents per pound for barrel lots:

	Cincinnati	St. Louis	Birmingham	Denver
Cup	7	7	8½	12½
Fiber or sponge	8	....	8½	20
Transmission	7	7	9	20
Axle	4½	4	3¾	5½
Gear	4½	....	8	9
Car journal	22 (gal.)	....	5½	8½

BABBITT METAL—Warehouse prices in cents per pound:

	New York		Cleveland		Chicago	
	Current	One Year Ago	Current	One Year Ago	Current	One Year Ago
Best grade	125.00	70.00	103.00	70.00	96.00	70.00
Commercial	70.00	40.00	23.00	24.50	25.00	25.00

HOSE—Following are prices of various classes of hose:

Fire

	50-Ft. Lengths
Underwriters' 2½-in.	75c. per ft.
Common, 2½-in.	40%

Air

	First Grade	Second Grade	Third Grade
¾-in. per ft.	$0.55	$0.30	$0.25

Steam—Discounts from list

First grade.....30% Second grade.....30–5% Third grade.....40–10%

LEATHER BELTING—Present discounts from list in cities named:

	Medium Grade	Heavy Grade
St. Louis	28%	35%
Denver	40%	30%
Birmingham	35%	35%
Chicago	45%	40%
Cincinnati	40—10%	40%

RAWHIDE LACING—35% off list.

PACKING—Prices per pound:

Rubber and duck for low-pressure steam	$0.99
Asbestos for high-pressure steam	1.76
Duck and rubber for piston packing	1.10
Flax, regular	.99
Flax, waterproofed	1.21
Compressed asbestos sheet	1.10
Wire insertion asbestos sheet	1.30
Rubber sheet	.66
Rubber sheet, wire insertion	.99
Rubber sheet, duck insertion	.55
Rubber sheet, cloth insertion	.25
Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes	1.21
Asbestos wick, ½- and 1-lb. balls	.75

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York and St. Louis
Galvanized iron rigging	+20%
Galvanized cast steel rigging	List
Bright plain rigging	30%
Bright cast steel	17½%
Bright iron and iron tiller	5%

MANILA ROPE—For rope smaller than ⅜-in. the price is ½ to 2c. extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: ⅜-in., 8 ft.; ½-in., 6; ⅝-in., 4½; 1 in., 3½; 1¼-in., 2 ft. 10 in.; 1½-in., 2 ft. 4 in. Following is price per pound for ⅜-in. and larger, in 1200-ft. coils:

Boston	$0.33½	Birmingham	$0.39
New York	.36	Denver	.35½
Cincinnati	.33½	Kansas City	.34
Chicago	.34	Seattle	.34
St. Paul	.34	St. Louis	.33
San Francisco	.32	Los Angeles	.35

PIPE AND BOILER COVERING—Below are discounts and part of standard lists:

PIPE COVERING

Pipe Size	Standard List Per Lin. Ft.
1-in.	$0.27
2-in.	.36
6-in.	.80
4-in.	.60
3-in.	.45
8-in.	1.10
10-in.	1.30

BLOCKS AND SHEETS

Thickness	Price per Sq.Ft.
½-in.	$0.27
1 -in.	.30
1½-in.	.45
2 -in.	.60
2½-in.	.75
3 -in.	.90
3½-in.	1.05

85% magnesia high pressure ..... List

For low-pressure heating and return lines..... 4-ply..... 58% off; 3-ply..... 60% off; 2-ply..... 62% off

LINSEED OIL—These prices are per gallon:

	New York		Cleveland		Chicago	
	Current	One Year Ago	Current	One Year Ago	Current	One Year Ago
Raw in barrel	$1.90	$1.26	$2.10	$1.30	$2.05	$1.20
5-gal. cans	2.00	1.36	2.25	1.40	2.25	1.30

* Nominal.

WHITE AND RED LEAD in 500-lb. lots sell as follows in cents per pound:

	Red				White	
	Current		1 Year Ago		Current	1 Year Ago
	Dry	In Oil	Dry	In Oil	Dry and In Oil	Dry and In Oil
100-lb. keg	14.00	14.50	13.25	13.50	14.00	13.00
25 and 50-lb. kegs	14.25	14.75	13.50	13.75	14.25	13.25
12½-lb. keg	14.50	15.00	13.75	14.00	14.50	13.50
5-lb. cans	.....	.....	15.25	15.50	16.00	15.50
1-lb. cans	.....	.....	.....	.....	17.00	.....

COMMON BRICK—The prices per 1000 in cargo or carload lots are as follows:

Cincinnati	$13–16.75	Birmingham	$15.00
St. Louis	10.00	Denver	9.50

WIRING SUPPLIES—New York prices for tape and solder are as follows:

Friction tape, ⅙ lb. rolls	38c. per lb.
Rubber tape, ½-lb. rolls	45c. per lb.
Wire solder, 50-lb. pools	46c. per lb.
Soldering paste, 2-oz. cans	$1.20 per doz.

PREPARED ROOFINGS—Standard grade rubbered surface, complete with nails and cement, costs per square as follows in New York, St. Louis, Chicago and San Francisco.

	1-Ply		2-Ply		3-Ply	
	C.l.	L. C.l.	C.l.	L.C.l.	C.l.	L.Cl.
No. 1 grade	$1.33	$1.60	$1.70	$1.95	$2.05	$2.30
No. 2 grade	1.20	1.15	1.50	1.75	1.80	2.05

Asbestos asphalt saturated felt (14 lb. per square) costs $5.35 per 100 lb.

Slate-surfaced roofing (red and green) in rolls of 108 sq.ft. costs per $2.20 roll in carload lots and $2.45 for smaller quantities.

Shingles, red and green slate finish cost $5.50 per square in carloads, $5.75 in smaller quantities, in Philadelphia.

ROOFING MATERIALS—Prices per ton f.o.b. New York or Chicago:

	Carload Lots	Less than Carload Lots
Tarfelt (14 lb. per square of 100 sq. ft.)	$64.00	$65.00
Tar pitch (in 400-lb. bbl.)	21.00	22.00
Asphalt pitch (in barrels)	40.00	45.50
Asphalt felt	72.50	77.00

HOLLOW TILE—The price per 1000 in carload lots f.o.b. mine is as follows:

	4 x 12 x 12	8 x 12 x 12
St. Louis	$70.00	$140.00
Chicago	70.00	120.00
Denver, per ton	None	None
Kansas City	78.60	150.00
St. Paul	56.00	110.00
Boston	110.00	150.00
Birmingham	72.00	135.00
Cincinnati	72.75	136.10

LUMBER—Price of yellow pine per M in carload lots:

	1-in. Rough 10 In. x 16 Ft.	2-In. T. and G. 10 In. x 16 Ft.	8 x 8 In. x 20 Ft.
St. Louis	$21—37.05	$23.00—24.50	$26.00
Birmingham	33.00	33.00	28.50
Denver	40.00	42.00	42.50
Cincinnati	45.00	44.00	39.00

STEEL SHEETS—The following are the prices in cents per pound from jobbers' warehouse at the cities named:

	Pittsburgh, Mill, in Carloads	New York			Cleveland		Chicago	
		Current	One Month Ago	One Year Ago	Current	One Year Ago	Current	One Year Ago
*No. 28 black	5.00	6.495	6.445	10.00	6.42	9.50	6.52	9.50
*No. 26 black	4.90	6.395	6.345	9.90	6.32	9.40	6.42	9.40
*Nos. 22 and 24 black	4.85	6.345	6.295	9.85	6.27	9.35	6.37	9.35
Nos. 18 and 20 black	4.80	6.295	6.245	9.80	6.22	9.30	6.32	9.30
No. 16 blue annealed	4.45	5.695	5.645	9.70	5.62	9.70	5.72	9.70
No. 14 blue annealed	4.35	5.595	5.545	9.60	5.52	9.60	5.62	9.60
No. 10 blue annealed	4.25	5.495	5.445	9.50	5.42	9.50	5.52	9.50
*No. 28 galvanized	6.25	7.745	7.695	13.00	7.67	11.00	7.77	11.00
*No. 26 galvanized	5.95	7.445	7.395	12.70	7.37	10.70	7.32	10.70
No. 24 galvanized	5.80	7.295	7.245	12.55	7.22	10.55	7.47	10.55

* For painted corrugated sheets add 30c. per 100 lb. for 25 to 28 gage; 25c. for 19 to 24 gages; for galvanized corrugated sheets add 5c., all gages

COPPER WIRE—Prices per 1000 ft. for rubber-covered wire in following cities:

	Denver			St. Louis			Birmingham		
No.	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex
14	$15.00	$20.00	$35.00	$12.50	$15.50	$33.50	$11.50	$17.80	$36.80
10	25.65	28.90	57.45	27.20	31.00	63.00	31.80	34.30	67.60
8	36.45	40.25	80.30	38.00	42.00	78.00	42.85	46.85	.....
6	57.40	61.70	.....	.....	65.00	130.00	69.60	74.10	.....
4	83.40	88.70	.....	.....	93.00	.....	101.75	151.35	.....
2	126.60	132.80	.....	.....	140.00	.....	151.50	168.00	.....
1	164.15	172.40	.....	.....	182.00	.....	201.00	254.50	.....
0	206.80	206.80	.....	.....	242.00	.....	276.00	285.00	.....
00	278.80	278.80	.....	.....	290.00	.....	317.00	330.00	.....
000	341.65	341.65	.....	.....	360.00	.....	417.00	428.50	.....
0000	417.05	417.05	.....	.....	435.00	.....	508.00	516.04	.....

EXPLOSIVES—Price per pound of dynamite in small lots and price per 25-lb. keg for black powder:

	Low Freezing 20%	Gelatin 40%	Gelatin 60%	Gelatin 80%	Black Powder
New York	.....	$0.28½	$0.35½	.....	$2.50
Boston	$0.25¾	.28½	.35¾	$0.42¾	2.50
Cincinnati	.19¾	.23½	.29¾	.....	2.45
Kansas City	.21½	.27½	.34¾	.44½	2.55
Seattle	.15½	.22½	.39½	.....	2.35
Chicago	.19¾	.23½	.34	.44	2.45
St. Paul	.20	.27¾	.34¾	.....	2.45
St. Louis	.20	.27½	.34½	.44½	2.35
Denver	.18¾	.26	.33	.43	2.55
Dallas	.24	.31½	.38½	.48½	.....
Los Angeles	.23	.29	.37	.....	3.05
San Francisco	.19	.26	.33¾	.43½	2.35

* Price for 100 tons or over

FREIGHT RATES—On finished steel products in the Pittsburgh district including plates, structural shapes, merchant steel, bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished), chains, etc., the following freight rates per 100 lb. are effective:

Boston	$0.27	New Orleans	$0.385
Buffalo	.17	New York	.245
Chicago	.27	Philadelphia	.23
Cincinnati	.23	St. Louis	.34
Cleveland	.17	St. Paul	.495
Denver	.99	Pacific Coast (all rail)	1.25
Kansas City	.59		

Note—Add 3% transportation tax.

COAL AGE

Volume 14 — New York, September 12, 1918 — Number 11

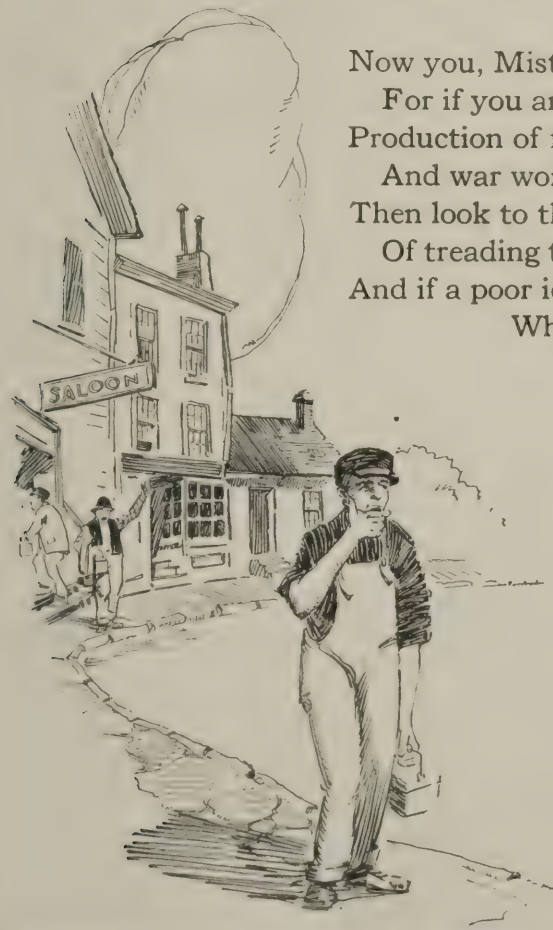
Think, Man, Think!

by Rufus T. Strohm

Written Expressly for Coal Age



So keen was the doughboy who went "over there,"
So hell-bent on chasing the Hun out of France,
That Tommy and Poilu were filled with despair
In trying to wean him from taking a chance;
"You're out of the scrap if you're wounded," they said,
"And too many dead put success on the blink;
So stop, when you're tempted to stick up your head,
And think, man, think!"



Now you, Mister Miner, your case is the same,
For if you are injured or if you are killed,
Production of fuel goes halting and lame
And war work's delayed while the job is unfilled;
Then look to the doughboy and learn to beware
Of treading too close to the dangerous brink,
And if a poor idiot flings you a dare,
Why, think, man, think

Fight shy of the perils in practical jokes,
Like jarring a chap with a shot of the "juice,"
For man-power's needed, and sensible folks
May think you're a dangerous fool to run loose;
And if on your way to the work at the mine
Your pals turn aside for a sociable drink,
And urge you to join them at Bacchus's shrine,
Then think, man, think!

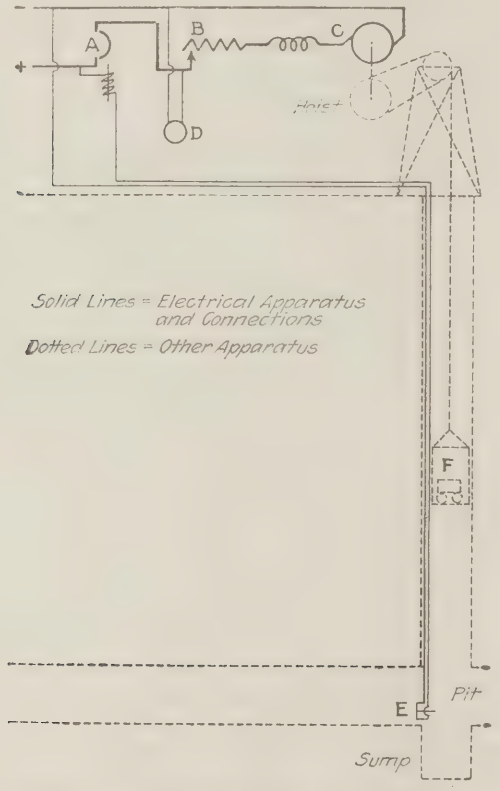
IDEAS AND SUGGESTIONS

Safety on an Electric Hoist

By R. J. Calloway
Chicago, Ill.

A large number of the accidents that occur in coal mines arise from careless handling of the cages. I know of three fatalities in a certain Illinois mine due to a misunderstanding of signals between the cager on the bottom and the hoisting engineer on top.

The electric hoist is being used more extensively than ever before, and the safety device proposed in this



ELECTRICAL CONNECTIONS TO THE HOIST

article could be employed quite readily with this type of lift. Manifestly, any scheme tending to promote safety in the handling of cages must place the control of the circuit supplying power in the hands of the cagers themselves. They are the workers who will suffer injury in case the hoist is operated at the wrong time.

The plan suggested may be understood by referring to the accompanying diagram. The hoist in this instance is shown connected to a series motor, although the scheme could be applied to other types. One leg of the circuit runs through the contactor *A*. This contactor should be located in a locked compartment so that it cannot be tampered with. From the contactor the current goes in turn to the controller *B*, the motor *C* and thence to the negative side of the circuit. A pilot lamp *D* is connected across the circuit just ahead of the controller. The control circuit of the contactor is carried down into the pit to the mechanical trip switch *E*.

The operation is as follows: The cage *F*, descending the mine shaft trips out the switch *E* just as it reaches the bottom. This opens the contactor *A*, removing the power from the motor circuit. When the cagers have completed their operations they close switch *E* manually. The contactor *A* then closes automatically, restoring power on the motor circuit and lighting the pilot lamp *D*. The lighting of this lamp is a signal to the operator to hoist. In case the control circuit of the contactor accidentally becomes broken, the power is of course automatically cut off, preventing operation.

Other schemes have been proposed to eliminate the hazards of caging. One plan contemplated loading coal onto the cages at the bottom by gravity much in the same manner as it is removed from the cages at the top. This, however, would in most cases involve a new and expensive form of entry work, and, so far as I am aware, has not been extensively tried out.

"Balance"

By Western Manager

Man at his best in many ways resembles a machine, and like a machine he has a tendency to become erratic under certain circumstances. The human brain acts not only as a storehouse in which should be neatly pigeonholed and ready for instant reference facts gained by personal experience and observation, but as a governor or balance which, when properly operating, should control the conscious actions of the entire mechanism.

Who has not seen an engine damaged or wrecked by the failure of the governor to act during some emergency? Likewise, who has not seen some man's entire future either seriously impaired or rendered absolutely valueless by the failure of his brain, or balancing mechanism, to slow down his actions under excessive internal pressure or outward stress.

The engine governor is constructed to work under a certain maximum pressure, either high or low, and when that maximum is exceeded the governor either slows the engine down or disaster results; and so it seems is the human brain constructed. Some individuals are endowed with high-pressure governing centers which permit of a wide range of control, while others are not so fortunate and seem to have a definite limit, beyond which it is not safe to force them.

Balance is the secret of success; it is known also as horse-sense, and no man without it has ever advanced very far. A man may be highly educated, gifted in his particular line of endeavor, and experienced in the details of his business, but owing to lack of balance he may never advance beyond a subordinate position, while another man, possibly a classmate, who was never noted as a student, may reach the pinnacle of success with no apparent effort. He, however, had balance.

Many a good mine foreman has been spoiled by promotion to a superintendency which he was not mentally attuned to hold. The pressure was too high for his governing faculties, and under the stress he, figuratively, blew up.

Numerous examples could be cited, many of them concrete, of men, who while making an undisputed success in subordinate positions proved egregious failures when promoted, notwithstanding the fact that they may have had the necessary educational training and experience to fit them for the higher position. They were lacking, however, in one essential qualification which sadly cannot be attained by either study or experience.

The higher official, when seeking a man to fill a vacancy, is often hard put to find a man having the requisite qualifications of experience, theory and balance, and the last of these is the most unusual. The subordinate who is passed over may feel that he has been treated unjustly, when actually the boss, with his greater experience and wider range of vision, has done him a signal favor by preventing him from making a failure which might affect his whole future.

It is true that numerous individuals, like some engines, run along for years without any obvious balance or control, but sooner or later they reach the scrap heap. The really big men of any industry are those who possess temperaments balanced to the finest point, and with a wide range of adjustment.

Practical Signal System on a Mine Slope

By C. G. Brehm
Oliver, Penn.

In a certain mine the coal is delivered to the shaft, from a higher level, by a dilly trip, on a slope. On the surface there is provided a 150-hp. three-phase, 60-cycle, 440-volt motor, from which a rope descends a borehole and passes around a bull wheel, to pull the empties up the slope to the different landings and

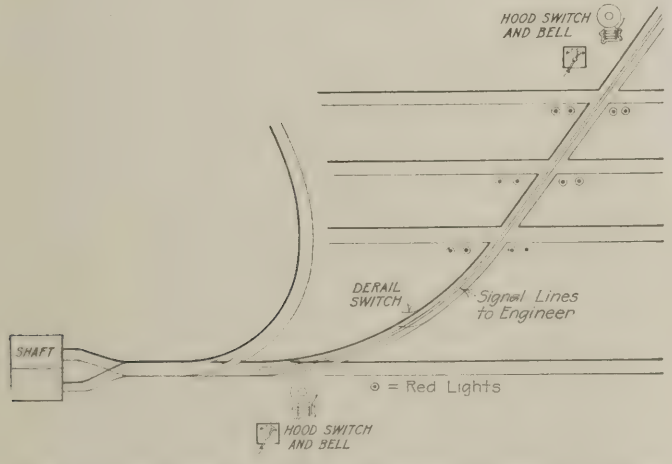
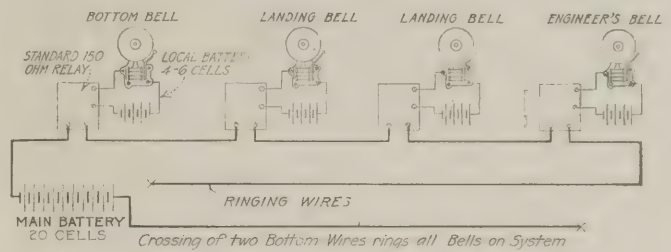


FIG. 1. DIAGRAM OF SAFETY SIGNAL INSTALLATION

to let the loads down. The length of the haul is about one mile each way, and the loads develop considerable speed in being dropped to the shaft bottom. Throughout the length of the slope is provided a signal line to the engineer. This the rope rider uses for starting and stopping.

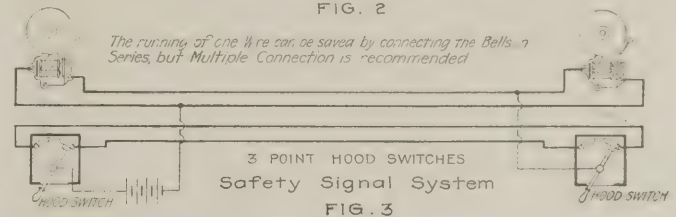
Several flats cross this slope, on which drivers are continually working, and as this system was being installed the possibility of accidents on these crossings presented itself. Another danger was also apparent, arising from the possibility of the rope or hitching breaking and allowing the loads to come into the bottom uncontrolled.

In an effort to minimize this danger and also safeguard the drivers at the crossings a system of electric danger lights and signals were installed as shown in Fig. 1. A derail switch was provided on the slope, near the shaft bottom, which normally remains open. On the slope, about 1000 ft. from the bottom, is placed a three-point hood switch and bell connected to a similar



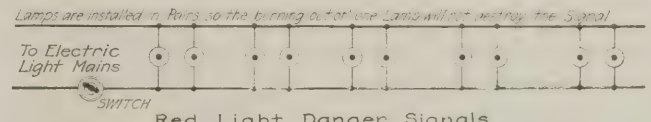
Haulage Signal System

FIG. 2



Safety Signal System

FIG. 3



Red Light Danger Signals

FIG. 4

FIGS. 2 TO 4. DETAILS OF THE WIRING SYSTEM

set at the bottom. There is also provided at each crossing red lights, which are lighted by the bottom man when a trip approaches.

The rope rider, on coming down the slope, throws his hood switch, and because of the presence of the bell knows if the bottom man is receiving the signal. In case his bell did not ring he would know that the signals were not working and would stop the trip by signal to the engineer. The hood switch bell on the slope, as well as the one on the bottom, will continue to ring until the bottom man throws his hood switch. The bottom man, upon receiving the signal of an approaching trip from the rope rider, snaps on the red lights for the crossings, closes the derail switch, and the trip is safely landed at the bottom.

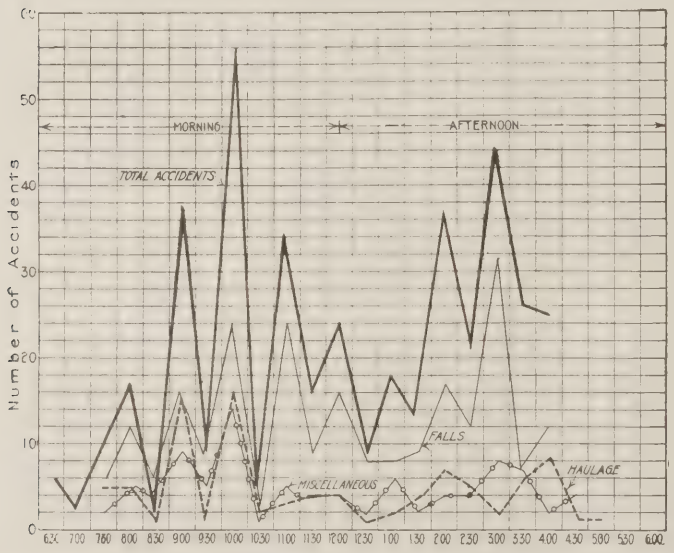
If for any reason, such as the breaking of the rope or hitching, the trip was to run away, a special signal call on the engineer's lines would warn the bottom man and the crossings would be protected by the red lights while the trip would be derailed at the switch. This system has been in operation for several years and has given perfect satisfaction. Details of the wiring are shown in Figs. 2, 3 and 4. No doubt such a signal system, or a modification thereof, can be used to great advantage in many mines.

Who Gets Hurt and When?

SYNOPSIS — Gives details, which have long been desired, relative to the distribution of mine accidents. In the Ellsworth mines Mondays and Tuesdays, ten o'clock and three o'clock, July and August, the third and fourth years of experience and ages over 47 seem to mark points of greatest accident hazard. Most of these dangers could be reduced if appropriate steps were taken by the employee.

THE Ellsworth Collieries Co., of which E. E. Bach is sociological director, not only notes how its men get hurt also when the accidents occur. It further records how long the men have been engaged in mining work and how old they are; in short, it ascertains: Who gets hurt and when?

Some people say that men get hurt when they are tired; others say they get hurt when they are sleepy, after long hours, a heavy meal or a midday schooner of ale; some say they are hurt because they drink over much on Saturday and Sunday and do not have full control of their faculties on Monday and Tuesday, and

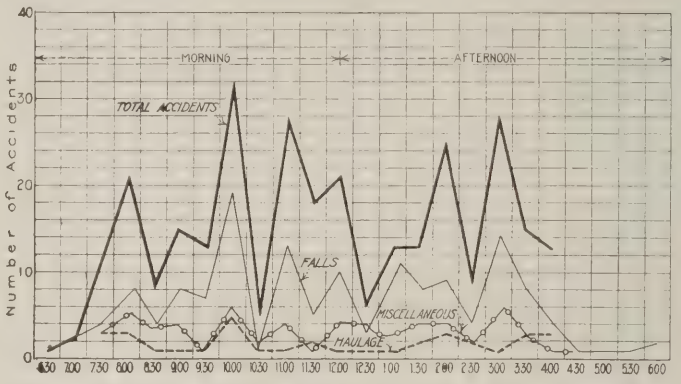


ELLSWORTH CASUALTIES IN 1916, CHARTED ACCORDING TO HOURS OF OCCURRENCE

so forth. Statistics do not prove much, but they at least give indications which a wise man will heed.

The Ellsworth Collieries Co. has fortunately had an entire freedom from catastrophic accidents since the beginning of its observations in 1911 and before. The figures and charts therefore do not need any revision to eliminate such general accidents. Two charts here presented show the number of accidents in each half hour of the day with reference to falls, haulage and miscellaneous hazards. The charts also show how the total accident rate varies with the half hours of the day. Apparently the early part of the morning is comparatively free from accidents. Ten and three o'clock seem to have been in both 1916 and 1917 the moments of greatest danger. It is natural to ask: Are these the hours of fatigue of the morning and evening? or, "Are there other causes for the frequency of accidents at these hours?"

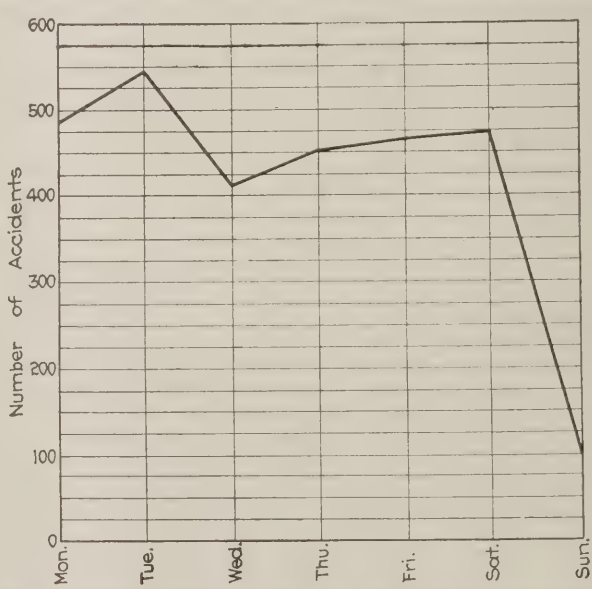
It is interesting to note that the men are still menaced by rock falls at as late an hour as 3 p.m., for the rate reaches one of its two peaks at that hour. The Ellsworth men must stay perseveringly at their work or the inherent danger of the mine face must be pecu-



ELLSWORTH CASUALTIES IN 1917, CHARTED ACCORDING TO HOURS OF OCCURRENCE

liarly severe at that time. Probably it is the absence of the men from work that accounts for the lower peak in the accident rate at 3 p.m. than at 10 a.m. It is interesting to note that in both 1916 and 1917 the haulage risks were at a minimum at 3 p.m. whereas the miscellaneous risk and the risk from falls was at a high point.

It must be remembered that at these mines shotfirers are employed, but they shoot the coal during working hours, and the progress of shooting may have something to do with the distribution of the accident frequency



ELLSWORTH CASUALTIES, 1911 TO 1917 INCLUSIVE, CHARTED BY DAYS OF WEEK

from falls of coal and roof. It will be noted from a table and a chart accompanying this article that Tuesday is the day with the greatest number of accidents and Monday is the next worst day. One does not know how many men would be killed if the Sunday "drunks" reported for work on Monday, though perhaps this sug-

ACCIDENTS DISTRIBUTED ACCORDING TO DAYS OF OCCURRENCE

Year	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.	Tota
1911	59	79	62	78	72	59	21	430
1912	56	72	59	52	53	77	38	407
1913	79	81	70	48	84	83	8	453
1914	63	73	42	46	67	32	2	325
1915	65	94	55	70	56	77	13	430
1916	103	77	81	103	69	80	8	521
1917	62	67	45	54	63	66	12	369
Total	487	543	414	451	464	474	102	2,935

ACCIDENTS DISTRIBUTED ACCORDING TO MONTHS OF OCCURRENCE

Year	Jan.	Feb.	Mar	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1911	37	30	32	24	34	18	32	60	40	36	37	50	430
1912	50	43	34	11	41	30	23	44	27	44	30	30	407
1913	39	27	42	43	28	51	55	31	55	43	28	11	453
1914	8	24	33	20	28	37	44	31	32	34	13	21	325
1915	21	24	27	34	39	52	52	29	41	39	43	29	430
1916	55	75	55	25	32	32	63	40	42	28	44	30	521
1917	33	35	33	26	23	33	33	33	21	40	37	22	369
Total	243	258	256	183	225	253	302	268	258	264	232	193	2,935

ACCIDENTS DISTRIBUTED ACCORDING TO OCCUPATIONS

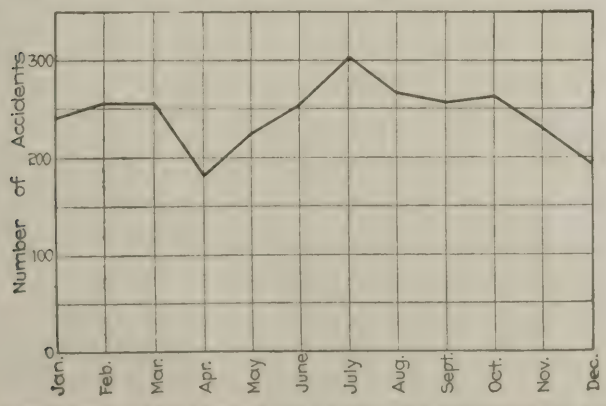
	1913	1914	1915	1916	1917	Total
Loader	19	12	20	175	148	374
Digger	12	27	20	104	73	36
Snapper	45	42	37	18	27	69
Laborer	47	25	33	17	15	137
Machineman	43	41	31	6	33	154
Motorman	30	17	13	18	14	92
Tracklayer	22	30	12	0	0	64
Shotfirers	44	5	11	0	4	64
Trapper	35	7	13	0	0	55
Pumper	5	2	12	2	0	21
Timberman	25	9	12	9	15	70

TONS MINED PER FATAL ACCIDENT

Year	Fatal Accidents	Tons Coal Mined	Tons Coal per Fatality
1907	9	1,278,122	142,013
1908	24	1,134,947	48,122
1909	7	1,122,384	174,626
1910	11	1,518,212	138,019
1911	10	1,375,475	137,547
1912	10	1,400,163	140,016
1913	8	1,627,058	203,382
1914	5	1,200,427	240,085
1915	8	1,722,542	215,317
1916	3	1,480,630	493,543
1917	10	2,050,820	205,082

gestion is not fair. It would take a clearer case than is shown to justify the connecting of the larger fatality risk of Tuesday and Monday with the hebdomadal inebriety of mining towns. It may be said that the Ellsworth Collieries Co. village is without a saloon, but just outside liquor is extensively sold, and the wholesalers, much to the regret of the company, do a large trade in the town itself.

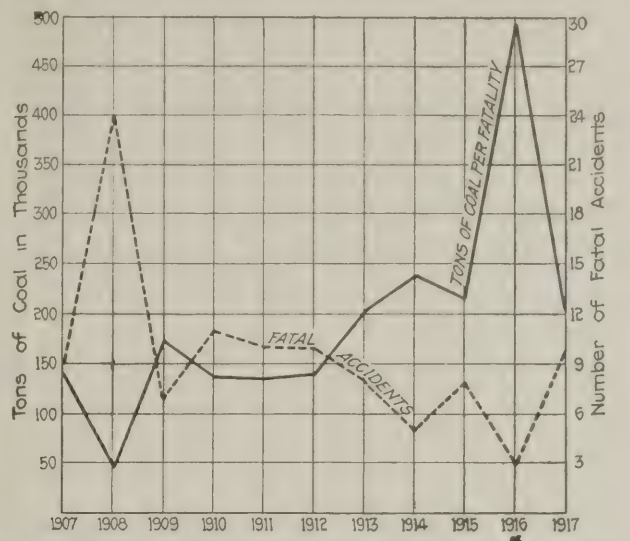
Another table and chart show that July and August have the greatest accident frequency. It is doubtful whether much can be determined from this information without a segregation of the accidents of mine workers and day hands and without some information as to the number of days worked in each month in the years under consideration. The Ellsworth Collieries Co. works more steadily than many others, and being the adjunct of a steel plant and having coke ovens, its operation is doubtless more evenly balanced throughout the year than is the operation of most mines, but still it is not safe to assume an equality of operation



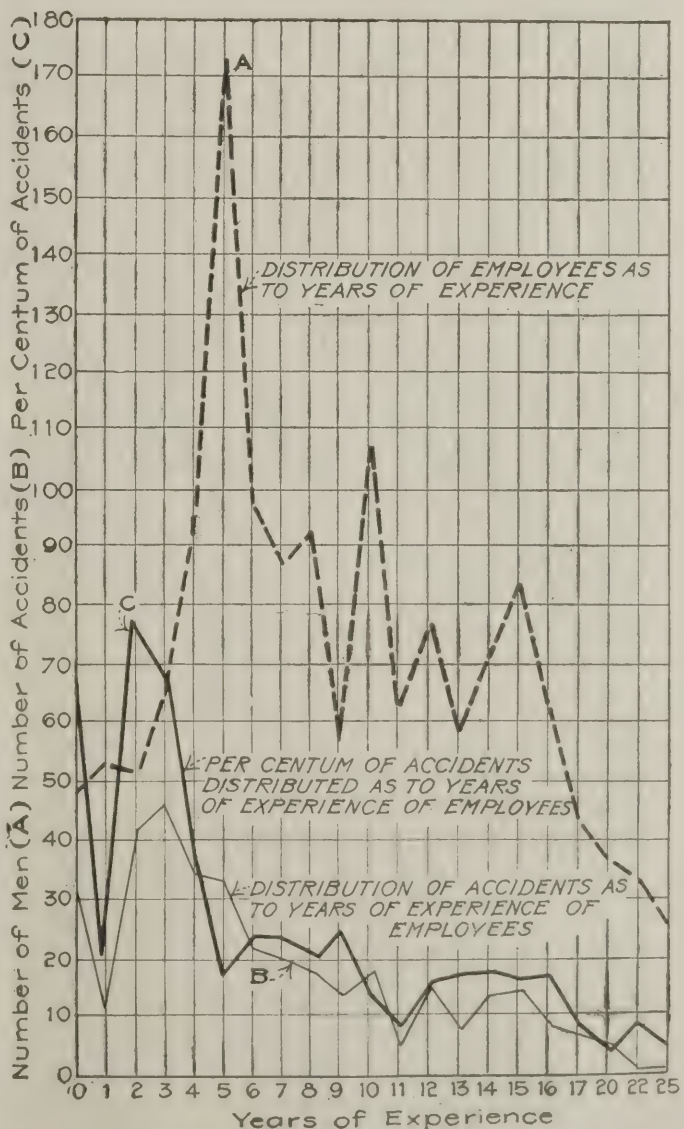
ELLSWORTH CASUALTIES CHARTED BY MONTHS IN YEAR

month by month; in fact the summer months were probably the least active and yet had the greater number of accidents.

The distribution of accidents by occupations is interesting but without a table showing the number of



ELLSWORTH FATALITIES AND TONS PER FATALITY FROM 1907 TO 1917



RELATION BETWEEN EXPERIENCE AND RISK AT ELLSWORTH, 1916 TO 1917

men engaged at the various kinds of work thus listed it is impossible to draw any conclusions except perhaps that the snapper and in less degree the motorman, like the train hand on the railroad, is exposed to the worst of all conditions. The danger from mine cars continually grows with the increased speed and increased length of trips. If anything goes wrong with the snapper in the rear of the trip, the motorman knows nothing of it as the noise of the trip and the distance between these two coworkers make it impossible for them to keep in touch.

The record of tons per fatal accident shows remarkable improvement until 1917 when the record falls to the level of 1913. In most mines 1917 was a year of increased fatality per ton of coal, the increase arising apparently from the hurry with which the work was performed.

One interesting chart shows the distribution of accidents with years of experience of the employee, how



RELATION BETWEEN AGE AND ACCIDENTS AT ELLSWORTH, 1916 AND 1917

many employees there are with a given number of years of experience and the relation between accidents and men employed for any given number of years of experience. It seems to show that the greenhorn with less than a year's experience is a poor risk. Experience and observation seem to improve him and when he has been between a year and two years at the work he is a fairly safe employee.

But the third year ushers in a period of risk taking. He appears to have become sure that the dangers will "never get him" and as a result he is "frequent deceased" after two years' experience. Gradually he appears to learn better. In the "5-plus" year he has become a "safety fan." He no longer believes in tempting Providence. Though there are wriggles in the percentage curve thereafter, on the whole it is a descending curve to the last.

All this is very consoling. It shows it is easy to teach safety to the greenhorn and it proves that the older men are willing to stay taught. But in between there is a peak exhibiting a disposition in the new man to "sow his wild oats in the safety field." This disposition can surely be eliminated by suitable safety propaganda.

The thorough investigation of the Ellsworth Collieries Co. seems to show that the old miner with his set ways is not the big offender. It is the young man with the wine of life in his veins and strength in his limbs who is willing to take and does take a chance, not because he is convinced that a certain course is safe enough but because he just delights to gamble with death as he likes to gamble with the contents of his pay envelope.

Let the young, inexperienced miner see that achieving safety is just as well worth while as playing with danger and he will become a safer employee. Every young man has ideals and works toward them. If they are ideals of foolhardy courage he will follow his ideals to his death. If they are ideals of safety and thrift, he will follow them through a long industrious life of good citizenship to an old age of comfort and honor.

An Iniquitous Custom

A criminal action was heard in the coal mining town of Fernie, B. C., recently which created something of a furor there and held the attention of coal mine operators and miners throughout the province. The circumstances, in a few words, were that a miner employed by the Crow's Nest Pass Coal Co. was accused of loading a number of cars and placing his tally check thereon while supposed to be on company work and paid by the company. Thus he got double pay—pay at the stated rate for company work and pay, under the contract system, for the coal loaded, which in the ordinary way was credited to him.

Witnesses for the defence testified in effect that it frequently happened, so frequently as to be almost a custom, that subofficials would allow contract miners, while working on company time, credit for coal loaded by them on contract basis in addition to the regular schedule for the company shift. It was alleged that the motive for this was to "speed up" operations by hastening the expeditious completion of necessary work and avoiding undue interference with production.

On the other hand company officials and subofficials entered an emphatic denial of the existence of such a system. The secretary of the local union declared that the practice was common but repudiated it, stating that it was not followed with the approval of union officials.

The Court in fining the accused $100 or six months in jail said: "If this custom did exist, it is a criminal one. I do not care if a few overmen or firebosses connived with the workmen; it was a criminal one undoubtedly. I do not share Mr. Phillips' (witness for the defence) Bolsheviki idea that it is all right to steal from your employer but not from your fellow worker. I do not think any right thinking man will agree. But, as I say, if it was a custom, it was a criminal one and one a man should be punished for."

Progress in Accident Prevention

What the National Safety Council Has Accomplished in Safeguarding the Workman—Nothing Can Be Achieved Without the Earnest Co-operation of the Workers Themselves—Education in Safety Should Begin in the Home—How the National Safety Council Has Grown

THE development of the science of accident prevention in America within the last five years has been summarized in a single phrase, "Nothing is so valuable economically as the man." Outlined briefly, the following have been found to be the essential features of accident prevention work:

1. To ascertain the actual conditions of risk under which employees perform each task and to determine the practical methods of eliminating or reducing this risk.

2. The provision of proper working conditions and of efficient safeguards for dangerous machinery and appliances.

3. Careful selection, instruction and supervision of workmen, and their assignment to work for which they are best suited.

4. The promulgation and rigid enforcement of necessary rules for safeguarding.

5. The inculcation of habits of caution in the minds of all concerned.

Actual conditions of risk, five years ago, were usually summarized as follows: Industrial accidents, fatal, one every four minutes; non-fatal, one every four seconds. Only male workmen were taken into account and no reference was made to the many women and minors engaged—probably because no statistics were available. Elimination of risk has not been achieved or even approached, but a start has been made, approximating reductions of 15 per cent. in fatal and 40 per cent. in non-fatal industrial mishaps. Members of the National Safety Council who have carefully compiled statistics covering the five-year period report even more satisfactory totals, a few declaring reductions for both fatal and non-fatal classifications of 65 to 85 per cent.

The attempted achievement of proper working conditions and the standardizing of safeguards on dangerous machinery and appliances have revolutionized modern industrial methods, particularly when applied to plants engaged in "quantity production." Starting with the fundamental principle of installing only safe machinery and equipment, plant managers demand of machine builders that every guard of known merit shall be incorporated in the design of the machine. In the present day workshop the executive strives to embody in every operation, beginning in the drafting and planning departments, provisions for safeguarding his workmen. The purchaser of a crane, for example, can now secure a completely appointed device—fully as efficient as any previous model, plus a full complement of guards.

Manufacturers of woodworking devices have gone further, probably, than any other group of machinery designers, and shapers, jointers, saws and planers are usually fully protected. The same may be said, varying only in degree, for the manufacturers of lathes, cutting, stamping and boring machines commonly found in workshops of every character. In the operation of such machinery, however, plant executives, even through the most careful supervision, have not succeeded in achieving entire elimination of work accidents.

In older installations the safety engineer and department foremen are relied on to design and fabricate most of the guards. Certain large industries have systematized the designing, building and installation of guarding devices by turning the work over to a special department, and men engaged in this work are not called upon to take part in production. Remarkable results have been achieved, but as yet, although records in accident prevention show reductions of 85 per cent., no safeguard, however elaborate in design and efficient in operation, is claimed to be "fool proof." Accidents still occur.

Careful selection, instruction and supervision of workmen and the assignment to them of work for which they are best suited may be said to start in the home rather than in the factory, workshop or mill. Education in safety begins with the parents, continues in the schoolroom, and finally reaches the employment manager or foreman.

A score of American cities have attempted civic safety work, notably Rochester, N. Y., where a campaign of education embracing every phase of home, street, public and industrial accident prevention is being carried on. Thousands of educational bulletins, changed weekly, have been printed and displayed, and the lessons have proved of intense interest. Scenes familiar to every citizen of Rochester have been utilized to drive the lesson home, and it is a safe prediction that the campaign will prove of lasting benefit.

Special series of safety bulletins are available for use in public schools, and in many communities these are proving valuable aids to teachers in safeguarding pupils to and from their homes. Primary lessons in crossing streets, avoidance of traffic accidents, safety at play and in the home are taught in the lower grades, while in the advanced grades more comprehensive lessons are offered.

Carrying the idea to a logical conclusion a national committee is now at work formulating a scientific course for students of technical schools and universities. The need for such a course is emphasized by the establishment in western Pennsylvania of a private course in safety engineering, under the auspices of a local branch of the National Safety Council, the industries being unable to secure a sufficient number of technically educated men to fill the positions awaiting such engineers.

Supervision, whether in production or in accident prevention, is one of the most important of industrial problems. In safety work it has often been said that "without the whole-hearted coöperation of the foreman all efforts in accident prevention must fail."

Adopting the experience of safety engineers it has been found advisable, if not imperative, to enlist the services of the general manager not only in enforcement

but in every stage of preliminary planning; this secured, the executive staff accepts as the policy of the establishment the slogan "Stop the Accidents," or as more popularly phrased, "Safety First."

The management, the planning staff and the foremen working in unison, the employment manager is next in line for conversion to the movement. This is well emphasized by the present plan in certain large industrial plants of charting every position in the works and the acceptances by the employment managers of partially incapacitated men or women for lighter service. The plan, too, has worked well in returning injured men to work. Men incapacitated because of injury to a lower extremity are found places where service may be performed while seated, as has been repeatedly proved to the satisfaction of both employer and employee.

The promulgation and rigid enforcement of necessary rules for safeguarding has worked out in actual practice to an advanced stage of mutual coöperation. Success in drafting shop rules for accident prevention has been attained when shop safety committeemen serve on boards organized for the formulation of accident prevention standards. In fact, next to the general manager and his superintendents, the members of the shop safety committee are the most valuable safety boosters in the plant.

Safety rules are often augmented by bonuses, prizes and rewards of various kinds, and these serve to inculcate the habit of caution in the minds of all concerned. That "the best safety device known is a careful man" is an aphorism of proved merit. Discipline has its value, but watchful care must be exercised to prevent foremen from confusing discipline with peevishness or "nagging" of workmen. Proneness to follow precedent in operation, while excellent in maintaining discipline of a sort, is destructive to best results in safety work—change of process, equipment and operation calls for complete revision of method, and gradually habits of personal caution and thinking observance of safety standards are revising experience tables of lost-time mishaps in the industries of the country.

History of the National Safety Council

ON SEPT. 20, 1912, the Association of Iron and Steel Electrical Engineers met in the city of Milwaukee and following the report of the Committee on Accident Prevention, resolved to launch a national coöperative movement for the dissemination of policies and methods worked out in the steel industry and found effective in reducing the number and severity of industrial accidents.

Forty delegates attended the First Safety Congress, meeting jointly with the Iron and Steel Electrical Engineers. An outline of procedure was adopted, together with a constitution and by-laws, and the work of scientific accident prevention became an integral part of American industrial life. Federal and state officials were in attendance and took active interest in the work. After several days of discussion and careful planning, a central body was established known as the National Council for Industrial Safety. For convenience of classification, departments were established to popularize and further the movement, and the close of the Congress found the organization ready to take up safety work in the mining industry, on the railroads, in manufacturing and among iron and steel companies.

The new organization grew and prospered. A weekly safety bulletin service was established and has continued without a break for more than four years, growing to a distribution of 75,000 copies per week. Statistical researches were made and tabulated, and practical value given to shop activities. The innovation of using available data in the simple and effective form of one-page illustrated bulletins, rather than in the compilation of massive treatises, proved the value of the Council's services in presenting the lessons in readable form, fresh from the press. The Council doubled its membership and greatly increased its usefulness in the second year.

The Third Safety Congress was held at the Hotel LaSalle, Chicago. This series of meetings was epoch making, both in attendance and interest; it was at this Congress that the industrial medical practitioner first made his voice heard. Plant managers learned that the installation of adequate mechanical safeguards did not comprise their entire duty. Sanitation, ventilation, control and eradication of industrial disease, elimination of infections—all these and other questions were placed on the program and thoroughly discussed. Tuberculosis, blood poison, hernia, eye strain and excessive fatigue were handled in a way to awaken the interest and cooperation of the large audiences.

A year of intense activity followed. With a broadened scope of activities the association changed its name to the "National Safety Council." The program of the Third Safety Congress furnished the text for the activities of the officers and members, and the work was carried on with renewed enthusiasm. The membership doubled, and with every mail came scores of experience statements from plant officials. These were compiled, digested and reissued for the information of the whole membership. It is significant of the interest taken in the work that the master minds of industry have cheerfully and unostentatiously given so liberally of their time and experience for the causes of safety and humanity.

The Fourth Safety Congress was held at the Bellevue-Stratford Hotel, Philadelphia. To meet the demands of the Congress it was necessary to again divide the Council into new sections, each group meeting being larger in attendance and more ambitious in program than the first congress at Milwaukee. The Governor of Pennsylvania, the mayor of Philadelphia, the press and the public united to further the propaganda of the congress.

After the preliminary "round table" gatherings, devoted to general discussion, ten sectional meetings considered the particular safety problems of their industries. The Cement Section took a leading part in the congress, as did the Mining, Steam Railroad, Laundry, Paper and Pulp Manufacturers, Public Utilities, Textile, Industrial Hygiene, Safeguarding of Machinery, Foundry and Woodworking Sections.

It was at this gathering that the greatest truth in the safety crusade was forcibly driven home to plant managers, safety engineers and the public: That all the safeguards, all the rule books, all the discipline, and all other efforts must fail without the earnest and willing coöperation of the workmen themselves. Millions of dollars had been expended by members of the National Safety Council in perfecting mechanical safeguards in their plants; other millions went for sanitation, for ventilation, for preventive measures, yet the men vitally affected too often showed only a perfunctory interest in their own welfare.

A score of addresses and lectures were delivered at the Philadelphia Safety Congress, pointing the way to success in administering safety work—the way to the hearts of the millions of men and women toiling in the industries. The visiting nurse, the industrial physician, the dentist and the teacher came forward and joined the employer, social worker, priest and parson in teaching applied and practical Christianity. Industrial justice was the keynote of the congress.

Another important lesson was gleaned from the wealth of digested experience and statistical data furnished through the medium of the parent body—the National Safety Council. Where one accident was prevented through safeguarding, three were prevented by the exercise of personal care and caution by the workmen themselves. Where one case of industrial disease was prevented in the shop or factory, two were susceptible of prevention and cure in the home life of employees.

From the time of the Fourth Safety Congress the importance of education, rather than compulsion, in safety matters, was given prominent place in the activities of the movement. The elasticity of safety work was never better exemplified than during the succeeding year. Employers who had held aloof, waiting for the movement to prove itself, came forward in whole-hearted recognition of the justness of the plea for a larger humanity. From an organization struggling to meet the patent demands made upon it in the simple necessities of every-day life, organized accident prevention, almost in a day, was placed beyond the need of financial worries.

From the Fourth to the Fifth Safety Congress the membership again doubled in number; the work of the sections was improved, an increased staff at headquarters facilitated the activities of the officers and the newer phases of safety work were pushed with unrelenting vigor.

The Fifth Safety Congress was held at the Hotel Statler, Detroit, and the Sixth Congress at the Hotel Astor, New York City. Perhaps the most important contribution to the cause of safety during this period was the organization of an information bureau and library containing every scrap of printed material available, touching on the work of accident prevention. This information bureau, at present in charge of three trained librarians, classifies and files all available data, sending it to hundreds of inquirers every month. Among the duties of a staff of safety engineers is the classification and preparation of the material for suitable bulletins and publications for employers and safety engineers to properly start them in new activities. For the year ending Apr. 1, 1918, five million bulletins were distributed to fifteen thousand representatives scattered in all parts of the country.

During the year 1917 a monthly pamphlet, "Safe Practices," was born; this is an encyclopedic work destined to take its place in literature with the foremost handbooks of accident prevention. A modest number on "Ladders" was followed by others on "Stairs and Stairways"; "Boiler Rooms"; "Crane Construction and Safe Practices"; "Knots, Slings, Bonds and Hitches"; "Belt Shifters," etc. In time, it is intended to present every phase of industrial education, and by rule, illustration and practice complete a digest of safe practices for the prevention of accidents in every branch of industry.



DAVID VAN SCHAACK
President



S. J. WILLIAMS
Manager Accident Prevention Division



W. H. CAMERON
Manager, Secretary and Treasurer

MEN WHO HAVE GUIDED THE DESTINIES OF THE NATIONAL SAFETY COUNCIL DURING THE PAST YEAR

Y. M. C. A. Building vs. "Y. Hut"

BY CHARLES F. WILLIS
Consulting Supervisor, Department of Industrial Relations, Phelps Dodge Corporation, Bisbee, Ariz.

Though the illustrations and story are based on the experience of a copper corporation, which is practically identical with the Stag Canon Fuel Co., a large coal-operating concern, the ideas given are quite applicable to coal mining. The article was prepared specially for us by the author.

A PROBLEM that is now being faced in many states of the union, and one which probably will soon be confronted all over the country, is how to replace saloons in mining and industrial communities by other places of entertainment. There have been many experiments along this line. Some believe that the motion-picture houses have already to a large extent replaced the saloon. Without a doubt, many who formerly were accustomed to loaf around saloons now attend motion picture houses, but these institutions are a partial substitute rather than a replacement.

It is not a logical replacement in that it provides none of those things that made the saloon attractive as a place in which to spend one's leisure time. It is not natural for a man working underground in the semi-darkness and in a more or less close atmosphere to select similar conditions for his leisure hours. Recreation rightly understood involves a change of conditions from those obtaining during working hours.

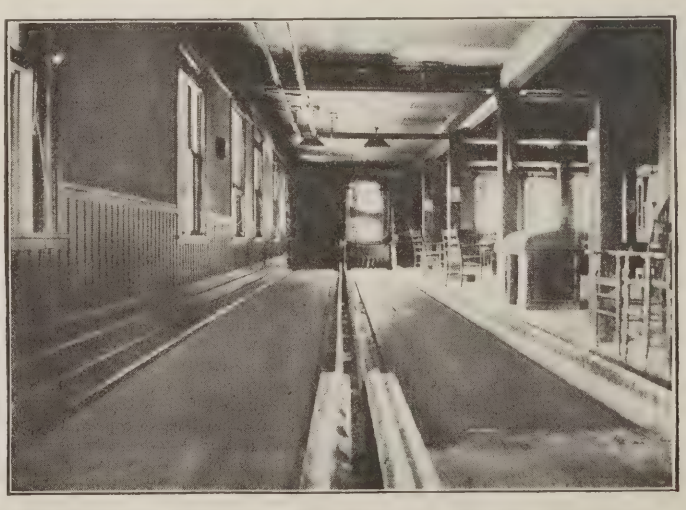
Since the abolition of the saloon in "dry" states there have been many soft-drink parlors established—this being another method of replacing the saloon. While this is a more logical method of meeting the difficulty, these places of entertainment have not proved successful. As business ventures they have paid, but they have not supplied the element of sociability on which the saloon keeper of the past relied as a means of attracting customers. In a soft-drink parlor a man usually goes in, gets his drink and comes out, staying no longer than is absolutely necessary for that purpose.

In certain mining communities there has been an attempt to replace the saloon by Y. M. C. A.'s, at which every conceivable equipment has been provided that in any way promised to furnish a substitute for the allurements of the saloon. There is grave doubt, however, that they reach the men who were accustomed to frequent the bar room.

Notable among the mining camp Y. M. C. A.'s is that provided by the Phelps Dodge Corporation at Bisbee, Ariz., where a fine building has been erected with practically everything in the line of "Y" equipment—pool tables, bowling alleys, swimming pool, gymnasium, motion pictures, educational classes, reading room with library and religious work. One might go through the entire list of Y. M. C. A. activities and find none of them missing in this organization. It has been remarkably successful, and now has some 1800 members, about 1000 of whom are miners, and the community has been much interested in its development. Its success has been apparent; it fills a place in this community that no other organization could fill, but there is again serious doubt that it actually replaces the saloon.

Another institution to replace the saloon is the employees' club, which is somewhat different in nature from the typical Y. M. C. A. The Morenci Club is an activity of this kind. It is also found at a village of one of the Phelps Dodge subsidiaries. A splendid building has been provided and the club serves as a recreational center for the people of the town. This organization is run partly as a business proposition; pool tables and bowling alleys are provided at about one-third the usual cost of these things; the best motion pictures are secured, even though it is done at a loss, for the company desires to educate the taste of the people for the best films. The club was designed to be a loafing place for all, irrespective of nationality or religion, to serve as a place where properly supervised entertainment could be obtained at a reasonable price. This institution also has a distinct place in the community, a definite need which it fills; but here again the question arises, "Is it actually replacing the saloon?"





MORENCI CLUB, MORENCI, ARIZ., AND A VIEW OF THE CLUB BOWLING ALLEYS





Y. M. C. A. AT BISBEE, ARIZ., BUILT BY PHELPS DODGE CORPORATION AT A COST OF $116,000; CLOSE UP OF ENTRANCE IS SHOWN ON RIGHT

It might be well here to analyze the saloon and the features of it that need replacement, to see whether or not the various substitutes do fulfill these needs. Saloons are usually placed conveniently to the homes of their prospective patrons; as the town grows, more are found, in locations convenient and easy of access. Comparatively few men go to a saloon primarily to drink. They go there because it is convenient, because it is a place where they will find congenial company, and they gather there in groups sufficiently small that all present may enter into close companionship.

They like the saloon because the equipment and the surroundings do not make them feel out of place, no matter how they may be dressed. They like its free and easy air. There are no restrictions; they can make all the noise they please or be quiet if they so desire. They buy drinks because they feel that it is only fair to the saloon keeper that they pay him something for using his building as a loafing place. This is not true in all cases, of course, but it is undoubtedly true of many persons. Many a man's first attraction to the saloon is the opportunity it affords to associate with the people who frequent it. It is only later that he gets the drinking habit and goes there for the express purpose of drinking.

Does the soft-drink parlor, the fine Y. M. C. A., or the commodious employees' club fulfill these conditions for the man who ordinarily used the saloon? As a rule these organizations are so large that intensive sociability is difficult. Yet they are not large enough to accommodate readily the many men who formerly used the saloon as a poor man's club. Y. M. C. A.'s and employees' club buildings are generally costly, it being the desire of the mining companies to erect something for their employees that is worth while. Fine lobbies, huge leather chairs and many luxuries are found, which are not a part of the saloon atmosphere or of any atmosphere to which the workman is accustomed. To make use of these places he instinctively feels that he has to don a white collar.

In most mining camps the working force is composed of men of many nationalities, and one saloon or another gradually becomes the loafing place for men of some one of the many nationalities represented. We find that there is little mixing between the people from different countries. In the case of the Y. M. C. A. or the employees' club, however, an attempt is made to mix these races. Moreover there may be but one, or there are, at best, but two Y. M. C. A.'s or clubs in a large community. If that community is not spread over a large area it is easy for every man to take advantage of the entertainment provided, but in many mining villages the distances are too great for that to be done. Men seek their social pleasures at the nearest point to be found, particularly after performing a hard day's work.

Now comes the question as to what features of the saloon can be provided, where they can be provided, and in what manner administered, so that they will reach the people whom the saloon is designed to accommodate. I believe that it is possible to supply everything that the saloon provided with the exception of alcoholic drinks, to provide them under some supervision and to give them all the features, with the exception of the bar, that has made the saloon attractive.

What is it, then, that draws men to the saloon? Bright lights, warmth and comfort, a building not so fine but what the workmen could feel at home, regardless of his dress, a place small enough for intimate social relations and a place convenient to his home. The saloon substitute will have to provide these, and an additional something to provide for the time which in the case of a saloon is spent at the bar.

May we not learn something from the Army Y. M. C. A.? This organization did not go into a cantonment of 30,000 men, put up one fine building and expect the men to use the building in common, but rather it put up eight or ten or even more huts. Is it not possible to follow out this same idea in mining communities? This does not mean necessarily putting up shacks, but rather buildings that are one or more steps up in quality and surroundings from the saloon. It is a case of educating the people to better things, but this cannot be done in one jump.

Why not provide in each residential section of a mining camp a neat but inexpensive building, measuring possibly 20 x 40 ft., containing two or three pool tables, a couple of card tables, a branch library, with magazines and newspapers, an electric piano for music, and a counter where smokes, candy and soft drinks could be purchased? One of these could be erected for each one

thousand of population, and it could be located near the homes of its prospective patrons.

The mining companies operating in these communities should furnish these buildings, as private capital could not afford to indulge in experiments of this sort. The substitute could not expect to make profits as generous as the saloons. The saloon keeper often provided several questionable attractions to draw people to his place of business, but his temperance rival could hardly vie with him in this business.

Not only is it necessary that the company should stand behind the ventures financially, but it is advisable that it should finance and control the institutions, for then they will not be run merely as business propositions. There will be much in the way of price and other regulation. The plan fits itself readily to every size of community. The buildings need not be uniform in size, and in fact where there is much racial diversity, more and smaller buildings would seem to be advisable.

There are several ways in which these "huts" could be administered. They could be organized as Y. M. C. A. substations, and under such organization could include many advantages of the "Y." They might be put under direct supervision of the company, and a man employed to run them, who would be given a guaranteed salary or a percentage of the profits. Either of these plans would probably be preferable to leasing the buildings to concessionaires. The scheme appears to afford a cheaper and more satisfactory plan of replacing the saloon than many of these hitherto favored.

This Company Gives Its Girls a Good Time

FOR a number of years E. H. Morand, superintendent of the schools of Sopris, one of the Colorado Fuel and Iron Co.'s operations, has yearly taken some of the boys of the company's villages on a camping trip, sometimes quartering them in a house but more usually erecting tents for their accommodation.

When Miss Miriam C. Dawley came to Primero in 1916 to be the first community secretary engaged in connection with the Young Men's Christian Association's activities of the Colorado Fuel and Iron Co., she extended this good work by taking about 45 girls from four of the mining towns of that concern for a similar outing in the woods. On this first trip they slept in a schoolhouse and used an abandoned boarding house for kitchen and dining room. Last year the girls obtained the use of the country club at Stonewall. Eleven of the Colorado Fuel and Iron Co. camps were represented and 79 girls in all attended.

These camping trips have been so successful that the company officials decided to build and equip a lodge that could be used as a permanent camp for both boys and girls. The site selected for this lodge is in a most picturesque place near the natural wall of stone at Stonewall, Colo. The building is located in a beautiful pine grove and has been christened the "Camp of the Whispering Pines." The main hall is 25 x 56 ft. and has an immense stone fire-





HOW THE COLORADO FUEL AND IRON CO. GIRLS FROLIC AT THE CAMP OF THE WHISPERING PINES
Above—Interior view of the lodge with girl merrymakers ranged in converging lines from the roaring open fire. Below—A demonstration of the campfire girls in front of the lodge with the the "whispering pines" in the rear





WITH EXERCISE LIKE THIS THE GIRLS OF THE FUEL AND IRON CO. DEVELOP THEIR LUNGS AND SQUARE THEIR SHOULDERS

Above—Return to camp after night spent in the mountains. These girls went up high enough to find a large snowbank. Below—Setting-up exercises at 7:15 a.m. The lodge is in the background. Here, first the girls and then the boys are entertained.

place at one end. This room is used as general assembly room, for games, dances, classes and dining room. The dining tables are portable and are moved out of the way when not in use. The company has furnished all the equipment, including 60 folding cots; the best grade of enamelware, silver knives, silver forks and silver tea, soup and tablespoons, sufficient glassware, a complete set of kitchen utensils, a pressure cooker or digester, a hotel range and hot and cold water. Four shower baths and dressing rooms are being built and a telephone installed. Before the next camping season the kitchen will be remodeled, a new pantry storeroom added and barracks will be built. This will make the camp quite complete and give every facility for comfort and convenience.

This year the girls from 18 of the company's villages, all those that are in this part of the state, were represented, over 200 girls being present. The girls over twelve came in two separate groups and stayed ten days. Another group of girls under twelve years of age stayed for one week. The daily program was as follows: Rising bell, 6:45; setting-up exercises, 7:15; devotional service and flag raising, 7:30; breakfast, 7:45; cleaning up of building and grounds; folk dancing, 9:30; painting and stenciling, 10:00; first aid, 10:30; Red Cross, 11:00; dinner, 12:00; rest hour, 1:00; recreation, 2 to 5:30; supper, 5:30; stunts, 7:30; retiring bell, 9:00; lights out, 9:30.

The company furnished all the girls with transportation from their home to camp and return. As the ground is located 13 miles from the railroad, the girls were taken to and from the station by automobiles furnished by the company. A trained nurse, paid by the company, looked after the physical welfare of the girls and taught first aid. The different camps took turns in putting on the stunts in the evenings and gave many clever performances, which were appreciated by the audience.

On June 23 the lodge was formally opened. Several officials of the company were present and the building was presented to the girls and boys of the Colorado Fuel and Iron villages by S. G. Pierson, vice president of the company. An interesting program was given, the meeting being attended by large numbers of the friends and families of the girls.

The boys' turn followed soon after the girls' closed and was attended by about 100 boys. These camps have been so successful and have been so thoroughly enjoyed and so beneficial to the girls and boys that a more extensive program is already being planned for next year.

We are apt to deplore the fact that some of the men at the mines are prone not to use the best judgment as to the use of their leisure moments. Their ideals and those of their families, we are disposed to declare, are not of the best. Perhaps there has been no attempt, as here at the "Whispering Pines," to uphold higher ideals of amusement and community service, and that may account for the fact that pleasure is sought where only pain and discouragement are to be found.

Safety in the Use of Explosives*

By ARTHUR LA MOTTE†

The development of measures and appliances for avoiding accidents incurred in the use of explosives and for minimizing their results has been the subject of careful study and experimentation. Though there exists among mining men a general familiarity with specified precautions, a closer analysis of the recommendations made by manufacturers is often desirable. The list of "don'ts" seems formidable, but it should prove interesting to mine executives, foremen and workmen.

IT HAS been maintained that it takes three generations to make a gentleman; the same may be said of a man who can be depended upon to engage in hazardous work with a maximum of safety. One must begin with his grandfather. The primary characteristics of the safe man are unselfishness and consideration for others. Personal bravery and nerve, or cowardice, has nothing to do with it. Thorough knowledge of the subject has a great deal to do with it. The most unsafe man on dangerous work, or, rather, in handling dangerous goods, is the man who is afraid to be afraid. He may know that the thing he is doing is dangerous—he may know that it is dangerous to remain where he is under certain conditions—but he is often afraid to take cover himself or to warn others, or to take ordinary intelligent precautions, for fear of being thought afraid.

Timid Attitude of Foremen Detrimental To Best Safety Practice

I remember being in a mine some years ago where five men were killed by the tipping of a skip while it was being hoisted, because several of the men rode on the bail, causing it to tilt in front and engage a crosstie. Positive orders were thereupon issued that no one should be allowed to ride on the bail; and yet, only three days later, when I was coming out of the mine, in company with the foreman and several others, the skip was stopped and several men got on and climbed out on the bail. When the foreman remonstrated with them, saying that this was against orders, one of the men sneeringly remarked: "What's the matter with you? Are you afraid?" This instantly silenced the foreman, who made no further objection, and we went out under exactly the same conditions as those which were known to have caused a fatal accident.

The prevention of this type of accident, it seems to me, can be accomplished only by discipline, laying down hard and fast rules and enforcing them ruthlessly. Education, which is effective in preventing a large class of accidents, seems to be helpless here. If possible, rules should be made so inelastic as to prevent even the officers of the company from violating them. In the army, for general safety, even the commanding general may not do certain things, and I feel it would have a beneficial effect on industrial workers if they knew that their chiefs were not allowed to do various dangerous things which are forbidden the workers.

To return to the subject, it is necessary, to an extent, to begin with the grandfather of the dynamite; that is, the raw materials. These are purchased on specifications, submitted to a rigorous analysis, and are carefully inspected, sorted and strained. The inert or non-explosive ingredients which enter into the manufacture of explosives are just as carefully treated as are the more essential ingredients; and this inspection is brought right up to the last process in the course of manufacture. For instance, the wood meal and nitrates are given the final sieving in the mixing house just before they are put into the tub and incorporated with the nitroglycerin. This latter ingredient is put through a series of processes which would delight the heart of any safety man. From first to last it is "handled with gloves," generally rubber gloves. After separation from the acid it comes in contact only with wood or rubber. It is washed and stored in wooden tubs under water. It is drawn off through rubber pipes, the flow through which is stopped by elevating the end of the pipe. It is weighed in rubber buckets and is transported either through rubber-lined gutters by gravity or by a rubber-tired traveling tank with a rubber hose for a spout. Buildings are floored with rubber and the workmen wear rubber-soled shoes. The scales are covered with rubber, both the platform for the box and the platform for the weights. The weights also are covered with rubber. The operation is carried out in a frame building having an earth embankment entirely surrounding it as high as the eaves of the building itself, and this building is kept as far away from every other explosive building as the experience of the plant engineers shows to be necessary. After the dynamite is made, it is transported, in the process of being punched and packed, in wooden boxes having no exposed metal parts, and is punched with soft rubber-tipped wooden sticks. Special shoes are worn throughout the danger area, and the floors of the buildings have coverings of soft rubber-like material which can be taken up from time to time and burned.

Precautions Developed from Classification Of Accidents

For a number of years a list of accidents in the use and handling of explosives was kept, compiled from the British and Canadian government reports and supplemented by an elaborate system of American newspaper clippings. The object was to classify the accidents which happen in the use of explosives in such a way that a brief list of precautions could be made up which would cover practically every condition likely to arise in the use of explosives in mines, quarries or on construction work. The list is added to from time to time, whenever a new cause of accident is reported. It is not always possible to be specific, but that the list covers the ground fairly well is shown by the fact that in the last few years no accident has been brought to the attention of the du Pont de Nemours management which is not

*Paper to be read at the September meeting of the National Safety Council.

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covered by the rules and which would not have been prevented had all of the precautions been observed. This list of precautions is printed in the company's catalogs, and I will take each rule in turn and try to explain the reason and necessity of the precaution.

All rules begin with the injunction "Don't." I remember reading this list at a convention of coal miners a few years ago, and one of the miners told me at the end that if he obeyed all the rules he would not be able to use explosives at all, but when I asked him to describe in detail each of the different operations through which he went in his blasting, I showed him that at no time did he do anything in violation of these rules, which was probably the reason why he had never had an accident with explosives.

"Don't forget the nature of explosives, but remember that with proper care they can be handled with comparative safety." The function of explosives is to explode, and a perfectly safe explosive would be useless. The company has always tried to avoid describing any explosive as safe, but explosives can be used in such a way that accidents are avoided, and for the man who handles explosives a good thought to carry is: "Don't take a chance, and don't try conclusions with dynamite." It is dangerous, of course; but so is a mine mule, and both the mule and the dynamite will perform their allotted work and render good service if treated with the proper amount of respect.

Danger of Smoking and Use of Open Lights

"Don't smoke while you are handling explosives, and don't handle explosives near an open light." Not all explosives ignite from a spark with the same facility. Blasting powder and nitro-starch powders are most easily ignited. The paper shells covering dynamite give it a certain amount of protection, but there is considerable difference, even among the various kinds of dynamite, in the ease with which they are ignited. Straight dynamite ignites more easily than ammonia dynamites and gelatins. The permissibles of the ammonia-base type are least easily ignited. A pipeful of ignited tobacco spilled in an open box of dynamite would probably ignite it; it would certainly ignite blasting powder. Open lamps on the hats of men who carry the dynamite around in the mine are distinctly dangerous, as sparks are continually falling from wick lamps, and, although acetylene hat lamps are safer, I have seen a lighted lamp drop into a box of dynamite. The best practice is for powder men to be equipped with permissible electric hat lamps, which are the safest lights known. It is thought that the Park Avenue explosion in the New York subway construction was brought about by a man bringing an open light into the powder house, where a number of detonators had been inserted into the dynamite. I remember seeing a drill runner drop an open bug-light into a lot of paper shells which had been removed from several boxes of gelatin dynamite and which entirely covered a box of primers. This was in one of the New York subway tunnels and probably closely paralleled, except for the result, the Park Avenue explosion.

"Don't carry loose matches in your pockets while loading explosives—use safety matches." A number of accidents have occurred from the dropping of matches from hat bands into bore holes which were being loaded with dynamite. Quarrymen frequently appoint a number of laborers to fire the block-hole and mud-cap shots, for the lighting of which they fill their pockets with matches and stick half a dozen into their hat bands, so that in case one match goes out at a critical time they can quickly lay hand on another. These men are called upon, in the loading of a large blast, such as well drill holes, to assist the blasting foreman, and it seldom occurs to him to take matches away from the men, especially out of their hat bands. In leaning over the holes, matches stuck into the hat band are likely to fall into the bore hole and fire the dynamite. Though dynamite will usually burn peacefully in the open, it cannot be depended upon to do so in a bore hole, and will certainly explode if the detonator has been inserted.

I almost hesitate to read the next rule on the list, as it would seem that no one out of an insane asylum would require it, yet the failure to observe so obvious a precaution has been the cause of many serious explosions. "Don't shoot into explosives with a rifle or pistol, either in or out of a magazine." To an intelligent man it would appear to be a plain case of suicide, and yet not many years ago a customer tried to convince one of the company's salesmen that the dynamite would not explode if fired into with a small-caliber rifle bullet. The customer tried the experiment in his cellar, shooting into several cases of dynamite which he had stored there. However, he failed to prove his point, as the dynamite did explode, killing the experimenter and his entire household. "Don't allow shooting or hunting near magazines." Though magazines should be bullet proof, it is seldom that they are, and, even if they were, the doors are likely to be open when explosives are being carried in or out. The risk of a disaster is too great for any sensible person to take any chances.

Careless Deposition or Storage of Explosives

"Don't leave explosives in a field or in any place where cattle can get at them." Black powder probably would do them no harm, but nitroglycerin is a powerful poison. Although cattle like the taste of the soda and nitrates in dynamite, the other ingredients would probably poison them. "Don't handle or store explosives in or near a residence." In some parts of the country it is the custom for miners to buy their own explosives and take home what they do not use in the day's work. This introduces a great hazard into the home, both on account of the possibility of children getting hold of the explosives and because of the danger in case the building should take fire. The new Federal regulations governing the handling of explosives will probably result in fewer accidents from this cause.

"Don't leave explosives in a wet or damp place. They should be kept in a suitable dry place, under lock and key, and where children or irresponsible persons cannot get at them." There is an increased effort in the matter of conservation to use nitrate of ammonia explosives, which require less nitroglycerin. Nitrate of ammonia explosives are more hygroscopic than other types, although any explosive will deteriorate when stored in a humid atmosphere. Probably the chief cause of explosives taking on moisture is storage in magazines built into the side of a hill in so-called dugouts. The actual loss in dollars and cents from this kind of treatment of explosives is considerable, but there are two

reasons from a safety standpoint why explosives should be kept dry. In the first place, wet dynamite and wet blasting caps produce only a partial detonation, which is likely to cause a blown-out shot, and is highly dangerous in coal mines containing inflammable gases or dust. Secondly, the fumes from a partial detonation are more poisonous than those from explosives which are in good condition and explode perfectly. Dampness in blasting caps is a prolific cause for dynamite igniting instead of detonating, and a charge of burning dynamite in a bore hole fills the working place with extremely poisonous fumes. At present more care is taken to keep explosives under lock and key than was the case a few years ago. Blasting caps are particularly attractive to children, and from 30 to 50 accidents are caused every year through their playing with them, resulting in the loss of fingers, hands or eyes, and occasionally in loss of life. When one considers that a modern blasting cap will blow a hole through a $\frac{1}{16}$-in. steel plate, and that the pieces of flying copper will imbed themselves in iron two or three feet away, it is not difficult to realize what a power for mischief these necessary articles may become.

"Don't explode a charge to chamber a bore hole and then immediately reload it, as the bore hole will be hot and the second charge may explode prematurely." This operation, variously known as "springing," "chambering," pot-holing," "squibbling," and so on, is done by exploding a succession of charges in increasing amounts in the bottom of the bore hole, with little or no tamping, in such a way as to expand the bottom of the hole, so that a larger charge may be accommodated. In some rocks the enlargement is produced by shearing and scaling off rock from the sides of the bore hole, and in others by compressing the rock itself. This latter, of course, is possible only in soft rock. Considerable heat is generated, not only by the explosive itself, but in the compression that occurs, and unless ample time is allowed between "springing" shots, accidents are likely to occur from an explosion of the charges which may be placed in the hot pocket, or become ignited from fragments of fuse or wire insulation. Of course, when the pocket is full of water and fills up immediately after each "springing" operation, there is no danger from the hole being too hot, but another hazard presents itself in the loading of "sprung" holes. That is the danger of the dynamite, especially when a straight dynamite is used and the cartridges are slit, getting between the cracks and crevices of the rock in such a way that when the hole is being tamped it may be pinched under considerable pressure and cause an explosion. For this reason, dynamite of the gelatin type is much safer to use where this operation is regularly performed, but where gelatin cannot be used the next best thing is not to slit the cartridges.

"Don't do tamping with iron or steel bars or tools.

Fireco—A New Mining

Town in Heart of Coal Region Planned for Social,

ONE has but to look at the view of Fireco, Raleigh County, West Virginia, the seat of operations of the Leckie Fire Creek Coal Co., which bears the name of the company's president—Col. William Leckie, of Welch, and of the Douglas Coal Co., of which Colonel Leckie is also president—to secure some conception of how admirably Colonel Leckie and his associates have planned for the spiritual, social and physical welfare of the employees of the companies named as well as for the production of coal. To any one who knows Colonel Leckie such thoughtfulness on the part of the genial Scotchman, who combines business sagacity with a tender heart, is not surprising.

As will be observed from the view of Fireco, the town is grouped about the schoolhouse, the doctor's house, the theater and the company store. That is the pulsating center of this mining community. The schoolhouse seen in the picture is a large four-room building, well lighted and equipped with all conveniences. The company has also provided a schoolhouse for colored children, equally well lighted and conveniently equipped. The miners' houses are provided with modern conveniences such as electric lights, running water, shower baths or bathroom, sewerage, etc. An up-to-



NEW MODEL TOWN OF FIRECO, IN WEST VIRGINIA, SEAT OF OPERATIONS

Use only a wooden tamping stick with no metal parts." There is great danger in punching dynamite with an iron tamping rod, especially in holes bored in hard rock, but I venture to say that nearly half the miners who use dynamite use their drill steels for loading the charges, and, considering the frequency of this practice, it is a wonder that more accidents do not occur. It would seem a simple thing to provide miners with wooden tamping sticks and compel their use, but a number of them look upon it as a needless refinement, and always having their drill steels with them, they prefer to use them. When powder men remonstrate with them, they say that if the drill does strike a spark it will not ignite the dynamite; that they use it carefully and ram the dynamite in gently. However, it is only the survivors who say this. The men who are killed do not give their versions of these affairs. One of the curiosities of legislation was a bill introduced in one of the state legislatures requiring the use of several inches of copper on the end of the tamping sticks. When black blasting powder was used to a greater extent than it is now, copper was looked upon as a safe material to use with it, because it would not strike a spark, and that same feeling has descended to dynamite, but it is just as easy to detonate a drop of nitroglycerin or a pinch of dynamite with a copper hammer as it is with a steel one.

"Don't force a cartridge of explosives into a bore hole." This is one of the prolific sources of accidents in the use of explosives and one of the most difficult to control. If a miner or blaster has a cartridge of dynamite sticking half way down in a bore hole, it is a great temptation to drive it further by main strength rather than let it go and waste the bore hole and all the labor that it represents. Fortunately, modern explosives, which are much less likely to explode from rough handling than the straight dynamites of 10 or 20 years ago, have reduced the number of accidents from this cause to a considerable extent. The remedy, of course, is to have the drill bits always made to gage, allowing for a sufficient clearance over the diameter of the dynamite that is being used.

"Don't have a wire carrying electric current near detonators or charged bore holes at any time except for the purpose of firing the blasts." One of the dangers of having electric mining or quarrying machinery around explosive operations is the chance of one of the terminals coming in contact with the electric blasting-cap wires. Considering the care necessary to make connections properly for firing the blast purposely, it would seem that this danger is remote, but a number of accidents have occurred through careless placing of light wires. When the blasts are fired by the lighting or power current, it is doubly necessary to observe this caution, because, even with special safety switches, there is always a chance of the workmen becoming confused and connecting the wrong wire. Though the power and

Town in West Virginia

Spiritual and Physical Welfare of the Employees

date water-works system gives the community a splendid supply of water.

Even the three-story building which houses the company's store and the company offices is not wholly devoted to commercial purposes, the entire third floor being thrown into one large room used either as a gymnasium or dance hall.

Adjoining the store is a large auditorium building in which every provision has been made for the recreation of mine workers. The auditorium itself, where moving pictures are exhibited, has a seating capacity of four hundred. Another room is set apart as a pool-room. There are also two restrooms in the building in which soda water and beverages of like nature may be obtained. The floor beneath the auditorium room is fitted up as a barber shop. This floor is also equipped with showers.

The plants of the Leckie Fire Creek Co. and of the Douglas company have been electrically equipped throughout. The coal is cut by electricity and hauled by electric power. The mine fans and the big pumps at the pumping station are electrically driven. A large building seen in the illustration houses the machine shop, the blacksmith shop and the electric repair shop.



OF THE LECKIE FIRE CREEK COAL CO. AND THE DOUGLAS COAL CO.

lighting current is generally advised for quarry and construction work in the open, the regular blasting machine is much safer in underground work, as by its use the danger of connecting the blast to a live wire can be avoided, and though in open work the number of shots that it is desired to fire at any one time may be in excess of what the blasting machine can do, it is rare indeed that such necessity arises in mining or tunneling operations. By keeping an entirely different circuit for the firing of the blast, much greater safety in operation is secured, but under no conditions should electric drills, electric punchers or undercutters be operated or other wires allowed around a room where men are charging bore holes for electric firing.

Men Should Be Protected From Blasts

"Don't explode a charge before every one is well beyond the danger zone and protected from flying debris. Protect your supply of explosives, also, from danger from this source." "Don't cut the fuse short to save time. It is dangerous and wasteful of explosive, as it is impossible to tamp such charges properly." There are not many accidents from flying rock where electric firing is practiced, as compared with cap and fuse, because the blaster will not operate the blasting machine if he knows he is in range of the blast, and, even if his leading wire is being continually shortened by the rock falling upon it, he will take care to lengthen it by splicing on other wire until he can get into a safe place; but in quarry work this does not always hold. The blaster is likely to continue to use his leading wire without taking this precaution and get too close to the danger zone. I have seen blasters fire their shots from the cover of an up-turned dump cart while there was an unused half-box of dynamite, with three or four electric blasting caps in it, out in the open a few feet away from them. It would seem an unnecessary hardship to expect the blaster to take all unused explosives and accessories back to the magazine before the blast is fired, as he may have to use some of them in case it became necessary to reprime a bore hole, but it should be impressed upon him that these left-overs should be put in a safe place before the blast is put off.

"Don't hurry in seeking an explanation for the failure of a charge to explode." This is to warn blasters against returning to the face in the event of a hang-fire, until sufficient time has elapsed to render it safe. High-grade safety fuse is a wonderfully reliable device. It is strong, resists abrasion well and stands immersion in water, often for several hours; and it is uniform in its burning speed. Cheap fuse is not regular in its burning rate, is not waterproof and will not stand abrasion against rock in the bore hole nearly as well as the better grades. However, any kind of safety fuse is likely, occasionally, to hang fire. This happens at times from the blaster failing to ignite the powder core, and the jute or cotton wrappings of the fuse may smolder for several minutes and then ignite the core, or, if the fuse is cut in the hole, the powder core may go out but ignite the jute beyond the break, which may cause a hang-fire. It is difficult in experimenting with fuse to simulate the conditions which cause hang-fires, but hang-fires do occur in actual work and are a prolific source of accident.

Accidents happen more frequently, perhaps, from a miscount in the number of explosions. Where eight or ten fuses are lighted simultaneously, two will frequently go off at exactly the same time, making one report. Consequently, blasters are inclined to venture back to the face, even if the reports heard do not tally with the number of fuses lighted, assuming that two or more have gone off together. In the event of a misfire, half an hour is the least time that should be allowed before investigating. Two or three hours is much better, and waiting until the next day is practically safe. Hang-fires can be eliminated by the use of electric blasting caps and electric squibs, and the increased sales of these devices are gradually cutting down the number of accidents from this cause.

"Don't drill, bore or pick out a charge which has failed to explode." A careful miner can sometimes be depended upon to remove the tamping and insert another primer. It is, however, at times safer to drill another hole near the missed one, but this is not practicable in many instances, especially in hard rock and in "sprung" holes. As a precautionary measure against striking the charge in the case of a misfire, it is suggested that a piece of newspaper or a handful of some other easily recognized foreign substance be placed on top of the last cartridge before the tamping or stemming is done. This acts as an indicator, so that the tamping may be removed with comparative safety without any chance of digging into the explosive.

"Don't use two kinds of explosives in the same bore hole except where one is used as a primer to detonate the other." It is a common practice in some sections to place a dynamite cartridge in the bottom of a bore hole and the main charge of black powder on top of that, firing the black powder with fuse or squib. The dynamite explodes from the shock of the black powder, but it does not explode as completely as when detonated by a blasting cap, and it is doubtful if any real benefit is obtained. Different explosives have such different rates of detonation that it is not only wasteful but frequently dangerous to use this method of blasting.

Beware of Frozen or Chilled Explosives

"Don't use frozen or chilled explosives." Although frozen dynamite is more difficult to detonate with a blasting cap than when it is properly thawed, it is more sensitive to other kinds of shock. Before low-freezing explosives became as generally used as they are today, a number of accidents occurred when men broke the frozen cartridges in two or rolled them to break up the frozen crystals. In loading well drill-holes with large-sized cartridges, a number of thawed cartridges could be dropped into the holes, sometimes 100 ft. or more in depth, with safety. Punching a hole into a frozen cartridge is by no means a safe operation, and the fumes from frozen dynamite are more poisonous than from the same dynamite when properly thawed. In fact, frozen dynamite frequently takes fire from the blasting cap and burns up, giving off large quantities of exceedingly noxious gases.

"Don't use any arrangements for thawing dynamite other than those recommended by the manufacturer." Thawing dynamite is one of the frequent sources of accidents, or, rather, it has been, as the use of low-freezing explosives has cut down the number of accidents from this cause enormously. Manufacturers of explosives have investigated every kind of thawing device and recom-

mend only those which they know are safe. Thawing must be done slowly, at a relatively low temperature, and no part of the explosive should be exposed to any temperature higher than that which can be comfortably borne by the hand. It should not be heated on stoves or on hot rocks or metal, or placed on top of a steam boiler, or over any steam or hot-water pipe, or over heated metal surface. The warmer dynamite becomes, the more likely it is to exude, and a drop of nitroglycerin falling a few inches on a heated metal surface may explode. For this reason the radiators or coils in a thawing house should always be over or to one side of the dynamite, and never directly under it. It is often a great temptation to thaw dynamite by putting it directly on top of the radiator, but this is an exceedingly dangerous operation, and radiators should be fenced off so that it is impossible to do this in the thawing house. Explosives should never be taken into or near a blacksmith shop or forge, as the flying sparks are likely to ignite or to detonate them.

Prompt Use of Thawed Dynamite Recommended

"Don't allow thawed dynamite to remain exposed to low temperatures; use it as soon as possible." Blasters often attempt to use explosives which have become chilled or partly frozen, and when remonstrated with say that the powder has been thawed. For this reason, they are urged to use the dynamite as soon after it has been thawed as possible and to take precautions against it freezing again after it leaves the thawing house.

"Don't paint magazine roofs black." On a bright summer day the temperature directly under the roof of the magazine, especially if the ventilation is poor, may rise to as high as 130 deg. This may cause the dynamite to leak, and the waterproofing on fuse and electric blasting caps to run, so that they will not only not be waterproof, but they will not carry the spark or explode. For the same reason, high explosives, fuse or detonators should not be exposed to the direct rays of the sun longer than is necessary. Sunlight tends to decompose nitroglycerin, as well as to cause it to leak if it becomes too hot.

Precaution To Be Observed in the Use Of Blasting Caps

"Don't allow priming (the placing of a blasting cap or electric blasting cap in dynamite) to be done in a thawing house." A separate place should be provided for the operation of priming, so there will be no temptation to use the magazine or thawing house for this purpose. The Park Avenue explosion in the first New York subway excavation was probably due to failure to observe this precaution. "Don't prime or connect charges for electric firing during a thunder storm." A number of accidents have occurred from lightning exploding charges connected for electric firing, not only in the open but in tunnels where leading wires have crossed the rails and the rails have been struck by lightning. "Don't carry blasting caps or electric blasting caps in your pockets." In the first place, the blasting caps are likely to accumulate moisture, in which case they may set fire to the charge instead of detonating it, or become filled with foreign matter, in which case they will not explode from the fuse, and, finally, they are too dangerous and sensitive to make this a safe practice; besides which, they are likely to fall out, become lost and turn up again at an inopportune moment. "Don't attempt to take blasting caps from the box by inserting a wire, nail or other sharp instrument into the caps," and "Don't try to withdraw the wires from an electric blasting cap." The explosive charge in blasting caps is extremely sensitive, as mentioned before, and a box of blasting caps has enough potential explosive force to blow a man in two. The proper way to remove one cap from a box is to tilt it over slightly until a few caps slide part way out, and then withdraw one of the caps with the fingers. "Don't fasten a blasting cap to the fuse with the teeth or by flattening with a knife—use a cap crimper." Crimping caps with the teeth is a common operation, but aside from the danger of biting the shell down on the fuse, it does not make an efficient crimp, and the fuse may come out or moisture get in. The cap crimper is a tool made specifically for this purpose, and it should always be used. "Don't keep electric blasting caps, blasting machines or blasting supplies in a damp place." All of these accessories are either spoiled or their life and usefulness are materially abbreviated by damp storage. A blasting machine which is kept in a dry place will be twice as effective as one not kept dry, and the same is true of blasting caps.

Manner of Wiring

"Don't leave the leading wire connected to the blasting machine." To make assurance doubly certain, it is not a bad idea to carry the blasting machine with one if it is necessary to return to the charge; then it is possible to be sure that nobody has tampered with it or will attempt to fire the charge while one is in the danger zone. "Don't loop or tie wire connections. Scrape the ends of the wires clean and bright and twist them tightly together." In mines where there is much acid water or corrosive gases, it is worth while to have all the blasting-wire connections soldered, as a number of misfires have been observed from connections, which were originally well made, becoming so corroded as to fail of their purpose.

"Don't insert blasting cap or electric blasting cap in explosive cartridges carelessly. Have closed end of detonator point toward the bulk of the charge, and have it tied to the cartridge securely." A large proportion of blasters using electric blasting caps punch a hole diagonally through the side of the cartridge, insert the detonator and take a half hitch around the cartridge with the wires. If the hole is punched through the cartridge at too great an angle, it is likely to go through the cartridge and possibly jam in the bore hole. This would probably lead to a fatal accident. The detonator should lie as nearly as possible in the central axis of the dynamite cartridge, although a slight angle does no harm, provided the end of the detonator is well inside the cartridge. The object in having the detonator point toward the bulk of the charge is that the greatest effect of the detonator is from its loaded end. If the detonator points away from the bulk of the charge, unexploded powder may be deposited in the bottom of the hole and afterward cause trouble. The detonator should always be tied or fastened securely to the cartridge, so that there is no danger of its pulling out when the charge is loaded and tamped. Otherwise unexploded powder or misfired holes may result.

"Don't store or transport blasting caps or electric blasting caps with high explosives." High explosives by themselves are fairly insensitive to shock and will withstand an extraordinary amount of rough treatment at times without exploding; whereas detonators are extremely sensitive both to shock and to sparks, and though they are violent in their explosion, effects are local. When they are carried in the same receptacle or transported together there is established a condition combining the sensitiveness of the caps with the far-reaching force and violence of the high explosive. The rule against storing or transporting blasting caps with high explosives is a particularly necessary injunction, and, unfortunately, it is often largely disregarded in mines and quarries where the powder man carries a box containing twenty or thirty pounds of dynamite with a box of caps or a bunch of primers on top of the dynamite.

"Don't attempt to use electric blasting caps with the regular insulation in very wet work. For this purpose secure 'waterproof' or 'submarine' electric blasting caps." This does not necessarily apply where only one shot is fired at a time, but where several shots are fired there is a possibility of electric leakage and short circuits through the ground to the electric blasting cap wires. This results in the under holes and those adjoining going off and the holes in the middle of the line missing fire. "Don't use old or broken leading wire or connecting wire." Broken wires are prolific sources of misfires and failure to get the shot off at the time desired. Breaks inside of the insulation are not easy to detect, and the use of wire that may contain broken sections or strands often costs much more than would new material.

Effect of Temperature on Fuse

"Don't handle fuse carelessly in cold weather, for when cold it is stiff and breaks easily. It should be warmed slightly before using." "Don't store fuse in a hot place, as this may dry it out so that uncoiling will break it." The waterproofing material on fuse is a compound of various asphalt tars with guttapercha and similar substances which become brittle in cold weather and which also are likely to run if subjected to too high a temperature. It is well worth while to store the fuse, at least immediately before its use, at a temperature between 60 and 80 deg. F. If the fuse is too cold it may crack when uncoiled and cause a misfire or a hang-fire, with its resulting danger, or, if stored in too hot a place, it is likely to go out and cause a misfire.

"Don't lace fuse through dynamite cartridges, and don't place several slit or broken cartridges on top of primer with cap and fuse. This practice is frequently responsible for the burning of the charge." The paper shell of the dynamite cartridge is sufficient protection against the side spit of the fuse from igniting the dynamite inside the shell. Without this protection the side spit is almost sure to ignite the dynamite, which will burn much more rapidly in a bore hole when strongly confined than it will in the open, sometimes causing the loss of a considerable proportion of the charge, besides giving off poisonous fumes and possibly blowing out the tamping and so making the explosion ineffective.

"Don't expect explosives to do good work if you try to explode them with a detonator weaker than a No. 6." The use of modern low-freezing ammonia dynamites has resulted in an immense reduction in the number of accidents, as those explosives are less sensitive to shock and friction than those in general use 20 years ago. At the same time, these explosives require a much stronger detonator to develop their full power then did the older type of explosives. Although it is possible under favorable conditions to detonate even these modern explosives with weaker detonators than a No. 6, there is a considerable factor of safety gained by using the stronger caps. They not only insure complete detonation, but increase the effective power of the explosive and reduce the amount of noxious fumes to a minimum. Explosives which have been stored for some time under adverse conditions become more insensitive, and a larger detonator tends to offset this condition to a considerable extent. Strong detonators will fire larger charges than weak ones, and they not only reduce chances of misfires, but almost entirely eliminate the chance of a properly primed charge burning instead of exploding. No. 6 or stronger detonators are required for all "permissible" explosives which are not "permissible" unless the strong detonators are used.

Amenities in Mine Villages

By C. J. Fuetter
Van Lear, Ky.

In every mine village covered water-tight garbage cans should be provided, each for the use of four families where these live close together. Tenants should be made to understand that all old cans, bottles, rubbish and garbage should be placed in these receptacles where the flies would not have access and from which odors could not escape. In warm weather the material thus deposited should be hauled off at least every other day to some place far away from the camp. There it should either be burned or buried. Hogs and chickens should not be kept in a mine village, as they cannot fail to be nuisances. Cows on the other hand are desirable property around a mining town, if proper care is taken to remove the manure piles regularly.

Round the drift mouths today the ground is too often bespattered with waste carbide. It is not unhealthful, but certainly not sightly. A box might be provided for the emptying of the spent carbide, and barrels of water could be placed nearby so that miners who went to charge their lamps with water could be accommodated.

Who's Next for a Shot at the Kaiser?





Resuscitated After Long Treatment

RESUSCITATION requires, from first-aid men and doctors, no little perseverance and unswerving faith. It is easy to become discouraged with the failure of the injured man to respond to the efforts made in his behalf. An instance of painstaking treatment and painful doubt, with final success as a result of continued effort, is furnished by the record of the first-aid team which aided Joseph Gemmel, who was smothered in a rush of coal and water at the Morea colliery of the Dodson Coal Co. on Nov. 5, 1917. The final successful result was highly creditable to the medical department and to the first-aid men of that corporation.

On the morning of the day mentioned, Gemmel and his "buddy" went to work in their breast off No. 4 Rockhole on the East Skidmore gangway, first level. The place had been idle for a few days because of the heavy rains the week before.

His buddy, being out of the way of the rush, called to Gemmel, and receiving no reply, came down to investigate. When near the bottom of the manway he found Gemmel covered up and called help from the next breast. Sending word to the slope bottom about the accident, the men began working the injured man down to an electric locomotive which was under the chute at the time. A nephew of Gemmel's, who was working with the other men at the rescue and resuscitation of his uncle, finally got some response to the efforts he made to enable the injured man to breathe. By this time the first-aid men, who had lost no time in responding to the call, were on hand. Taking hold of the case, they were able, by long-continued effort, to do much in helping in the work of resuscitation. Later the injured man was moved from the gangway to the hospital, which was some 2000 ft. away, and there effective work was done for several hours.

Dr. Frank Conahan, the company physician, meeting the men on the way out was on hand to take charge of the work in the hospital. The doctor and first-aid men worked for three hours before the patient began to show any favorable signs, and two more hours were spent with him before he could be removed to his home in Morea. One of the accompanying illustrations shows the doctor and the men working over the injured man in the mine hospital.



The hopes of recovery were small for a long time, but by sticking to the job and putting forth every effort the doctor and men were successful in saving Gemmel's life. In the work of resuscitation the Schaefer, or prone, method was used, and at times the doctor administered oxygen to the patient. The quick response to the call at the time of accident was one feature for praise, and it aided greatly in securing the final favorable result. Gemmel was the oldest miner in the village, having worked at Morea colliery for thirty years.





ILLUSTRATING THE RESUSCITATION WORK PERFORMED ON JOSEPH GEMMEL, MOREA COLLIERY, MOREA, PENN. Center illustration—Miners lowering the body to the gangway. Left illustration—Doctor at work in mine hospital. Right illustration—First-aid men and officials at Morea mine. District Nurse Sweeny to left and Dr. Frank Conahan to right

Our Great-Hearted Coal Miners*

By HORTENSE FLEXNER

THE miner understands necessity. He understands it in a face-to-face and personal way. Because he is familiar with danger, and because he has seen men hurt, he is ready to give and give again to the Red Cross. It is part of his code that a need must be met. If a man is injured in the mine, a "paper is taken" for him. Somebody goes round with a slip of paper and the men sign up for the amount of money they can give the family, until the bread-winner is able to work again. It is an old custom, many years older than the war. It has grown out of the miner's recognition of need—human need. Today the Red Cross is "taking a paper" for the men in France. And the miners, great-hearted people, gentle, with lonely eyes that can visualize human suffering, are pledging their strength to meet the need.

"I'M WILLIN' to give anything but what it takes fer the bare necessities. They need it. Us fellows kin have what we want. They take what they git." It was a long speech for the big, slow giant of a miner, stopped at the entrance of an east Kentucky coal mine, with the lamp in his cap still burning and the black powder of the coal on his face and chest. He was telling why he had given the wages of a day's labor to the Red Cross during the last drive.

"They need it," he said with large finality, speaking unaware for hundreds of heavy-muscled, silent men like himself, working alone, day by day, "fighting the face of the coal like it was a Prussian"—and thinking.

"We give 'em a day," said an older man, with a son in France. "Thur ain't no tellin' how many they give us—mebbe all they got."

Another man, grimy, embarrassed at being questioned, braced a big hand against the wall.

"A day ain't enough," he brought out slowly. "I'd give a day a month to the Red Cross. So would all the boys."

"Did the men get out as much coal on Red Cross Day as on other days?"

"As much? More! They kept a-thinkin' who it wuz fer."

There is always something personal in the references of the miners to the army. "They," with a wave of the hand to indicate far places, "the fellows," "the boys"—never the soldiers. To the miners, the men in France are intimates, friends in danger, doing the day's work, "takin' what they git." There are no camps in the mountains, no uniforms, very few war posters. The military atmosphere is lacking. But in no place could there be a keener appreciation of the meaning of the war, or more vivid realization of what the men in the trenches are living through.

The success of the second Red Cross drive in the mining section of Kentucky was due to three chief causes: the inborn and stiff-necked loyalty of the mountain people to the Government; to the excellent plan of work and education mapped out in the office of the State War Fund by J. R. Downing, campaign manager, and S. W. Calder, executive secretary. The third and very important factor in the success of the drive was the chapter war fund managers, the men and women of the isolated mountain counties who went from mining camp to mining camp, town to town, spreading the word of the Red Cross.

The result of the drive is not wholly known at this writing. But this is known. The nine separate coal divisions of the state totaled more than $200,000. Counties far up in the hills, remembered chiefly because of the long blood feuds of the mountaineers, exceeded their quotas many times. In the most remote places, beyond the railroad, the Red Cross flag hangs in the windows of tiny log cabins and country stores; it stands above the noisy coal tipples, where the little cars from the mine run straight down the mountains to dump the coal in freight cars; and in some camps, it shows above the black mouth of the mine itself. The word has been spread.

Harlan County, for the most part mining camps and very small towns, raised six times as much money as it was asked for, giving $43,000 instead of $7500. Bell County contributed $42,000, though its quota was $15,000. Perry County ran far ahead of its allotment and Crittenden, which yields fluor-spar, gave a carload of that to the Red Cross, instead of coal. Rivalry between counties was keen, as it was keen between individual workers, everybody doing his best, remembering "who it wuz fer." In the west coal section the operators gave the coal and the miners their wages.

The plan developed by the State War Fund office to interest the miners originated with Mr. Calder, who suggested that the miners be asked to give a day's labor to the Red Cross and that the operators be asked to duplicate whatever the men gave. This seemed a difficult proposition at first. For one thing, the miners were prejudiced against the Red Cross. When the last strike was settled a clause was inserted in the agreement, providing that every miner who stayed away from work without lawful excuse should be fined one dollar for every day's absence. The fine, which had to be given to some impersonal good work, was given to the Red Cross. But the men did not like the fine, and their dislike spread to the recipient of it. A man who was fined would say, in no friendly spirit, that he had been "red-crossed."

To change this impression the State War Fund office secured the aid of Major Gledhill of the British Army, Colonel Perowne and Captain Harris. These men had "been in the war," and had been wounded in battle. For two weeks they stayed in the mountains, going from camp to camp, talking to the men, telling straight facts. In the end the miners were won. When Mr. Downing sent out a pledge card asking the question, "If you knew that a day's pay would save a life, would you give that day?" the men answered "Yes."

Next, the operators were visited and consulted about duplicating the men's wages. One by one they agreed. Placards were sent out to the mines and the men made

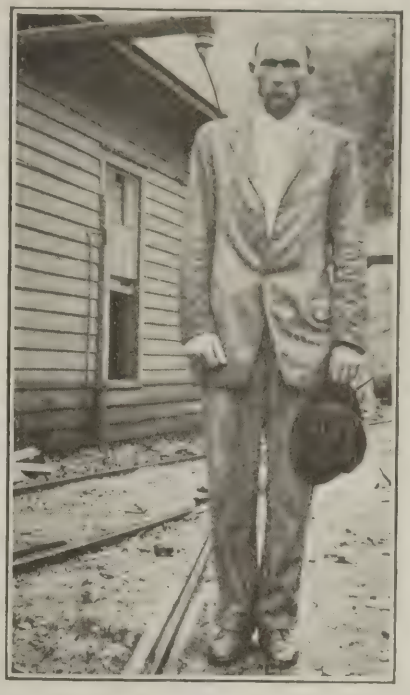
*Reprinted from the September, 1918, issue of "The Red Cross Magazine."



James Bullins, who won the gold medal at Kettle Island; and John Butler, the second prize man



John S. Prater, a medal miner at the Te Jay Mine, who is "a little old to fight"



Linnis Lasley won the third medal for Bell County by doing his "best on Red Cross Day"



Virgil Moore earned $25.56 on Red Cross Day. He stands ready to "back up the fellows in France"



Henry Beaute, a Red Cross worker for Harlan, mined twenty-two dollars' worth of coal on Red Cross Day



F. D. Perkins, Superintendent of Schools at Harlan; and Bud Chambers, who gave $28.50

IN THE COAL REGIONS OF KENTUCKY

The miners, great-hearted people, gentle, with lonely eyes that can visualize human suffering, gave each the wages of a day's labor to the Red Cross

ready to do a hard day's work for the Red Cross. In several counties medals were offered as prizes; in others, flags. The mines in the west section gave the men a day's rest before May 21, so that the results should be the best possible.

The amounts earned by the men on Red Cross Day varied according to their strength and the vein of coal. The fact that the coal is cut out by machine and only loaded on cars by the men, makes it possible for them to load thirteen, fifteen, sometimes twenty and twenty-five cars a day. For each car filled the miner receives $1.

James Bullins did a record day's work for the Red Cross in the mine of the Pioneer Coal and Coke Company at Kettle Island. This mine is in Bell County, and it was organized by the Rev. J. Wood Browning, of Pineville, a worker who understands the men, the mines and the need. Bullins won the gold medal in the county, earning $17.32 on Red Cross Day.

"Yes, I did my best for the Red Cross," said James Bullins, coming out of the rain into the superintendent's office. He is a tall lean man, perhaps thirty-five, with fine blue eyes looking strangely bright, because of the black dust all over his face and beard. "It wuzn't nuthin' to do. Why wouldn't I? If we lose, we ain't got nuthin' nohow." Another miner who had won second prize, John Butler, whose earnings amounted to $15.78, appeared at the door. Butler has a boy in France.



A MOUNTAIN HOUSE. THE RED CROSS SHOWS IN THE WINDOWS OF MANY LOG CABINS LIKE THIS ONE

"I had a helper that day," said Butler. "I wanted to take out all I could. I felt like I was a-doin' it fer the boy."

"Pretty hard work, isn't it, loading fifteen cars of coal?"

"Yes, it's hard. But it ain't nuthin' to what they're doin' fer us. An' the coal is needed. I'm willin' to give a day whenever they ask fer it."

The superintendent came in, J. N. Woolum. "The men liked the idea of Red Cross Day right away," said Mr. Woolum, "it wasn't forced on them. It was their affair to accept or refuse. Not a man refused."

Linnis Lasley won the third medal. Lasley is a great-boned fellow with slow, kind eyes.

"I got out all the coal I had. I would have loaded more, but I had to wait for the machine to cut more coal. That took up the time. I wanted to do my best on Red Cross Day. The boys need it. If we could see over there, I reckon it would look mighty bad."

There were men, however, in some of the mines who refused to work for the Red Cross. When they refused, they did not realize just how the other miners would "take it." Bud Chambers, of the Lick Branch Mine at Coxton in Harlan County, told how one of these men was treated. Chambers, incidentally, earned $28.50.

"One fellow threatened to give only five dollars," said Chambers. "We told him we'd drag him out, and he changed his mind. But they did drag some out at Straight Creek. There was a single man there who said he wouldn't give a cent. That was beforehand. When the day came, he did just what everybody else did. I guess he knew how we felt. If he hadn't worked, we made it up to take a collection and give him the money for the Red Cross."

Bud Chambers is an ex-marine and feels keenly about the war. He paused a minute and went on.

"But a man who'd be a slacker would be it one place as well as another. You can't make a fellow do good work if he don't want to. I believe in standin' 'em up against a wall and shootin' 'em down."

In some of the mines, the companies found it necessary to take out the men who had "turned down" the Red Cross and move them to other locations. The feeling ran so high that the loyal miners refused to work with them. Three weeks after the drive a man came to the chairman with a day's wages. The men had refused to work with him and, though he was so late, he was forced to give his share.

"The men don't forget," said Virgil Moore, a great tall fellow, who earned $25.56 on Red Cross Day. "If a man ain't ready to back up the fellows in France, something is wrong with him, and mighty wrong."

Harlan County was organized for the Red Cross by F. D. Perkins, Superintendent of Schools, and every corner of his district was reached. As one of the miners put it, "Thur can't no pro-German stay in Harlan." Mr. Perkins began his work two weeks before the drive,



WASH DAY ON THE CUMBERLAND, IN THE HEART OF THE MINING DISTRICT

getting in touch with men and operators. He did not limit the idea of giving the day's work to miners, but extended it to all "earning people," including physicians, lawyers, teachers, clerks, and postmasters. Every business house in "Harlan Town" was asked for its profits on that day and not one refused. Bulletins were published during Red Cross week announcing returns, and everybody watched the big Red Cross thermometer, where the mercury crawled up and up.

The Harlan Gas Coal Co. was one of the mines where everybody "did his best." The women in the mining camp were as keenly interested as the men and one of them, standing in her door-way with some five or six children about her, said:

"I wanted my man to take out all he could. We kin spare it. When people is sick and when they is hurt, it ain't no time to stand back." The cabin had two rooms at the most, and a man's earnings must have been useful every day. But the mountain people do not "stand back" when it is not time to "stand back."

Henry Beaute is one of the big "Red Cross fighters" for Harlan. But at first he worked under difficulties. This was because one night he made a statement that somebody interpreted wrongly. Beaute was arrested as a pro-German, tried and released. But his feelings were outraged and he went to Mr. Perkins, to ask to be used in some special way on Red Cross Day, to prove his loyalty. Mr. Perkins gave him the pledge cards which the miners were to sign, and Beaute proved that he was in earnest by getting every man at Tway to sign.

"I wanted a chanst to show 'em," said Beaute, "and I did. One thing that made me work so hard, though, was because they claimed the Gov'ment needed the coal." (Beaute got out $22 worth of coal on Red Cross Day.) "Besides," he said, "I asked every man to give—the men workin' on the outside. I proved I wasn't no German."

He stopped a minute and went on. "I'm goin' to git in this fight yet. They ben showin' pitchers uv the Kaiser in this town and I seen 'em. The Kaiser's pitcher gits in my blood. Hit makes me so mad I throw the coal plum over the cars. The Kaiser and his gineration are goin' to be killed out."

At Te Jay one of the big mining camps, and one of the most beautiful, is located. The hills are all around, and the little houses at the foot of them are well built and well cared for. The Commissary is a real department store and is managed like one. The Balkan Mine at Te Jay won the silk flag in Bell County for its contribution of $2100.

John R. Prater, one of the men who won a medal, explained his motive.

"We'd never done much fer the war down here, an' we wanted to help the Gov'ment. I'm a little old to fight, but I ain't no better than them as is gone, and when my turn comes, I'll go."

John S. White, financial secretary of Local Union 3323, worked day and night for the drive.

"I told 'em," said White, "that if they think it's nice to work eight hours and go home, they ought to think of the fellows who can't. Us miners are at the bottom of the war. We feel proud of our task and we are going to take out coal as long as the country needs it."

[The writer declares the operators duplicated the gifts of the miners and in a sense that is a correct statement. The operators actually gave the Red Cross the difference between the selling price of the coal and the labor cost of running the mine for the day.—Editor.]

Meeting of National Safety Council

WITH the motto "To adequately support our army abroad we must conserve our man power at home —we must prevent accidents in the industries of America," the National Safety Council will hold its seventh annual congress at the new Hotel Statler, St. Louis, Mo., the home of the former president, Arthur C. Morey, who is this year the chairman of the committee on arrangements. The meeting is being held before the Liberty Loan drive because the safety engineers of the United States are the most important agents in the sale of those Liberty Bonds which are to make the world safe for democracy and decency. They had to get their meeting out of the way for their loan campaign, which will commence Sept. 28. The special committee meetings will be held on Sunday, Sept. 15, from 10 a.m. till 4 p.m. The morning of Monday, Sept. 16, will be devoted to the annual meeting for all members, the address of welcome being made by Mayor Henry W. Klein, of St. Louis, and the response by the president, David Van Schaack, who also will make his annual address. Reports of officers will follow. At the afternoon session the following addresses will be delivered:



"Democratization of Industry," by Charles M. Schwab, Emergency Fleet Corporation, Philadelphia, Penn.

"Personnel Problem in Industry."

"Nationalizing the Safety Idea," by George Ring, Jr., president, Advertising Men's Club of St. Louis, Mo.

"Economic Value of Health of Industrial Employees," by Dr. Thomas Darlington, former chief of Department of Health, New York City, now of American Iron and Steel Institute, New York City.

Safety address reproduced phonographically.

Motion picture film entitled "Why," presented by the United States Steel Corporation.

The phonographic safety address is to exhibit how "canned" addresses can be delivered (in a foreign language, if need be) to mine workers and others. It is an attempt to solve the difficult language question and to meet the problem of the man who has no oratorical talent at his operation and cannot obtain any.

On Monday evening, at 8 p.m., a public mass meeting will be held at the Odeon, 1042 Grand Ave., St. Louis, Mo., for which the following items are listed:

"Safety as an Asset in Winning the War," by Franklin K. Lane, Department of Interior, Washington, D. C.

"Safety in Warfare," by H. W. Forster, general manager, Independence Bureau, Philadelphia, Penn.

New York Central Railroad Co.'s Safety Film, "The Rule of Reason."

On Tuesday morning a general session will be held from 9:30 till 12.

"The Real Problem of the Safety Engineer," by Charles R. Hook, vice president Operating Division, American Rolling Mill Co., Middletown, Ohio.

"How to Organize for Safety," by Frank E. Morris, safety engineer, American Rolling Mill Co., Middletown, Ohio.

"Modern Methods of Safeguarding," by J. J. Heelan, superintendent Bureau of Inspection and Accident Prevention, Aetna Life Insurance Co., Hartford, Conn.

"Does the Attitude of the Foreman Determine the Success of the Safety Engineer?" by W. E. Worth, general superintendent, Chicago Tunnel Company, Chicago, Ill.

Safety address reproduced by phonograph record.

The Local Councils will hold at the same time a meeting of officers and committeemen at which their problems will be discussed. The Chemical, the Woodworking, the Foundry and the Employees Benefit Association sections will hold separate meetings. In the afternoon, from 2 p.m. to 5 p.m., there will be a general round-table discussion on "How To Sell Safety to the Big Boss," and "Promotion of Community Interest in Safety as an Industrial Asset." There will also be meetings of the Health Service, Public Safety, Steam Railroad and Women's sections. On Wednesday, besides the meeting of the Mining section, there will be a meeting to discuss employees' benefits and others for the consideration of safety in construction work and in relation to the iron and steel, public utilities, steam railroad and woodworking industries. A session will also be held of the Public Safety section. In the evening an informal dinner will be held at which President Woodrow Wilson will deliver a five minute address by long distance telephone; R. M. Little, director of the American Museum of Safety, will speak on "Forethought vs. Afterthought in Safety," and James Schermerhorn, the editor of the *Detroit Times*, who so pleased the audience who heard him at Detroit when the convention was held in that town, will deliver an address entitled "The First Set of Fours." Miss Jane Addams, of Hull House, Chicago, Ill., will conclude the evening with some remarks on "The New Place in Industry that the War Has Given to Women."

Thursday will have meetings not only of the Mining section, but of the sections devoted to safety in the electric railway, iron and steel, paper and pulp, cement and textile industries, and to the relation of the Government to safety and employment.

On Friday the automotive, car builders, iron and steel and paper and pulp industries hold sectional meetings. With these the congress closes. There will in all be 174 speakers.

The Mining sessions are given in full as follows:

Wednesday, Sept. 18, 1918

1. Report of Chairman.
2. Report of Secretary.
3. Reports of Committees.
4. Appointment of Nominating Committee.
5. Addresses:

9:30 a.m. "Hazards and Safeguards in Coal Break-

ers and Washeries," by D. K. Glover, Lehigh Coal and Navigation Co., Lansford, Penn.

10:00 a.m. "Is the Experienced Miner More Liable to Accident than the Inexperienced?"

10:30 a.m. "What Relation Has Labor Turnover to Mining Accidents?" by Robert Johnson, Pittston, Penn.

11:00 a.m. "Safety Work in Metal Mining from the Employees' Standpoint," by Edwin Higgins, California Metal Steel Producers' Association, San Francisco, Cal.

11:30 a.m. "Hoisting Ropes," by M. W. Reed, American Steel and Wire Co., Worcester, Mass.

2:00 p.m. "Standardization of Mine Cars in Metal Mines," by Prof. R. M. Raymond, School of Mines, Columbia University, New York City.

2:30 p.m. "Acetylene and Electric Cap Lamps from a Safety Standpoint," by H. M. Chance, Philadelphia, Penn.

3:00 p.m. "Suggested Methods of Keeping Mine Accident Records; Results Which Have Been Obtained," by A. H. Fay, Mine Statistician, United States Bureau of Mines, Washington, D. C.

3:30 p.m. "Hazards in Ore Dressing Plants," by J. S. McKaig, New Jersey Zinc Co., Franklin, N. J.

4:00 p.m. "Handling and Storing of Explosives," by Arthur LaMotte, Manager Technical Division, E. I. du Pont de Nemours & Co., Wilmington, Del.

4:30 p.m. Discussion.

Thursday, Sept. 19, 1918.

9:30 a.m. "Practice of Mine Ventilation," by C. A. Mitke, Assistant Consulting Engineer, Phelps-Dodge Corporation, Bisbee, Ariz.

10:00 a.m. "The Dust Hazard to Health in the Stone Industry," by F. L. Hoffman, Statistician and Third Vice President, Prudential Life Insurance Co., Newark, N. J.

10:30 a.m. "The Effects of the Use of Pneumatic Tools on the Nervous System," by Dr. F. M. Barnes, Jr., St. Louis, Mo.

11:00 a.m. "Abatement of Dust from Drilling Operations by the Use of Water Drills," by W. O. Borcherdt, superintendent, The Bertha Mineral Co., Austinville, Va.

11:30 a.m. Report on Standardization of First-Aid Methods, by Lt.-Col. C. H. Connor, American Red Cross, Washington, D. C.

Careful Records Reduce Mine Accidents*

By ALBERT H. FAY
Assistant Statistician, United States Bureau of Mines, Washington, D. C.

WHEN, in 1911, the United States Bureau of Mines began the collection of mine-accident statistics, there were but few data available concerning the nonfatal injuries in the mining industry. Even the reports of fatal injuries were not so complete as they should have been, but regarding them sufficient data had been accumulated to enable us to point out the principal hazards. The returns, when first received and published, showed what was then considered a high rate for nonfatal injuries, for at that time there was nothing with which to compare it. In about 1911 the first efforts were made in the movement which caused the industrial accident commissions to be legislated into existence. The mining companies had not been accustomed to keeping complete records for either the state or Federal Government, and in many cases not even for their own use.

The recording of all accidents is absolutely necessary if there is to be a reduction in the casualty list at mines. Detailed records will give the exact cause of the accident, and knowing this, in most cases remedies will readily suggest themselves. Records furnish the safety engineer a reliable mass of data about which to formulate ideas relating to safety, safety devices and safer methods of mining. To this end the bureau prepared a form for keeping a record of accidents at mines. On this form is to be recorded the name of the injured person, the date of the accident, the cause, also whether or not it was fatal and also the degree of disability, due to the accident, measured in days lost. A number of the mining companies are keeping this record, and the returns which have been received from these companies indicate that the tabulations are being kept more carefully now than in the past. At the same time they show an increase in the number of nonfatal accidents, but this is more apparent than real, as the industry is no more dangerous than when records were not kept. The record simply brings to light the hidden dangers of a great industry.

The accident rates at mines as heretofore published also appear lower than they actually are, by reason of the fact that in so many instances the operator reports the total number of men whose names appear on the payroll during the year. By reason of the annual labor turnover, the number of men on the payroll is much larger than the actual number of full-time workers, hence in order to get true accident rates it is necessary that the time during which the men were employed be known. Such a record of the hours worked has been kept by the New Jersey Zinc Co., thus placing the accident rates on a basis regarding the exactness or completeness of which there can be no doubt.

The next best step to adopt was to reduce all accidents to a 300-day basis. This, however, does not take into account the 8-hour or 10-hour day, but in most of the metal mines, in recent years, the 8-hour day has prevailed. Many of the inequalities have been eliminated by reducing the figures to a common denominator of 300 days. This, however, does not eliminate the payroll discrepancies, when the number of men employed is given as per total on payroll.

The increasing completeness of records is due in part to the bureau's campaign among mining companies for safer conditions and in part also to the annual requests made to them for reports of accidents during the current year. The enactment of accident-compensation laws is another important cause. The mining companies expect to make returns, and the majority of them, therefore, are now keeping records so that they

*Abstract from an article "Results Obtained by Keeping Mine Accident Records," to be read before the Mining Section of the National Safety Council at St. Louis, Mo., during the Seventh Annual Congress, September, 1918.

may be able to render their report at the close of the year. There is, however, some lack of uniformity as to what injuries they shall record, although it is believed that the larger companies are recording practically all injuries. The accidents which are reported to the bureau are only those which cause disability of one day or more. We do not expect accidents causing a disability of less than one day to be reported, although in some cases it is believed that they have been included.

A recent paper prepared by B. F. Tillson, on "Recording Accidents and Safety Measures,"[1] gives a detailed description of the methods used by the company just mentioned in keeping records of accidents, together with its method of determining rates for comparative purposes, and also many suggestions as to what has been done in the matter of safety improvements and the methods employed among the foremen and shift bosses to reduce accidents.

Mr. Tillson's article shows that for the first four months of the year 1913, without any special safety organization, but with complete records, the nonfatal injuries at the mines which caused any loss of time amounted to 2.24 per 10,000 hours of labor performed. The last eight months of 1913, during which safety-first was inaugurated, the accident rate fell considerably, being reduced to 2.17.

The organization was still more perfected in 1914 and 1915, with the result that in 1916 the nonfatal injury rate was 0.77 per 10,000 hours and in 1917, 0.78. By keeping detailed records, the company has been able to diagnose the principal causes of accidents and apply remedies therefor. By an educational campaign among the employees and by the giving of bonuses to the shift bosses the reduction in accidents has been marked. The records of this company not only show accidents by causes, but also by occupations; and the company also charts them according to the actual number of hours employed in the mines.

Data compiled by a large number of companies on this basis would undoubtedly furnish a reliable basis on which to study accidents and their causes, and at the same time give sufficient information to establish equitable insurance rates. Exact records should contain sufficient data to show the causes of all accidents; hazards by occupations; hazards by mining methods; the days and hours worked and the time lost per accident. This will serve as a basis for insurance rates that will be fair to all. Finally such records will show the real progress that is being made in accident prevention at the mines.

Mine Safety Appliances in Warfare

By F. H. TREGO
908 Chamber of Commerce Building, Pittsburgh, Penn.

FOR some years prior to our entry into the war, certain men were engaged in the excellent work of devising ways and means to cut down the percentage of accidents that occurred with such startling frequency among those employed in our varied industries. The individuals so engaged were styled "safety engineers," and they carried on their propaganda under the slogan of "Safety First."

The prime object of the safety-first movement is the conservation of human life, while that of war can be summed up in the word "destruction." It did not seem possible when we entered the great conflict that there could be any common ground on which the engineers of safety and the engineers of war might come together. However, as more was learned about modern warfare, and as it became more and more apparent that conservation would be a preponderating factor in the winning of the war, the door was opened whereby the safety engineer could enter and do valuable work.

To save a life wherever possible is not only humane, but at this time, when the necessity of conserving man power becomes daily more apparent, every life saved means a man more to help drive nails in the coffin of German autocracy. In this war, as in no other in history, the men who make up our industrial units—the men who make guns or cartridges, or help transport them, or dig the coal that heats the iron or steel used in their manufacture—are as vital to the success of our war program as the men who are on the firing line.

Among our "industrial soldiers" the practice of safety and the use of safety apparatus had gained great headway, but few ever thought of applying the safety-first principles learned in peace to the needs of the men in the trenches. The safety engineers did, however. They convinced the army officers that many of the things used by the industrial army behind the lines could be employed to advantage by those on the fighting line. It is the object of this article to describe briefly several of the safety devices that have been found useful for war work.

The general public will always associate the name of Thomas A. Edison with devices to entertain or brighten life. To various fields of human endeavor he has probably contributed more than any other man. To the safety movement, in which he has shown great interest, he has given the Edison electric safety mine lamp.

There are, of course, other types of electric safety lamps, but after exhaustive tests the Edison was chosen for use "Over There," and it is one instance of a specific safety device that is now being used in the trenches. Just how these lamps are employed one is not at liberty to disclose, but the fact remains that when the call came a device that had been developed and perfected by the safety movement was ready to "carry on."

Probably the most striking illustration of the development of a safety idea to meet a war need is presented by the Gibbs self-contained oxygen breathing apparatus. A few days after war was declared by the United States an officer in the War Department was asked to devote some of his attention to the question of breathing apparatus, with a view to its being used by the troops. After witnessing a demonstration of the

[1] "Engineering and Mining Journal," Apr. 17, 1917.

Gibbs device, the officer stated that he considered the time consumed in making the tests wasted, as there was no possible chance of the apparatus ever being needed abroad. Strange to relate, however, among the first requests made by General Pershing was one for hundreds of sets of oxygen-breathing apparatus.

Many people are of the belief that a self-contained breathing apparatus is simply a gas mask. Nothing is farther from the truth. The gas masks commonly used by troops in action are machines for filtering certain known noxious gases, and the wearer of the device is at all times obtaining the air he breathes directly from the atmosphere. The air is filtered by the mask in much the same manner as water is purified by passing through a filter.

There are gases, however, which cannot be so filtered, and these gases prove to be the most deadly. Carbon monoxide (CO) is one of them, but it is not what is termed by the military forces an "offensive gas." This means that carbon monoxide cannot be used as a gas for offensive purposes as are chlorine, mustard, phenylcarbylamine, phosgene, xylyl-bromide and various tear and sneezing gases now being released on the battle-fronts in Europe for the purpose of overcoming men. Carbon monoxide is a little lighter than air, and as soon as it is released passes off into the atmosphere. It cannot be held in clouds as are other gases, and therefore is precluded from use for offensive purposes.

There are numerous places, however, where troops do come in contact with carbon monoxide. These accumulations of gas are found in pill boxes, machine-gun emplacements, and in dugouts where heavy artillery is being fired from cover. In spots such as these the air becomes saturated with the poisonous gases, and the men who are forced to breath this air rapidly succumb.

Gibbs Self-Contained Breathing Apparatus

To overcome these conditions there is only one known safeguard—a self-contained breathing apparatus—and the Gibbs machine was chosen by the Government because it was found to meet all requirements. The wearer of this device obtains his air supply directly from the apparatus and not from the outside atmosphere. By an ingenious arrangement of valves, tubes and chemicals the air exhaled by the user of the apparatus is purified, cooled, and fed back to him. The apparatus can be used from two to ten hours without being taken off for recharging.

The United States Bureau of Mines, in conjunction with some well known safety engineers and physiologists, experimented for a number of years on an apparatus that would supply oxygen in proportion to the wearer's needs. It is a most noteworthy achievement of the Bureau of Mines and of the engineers referred to that a machine with this characteristic was perfected in time to answer General Pershing's call, and that within a short time a strictly American self-contained breathing apparatus—the Gibbs—was shipped to him in the quantity he desired.

Another of the inventions of the Bureau of Mines which has proved of service at the front has been the gas detector invented by George A., now Colonel, Burrell. It will indicate and record the percentage of combustible gas even when it occurs in a proportion as low as 0.2 per cent.

To the average person a stretcher on which to carry a wounded man would be deemed a simple device capable of very little improvement. Yet a new type of stretcher was called for by army officers to meet certain every-day conditions in the trenches. All the known makes of stretchers were submitted, but none would answer the purpose. The problem was finally referred to a prominent safety engineer who happened to be in Washington when the matter was being discussed. He was asked if he knew of anything that would meet the requirements. He said he believed he did.

Away out West, thousands of miles from Washington, at a gold mine among the Black Hills, this engineer had seen a stretcher in use which he was positive would prove to be the type so anxiously sought. It had been made at the mine after plans drawn up by the safety department. Telegrams were exchanged, and to the credit of the management of that mine it should be stated that within three hours after the receipt of the first telegram the only stretcher possessed by the mine was speeding on its way to the War Department. When the stretcher arrived in Washington it was subjected to a rigid test and accepted. Today hundreds of these stretchers are in use at the front, thanks to the Homestake Mining Co., of Lead, South Dakota.

Important to Conserve Human Life at Home

To this point conditions in Europe, where our cause for human liberty is being argued at the cannon's mouth, have alone been dealt with in this article. However, it is just as important that we seek the conservation of the men engaged in industrial pursuits at home if those on the firing line are to receive maximum cooperation from the industrial soldiers at home.

It is to be regretted that our casualty lists make mention only of those who are killed or wounded while engaged in battle, while nothing is said about the casualties which occur in industrial pursuits. For many years safety engineers have been trying to awaken the public conscience to the alarming number of accidents occurring in our industries each year and what they amount to as compared with the casualties of war.

Only a few figures to emphasize the need for an intensified safety-first movement can be given here, but these should be an object of just as much attention as the lists of those killed and wounded in battle. Our fatalities at home number between 30,000 and 40,000 a year, or about 125 a day. Our seriously injured total about 350,000 to 400,000 a year, something like 1000 every day. As to minor injuries, about 2,000,000 a year are reported, or about 5000 to 6000 a day.

If these injuries were suffered by those engaged in battle they would all be reported. Why not, then, some centralized effort on the part of our Government to reduce this loss at home? Our workers are soldiers, too, and just as necessary to the winning of the war as the men in the trenches.

We have our fuel administrator, food administrator, railroad director, shipbuilding program, price fixing, etc. Wherever a leak can be plugged Uncle Sam has supplied the stopper. But still the safety-first movement is not taken as seriously as it should be by those most vitally concerned. Why not a safety-first administrator, whose duty it will be to use every means available to stop the waste of life behind the lines?

Forms for Use in Recording Compensation

SYNOPSIS—*How to keep records which will stimulate foremen, assistant foremen and safety engineers in the work of safety and make it possible to ascertain the probable effect, in the cost of self-insurance, of any change in legislation.*

DURING the last few years, safety first has made great strides in all industries. Few indeed, if any, are the occupations that are more hazardous than that of the anthracite miner. Suddenly awakening to this fact, the safety-first movement has gone forward at a rapid pace, and today, it is one of the important issues in the operating department of all the larger coal companies.

For several reasons, the most potent factor in the advancement of safety during the last two years has undoubtedly been the passage of the "Workmen's Compensation Act." Before the act came into operation, few of the companies had any form of relief for their injured workmen. Those that did were more or less indifferent in their attitude to safety, and an accurate record was not attempted. As the workmen themselves contributed a portion of the funds to be expended, and as the time of compensation for injuries was limited (as were also the sums allowed in fatal cases) the yearly expenditures were small in comparison with what they are at present.

A majority of the anthracite coal companies carry their own insurance. A careful record of each case is kept, showing the actual cost of compensating the men in their employ. As a result, each month the management can see in dollars and cents, as well as in "man-days" lost, what accidents mean to the industry. At first these figures were a revelation. A study of the causes showed that by far the greater number of accidents were preventable and due to carelessness or ignorance. Through systematic education and safety devices, together with a rigid enforcement of safety rules, these causes are rapidly disappearing.

To keep an accurate account of all accidents, a practical system of handling compensation is necessary. The following is a detailed account of a method used by one of the larger anthracite companies. While to the reader it may appear cumbersome, it works smoothly and efficiently, and after much experimenting it is found to give entire satisfaction.

While the system involves much detail, it is handled with a comparatively small force and is not expensive. It also has the advantage of keeping the operation heads and the safety engineer in close touch with conditions at all collieries. It also enables them to know with exactitude the degree of safety existing in each of the many assistant foremen's districts. A record is kept both of the expense of accidents and of the labor loss. This system has resulted in reducing the average time lost per accident to a low figure and has kept the men well satisfied, as their cases are handled promptly and fairly. It has, moreover, resulted in a small percentage of disputed cases.

To make so complete a record requires a quick and elastic filing system. The only equipment suitable for this purpose is the visible index file, and this system has been adopted. When reports reach the office of the chief surgeon they are numbered consecutively and forwarded to the adjuster. The state reports are then made and the original papers kept in an individual folder. When the folder is ready for filing, a card (as shown below) is filled out, giving the employee's name, address and occupation, as well as the number of the case and the date of injury.

The card is then placed in the file in alphabetical order. Each card has a space in which the nature of the injury may be entered. The names on all cards are visible, making it decidedly easy to locate a particular case. When a man comes to the office to sign his agreement his name is asked, and he replies, for instance: "John Smith." Thereupon the clerk turns to panel "S" in the file and readily locates the "Smith" desired. Frequently two or more injured men bear the same name. This causes no confusion, as the man's identity is learned through his address, occupation and date of injury. The following forms show the use of the file and the simplicity of its operation.

Smith, James		218 W. Broad St., Lansford, Pa.			Machinist
Case No.	Date	Symbol	Case No.	Date	Symbol
3,190	1/26/17	G-1	.....	.....	.....

Smith, John		148 E. Elm St., Tamaqua, Pa.			Cont. Miner.
Case No.	Date	Symbol	Case No.	Date	Symbol
3,340	2/6/17	L-12	.....	.....	.....

Smith, Joseph		28 E. Ridge St., Coaldale, Pa.			Carpenter
Case No.	Date	Symbol	Case No.	Date	Symbol
3,400	3/10/17	Shops	.....	.....	.....

SAMPLES OF ACCIDENT RECORD CARDS

Each accident is classified as to nature, cause and class and separately classified as occurring either outside or inside the mines. Each accident and its actual expense is entered against the foreman or assistant foreman of the district in which the accident occurred. Foremen are told each month how their district compares with others in regard to number and cost of accidents, and this stimulates them to a greater zeal for the safety of the men and aids the safety engineer in eliminating the causes of preventable accidents.

It is impossible in a tabulated statement to indicate the exact nature of all accidents incurred, but the following list has satisfactorily covered all accidents which have come under notice during the past year. It affords a knowledge of the sources of accident that is indispensable in safety work.

ACCIDENTS CLASSIFIED BY THEIR NATURE—JAN. 1 TO DEC. 31

Nature	Number	Per Cent.	Nature	Number	Per Cent.
Burns	....	4.5	Miscellaneous	....	0.1
Contusions	....	28.7	Not injured, (entombed)	....	0.1
Crushes	....	1.4	Sprains	....	7.5
Dislocations	....	0.4	Suffocations	....	0.2
Electrocutions	....	0.1	Total	....	...
Fractures	....	4.4	Non - compensable accidents	....	
Foreign bodies in the eye	....	5.8	Grand total	....	
Infections	....	4.2			
Lacerations	....	42.6			

The following table shows the accidents occurring during the year, classified as to cause, and divided between the inside and outside operations.

ACCIDENTS CLASSIFIED BY CAUSE—JAN. 1 TO DEC. 31

Cause	Inside	Outside	Total	Per Cent.
Animals	.....	.....	.....	1.4
Caught in machinery	.....	.....	.....	4.7
Electricity	.....	.....	.....	0.5
Explosion of dynamite	.....	.....	.....	0.2
Explosion of gas	.....	.....	.....	1.5
Falls of roof or sides	.....	.....	.....	4.1
Flying material	.....	.....	.....	9.8
Falling material	.....	.....	.....	22.2
Falling persons	.....	.....	.....	6.4
Handling material	.....	.....	.....	17.9
Miscellaneous	.....	.....	.....	1.7
Heat	.....	.....	.....	0.0
Rush of material	.....	.....	.....	2.5
Suffocation	.....	.....	.....	0.3
Stepping on material	.....	.....	.....	2.9
Striking obstructions	.....	.....	.....	5.4
Transportation	.....	.....	.....	9.6
Use of tools	.....	.....	.....	8.9
Total	.....	.....	.....	...
Non-compensable accidents	.....	.....	.....	...
Grand total	.....	.....	.....	...

NOTE.—Transportation in the above statement covers all accidents caused by cars, electric and steam locomotives, whether the accidents result from the bumping of cars, the squeezing of men against the rib, the running of cars over them, or from other causes.

Accidents are divided into classes, according to severity, as follows:

ACCIDENTS CLASSIFIED ACCORDING TO DURATION OF DISABILITY—JAN. 1 TO DEC. 31

Class	Inside	Outside	Total	Per Cent.
No time lost	.....	.....	.....	.....
One to seven days lost	.....	.....	.....	.....
Seven to fourteen days lost	.....	.....	.....	.....
Fifteen days or more lost	.....	.....	.....	.....
Permanent partial disability	.....	.....	.....	.....
Fatal accidents	.....	.....	.....	.....
Total	.....	.....	.....	.....
Non-compensable accidents	.....	.....	.....	.....
Grand total	.....	.....	.....	.....

The value of this report cannot be overestimated, for the actual cost of each case is available, and the whole cost of any particular class of accident can be determined. Thus it will be possible to estimate what the cost of compensation will be in case any material change is made in the "waiting period" which is provided in the present law.

There are always a number of noncompensable cases recorded. This is due to the fact that the foremen are not fully conversant with the law and are desirous to report all cases as per instructions. At first, the employees reported to the foreman injuries received outside of their employment, and also those which, while received at their employment, were sustained under conditions which would not bring them under the law.

Sometimes the employees go to the doctor's office claiming injury, but have no confirming report from the foreman. The man is told to bring such a report, and if he fails to have it on his return the foreman is interviewed and the facts ascertained. Decision is then made as to whether or not the case is compensable. When a report arrives from any colliery that is out of the ordinary, the adjuster at once goes to the foreman, gets the witnesses together, if there are any, and obtains all facts pertaining to the alleged accident.

FOREMAN'S CONFIRMING REPORT
NOTICE OF

.....Trifling ..... Serious ..... Fata

Accident to.....Exam. Symbol.....Occupation....Rate.....

Street.....Number.....Town.....

Operation.....Section number.....

Date of accident.....Time.....M.....

Physician referred to .....

Last day worked.....

Date of report.....

Foreman.

The doctors are a great help also in preventing fraudulent attempts to obtain compensation. Many times where an injury is claimed a diagnosis reveals the fact that the suffering is from a constitutional disease. At times this disease is excited by a trivial injury, and this is especially true of eye cases. The employee is entitled to compensation, as he has valid proof as to its occurrence. Others have no proof of an injury and after they receive the doctor's attention the fact is established that they are attempting to take advantage of the Compensation Law. Cases of this sort are frequent.

At first many of the employees seemed to be dissatisfied with the provisions of the act, especially the 14-day waiting period. The company, whose record system is being described, continues medical treatment until the injured man is able to return to work. It was realized that the medical expenses in most cases would equal, and many times exceed, the compensation for the first 14 days. This concession of the company satisfied most of the complaints, though there is still an undercurrent of dissatisfaction on that score. Where the antiquated system of paying the doctor $1 a month for professional services and medicine for the mine worker's family is in vogue there the greatest dissatisfaction is found.

Prior to the passage of the compensation act the company, whose compensation records we have been examining, had a beneficial fund to which the employees contributed an exceedingly small percentage of their wages, and those who met with an accident were paid from the fund 50 per cent. of their wages from the date of injury until they recovered. However, no compensation was paid for any time exceeding six months, and no compensation was paid when the injury incapacitated them for work for less than six days. When the employees came to understand the workings of the compensation act and could compare it with the beneficial fund, they saw the advantages of the former.

How Cases Are Handled

The following is a statement in detail of the method used in handling cases from the time of application for employment through a period of disablement, compensation and a return to the mines.

1. *Application for Work*—A blank is filled in at the employment bureau and signed by the applicant.

2. *Physical Examination*—Signatures are compared and defects in the applicant, if any, are noted and notes of identification are taken.

3. *Industrial Certification*—Applicant is given a certificate of examination stating whether he is qualified for employment and for what special line of work he is available.

4. *Employee's Report of Injury*—When injured the employee reports at the colliery office, where a form confirming the injury is filled in and signed by the foreman. A copy is kept on file at the colliery office, one is sent to the chief surgeon, one to the adjuster, and one is given to the injured employee for presentation to the attending surgeon.

5. *Surgeon's Preliminary Report*—When the injured employee presents to the surgeon the foreman's report confirming the accident, he is given medical treatment and a surgeon's preliminary report is made out covering the nature and cause of the accident as well as an estimate of the disability and a description of the treatment. This report is then forwarded to the adjuster's office.

6. *State Reports*—From the information given on the surgeon's preliminary report the necessary state reports are made in the adjuster's office and forwarded to the State Department.

7. *Surgeon's Intermediate Report*—If the disability extends beyond the first or fifteenth of any month an intermediate report is made out by the attending surgeon. This is forwarded to the chief surgeon and by him to the adjuster. This report describes the treatment and gives the condition of the patient.

8. *Surgeon's Final Report*—When the disability ceases a final report is made by the surgeon showing when the disability ceased and the date when the injured person returned to work.

9. *Return-to-Work Certificate*—When the injured employee appears physically able to resume work he is sent to the chief surgeon's office for inspection, and there given a return-to-work certificate. This he must present to the foreman before being permitted to resume work. However, the injury received may not yet be fully healed, and the employee must report to the attending surgeon until he pronounces the injury cured.

10. *Final Report*—As soon as the injury is fully healed a final report is made. Copies of the final report and return-to-work certificate are forwarded to the adjuster's office, and the supplementary portion of the S.O.M. report having been filled out as to days of disability it is forwarded to the state.

11. *Notice to Payroll Department*—Upon receipt of the surgeon's preliminary report a notice is sent to the payroll department, provided the estimate of disability anticipates an absence from work of over two weeks. The payroll department ascertains the average weekly wage of the injured employee for the last six months or for so much of that time as he worked for the company. This statement of earnings is sent to the adjuster.

12. *Adjuster's Agreement*—The adjuster prepares an agreement and the employee, if able, goes to the adjuster's office and executes the agreement. His name is then placed on the payroll. In case the employee's disability is such that he is confined to his home or to the hospital, the adjuster takes the agreement to him for execution and prevents delay and unnecessary hardship to the dependents.

13. *Certified Copy of Agreement*—As soon as the agreement is executed a certified copy is sent to the state and a copy to the auditor, the original being kept on file in the adjuster's office. Once on the payroll the injured employee is placed on every succeeding payroll till his disability ceases. The lightly injured employee receives his compensation at the works, but if he is confined to his home or the hospital the pay of the injured employee is delivered to him wherever he may be.

14. *Receipt for Compensation*—Upon receiving final payment the employee signs a receipt for the full amount he has been paid. This receipt is forwarded to the adjuster, checked with the payroll and then forwarded to the state, thus closing the case.

15. *Adjuster's Records*—In the adjuster's office a record is kept of each accident, showing the colliery and section of the colliery where the injured employee worked, as well as the nature and cause of the accident, the name of the surgeon in attendance on the injured employee, the days that the employee was disabled, the medical cost, the compensation paid and the total expense. With this record made the case is filed and retired for future reference.

A banner bearing the inscription "Safety-First Honor District" is flown each month at the headquarters of that district which has had the lowest percentage of accidents during the month, based on the percentage of man-days of disability compared with the number of man-days worked as contained in the table below.

The form shown below is used as a detail report sheet for each colliery and also as a summary of the accidents, etc., for all districts. The report of an accident shows the place where it occurred. This is indicated by the number under the first column, headed "Section." Take, for instance, the district shown: A-1 would be "A—Colliery Outside." This shows at a glance whether the accident occurred outside or inside the mine. A-2, A-3, etc., indicates all accidents occurring inside, and the different numbers represent the sections and the assistant foremen in charge. This system permits entering each accident in its proper place directly against the foreman responsible in a sense for its occurrence.

NUMBER AND COST OF ACCIDENTS TO EMPLOYEES AND THE RELATIVE EFFICIENCY OF FOREMEN'S DISTRICTS BASED ON MAN-DAYS DISABILITY AND MAN-DAYS WORKED

Period Twelve Months Ending December
District "A"

Section	Foreman or Assistant Foreman	Number of Accidents	Man-Days Disability	Man-Days Worked	Loss in Time Due to Accidents	Compensation Expenses	Number of Accidents	Expenses	Total Expenses	Unit Cost per Man-Day Worked
4	.....	.....	.....	.....	0.009	.....	.....	.....	.....	.....
1	.....	.....	.....	.....	0.011	.....	.....	.....	.....	.....
2	.....	.....	.....	.....	0.012	.....	.....	.....	.....	.....
5	.....	.....	.....	.....	0.011	.....	.....	.....	.....	.....
3	.....	.....	.....	.....	0.023	.....	.....	.....	.....	.....
7	.....	.....	.....	.....	0.020	.....	.....	.....	.....	.....
10	.....	.....	.....	.....	0.037	.....	.....	.....	.....	.....
6	.....	.....	.....	.....	0.011	.....	.....	.....	.....	.....
8	.....	.....	.....	.....	0.040	.....	.....	.....	.....	.....
9	.....	.....	.....	.....	0.054	.....	.....	.....	.....	.....
Total	.....	.....	.....	.....	0.017	.....	.....	.....	.....	.....

Don't Call the Miner Till You Want Him

The *United Mine Workers' Journal* calls for the complete exemption of miners so that they won't be classed as slackers when the war is over, declaring that no halfway status will satisfy the men. It says:

"The coal miners are doing their duty everywhere, in and around the mines and in and around the trenches. They can render service as great, or perhaps greater, in the mines than in the trenches. But there will come a time after the war when men will ask each other the question: 'Where were you in the war?'

"If the Government were to exempt coal miners as a body from military service each man could answer this question without hesitation, as he would have the action of the Government as justification for his remaining at home to produce coal. It would remove all possibility of criticism of any miner who did not enter military

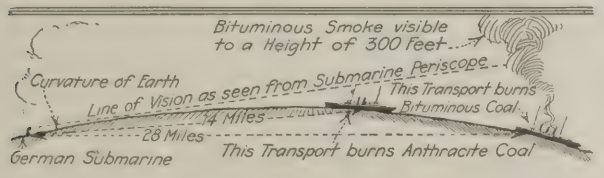
service. But without such action by the Government there will exist a feeling that some one may point a finger at the miner and accuse him of slacking military duty.

"Thus the miner is placed in a delicate and embarrassing situation. He will work just as hard, risk his life and undergo hardships in the production of coal, and there is no reason why any criticism should be directed to him, if he remains in the mines. The Government declares that coal mining is wholly war work."

It is in the same degree war work as is shipbuilding, and men engaged in shipbuilding are not required to perform military service. It would be unjust to criticize shipbuilders for remaining out of the trenches and it would be equally unjust to direct such criticism to coal miners.

The Danger in Smoke

The submarine, while it has ceased to be a national menace, is nevertheless an ever-present danger to both merchant and transport shipping. All allied vessels escaping hostile U-boats do so by one or more of four means—defense, convoy, evasion or flight. Obviously, defense has its shortcomings. Even though the fight may end successfully for the vessel, that vessel may be



Sketch showing Curvature of Earth and Manner in which a Submarine – its Periscope being 12 Feet over Water – can discover a Transport burning Bituminous Coal at a Distance of 28 Miles; while a Transport burning Anthracite Coal cannot be discovered at a Distance of over 14 Miles. This shows that if the Miners of the Anthracite Region can supply sufficient Anthracite Coal to make Power for Our Transports, the Chance of Submarines locating Transports by the Smoke is reduced One-Half.

decidedly the worse for having met the enemy submarine. Convoy, while highly effectual, is expensive and only practical for fleets or large numbers of vessels. Evasion is, perhaps, all things considered, the most satisfactory means whereby a single vessel may escape the U-boat, since flight—that is running away—is open to the same objection as defense—the fleeing ship, although it escapes, may be the worse for the meeting.

The secret of evasion lies in invisibility. To this end various methods of "crazy" painting known as camouflage have been adopted with considerable success. All the camouflage possible, however, will not protect a vessel that makes its presence known through the emission of smoke from its funnels.

The accompanying illustration is derived from a blueprint originating with the Lehigh Coal and Navigation Co., and widely distributed in the anthracite region. This shows the advantage of burning a smokeless coal by transports and other vessels. When a nonsmoking steamer is below the horizon its presence and position are unknown to a submarine 14 miles away. If large volumes of black smoke are emitted, however, the submarine commander will be aware at a distance of 28 miles of both the presence and approximate position of the vessel, even though no part of either hull or rigging is visible.

Thus a lurking submarine may discover a smoke-emitting transport or other steamer at just twice the distance at which it could discern the same vessel if no smoke were being emitted by it. The use of a smokeless fuel such as anthracite is therefore twice as safe (if safety may be said to exist at all in waters infested with enemy U-boats) as is the use of a high volatile smoky coal.

Mine Foreman a General in the Fray

Godfrey Jones, a Welsh mine foreman, who enlisted early in the war as a private and who was nominated Aug. 27 to be a brigadier-general, was once considered by mine officials with whom he was connected for years as lacking the ability to lead men.

According to the *Daily Mail*, Jones, who is 36 years old, attended night school as a boy and finally obtained his diploma. He was appointed foreman in a mine but did not make good and was reduced to the ranks of a digger. Given another chance he succeeded.

Shortly after the war broke out Jones joined the Cardiff "Pals" battalion of the South Wales Borderers. He speedily was made corporal and rapidly rose to the rank of sergeant-major. Later he received a commission.

Jones went to France in the autumn of 1915 and soon afterward was transferred to Saloniki, where he won the Distinguished Service Order and promotion to a lieutenant-colonelcy. Three weeks ago he obtained leave to come home and marry a war hospital worker. The directors of the mining company with which he was formerly employed have decided to create a special position for him on his return to civil life.



Effect of Pneumatic Reciprocating Tools on the Nervous System

By FRANCIS M. BARNES, JR.
St. Louis, Mo.

Apparently the temperature of the mines, the manner of drill operation and its discontinuity have prevented the symptoms of the disease, if the disease actually exists from appearing in mining work. The effects appear quite temporary and are entirely confined to cold weather. They are found most frequently, apparently, in the hardstone industry. The circulation can readily be restored by friction or swinging the arms.

WITHIN the past two years complaints of the ill-effect of the use of the pneumatic hammer have been prevalent in the Indiana stone belt, although these complaints do not seem to have originated so much with the individual user of the hammer as with labor organizations of which he is a member. It has been claimed that the use of the hammer produced a diseased condition in the men using it, affecting the nervous system and even leading to paralysis, insanity and other forms of complete incapacitation.

During a careful investigation on behalf of the Bedford Stone Club auxiliary it was not found, in any instance, that the use of the pneumatic hammer produced any deleterious effects upon the general health of the workers, excepting that among hardstone workers, possibly, consumption was somewhat more prevalent though no higher than is normal for similar groups of people. In fact, it is questionable if it is as high. Limestone cutters as a class are a robust, healthy group of men, somewhat above the average in other industries.

So far as this study is concerned the men using pneumatic hammers on limestone were found to be in good general health, and none of the group examined showed any constitutional disease. Their troubles (supposedly arising from use of the hammer) were limited to a disturbance of the function of the left hand—commonly known as "white fingers," or "dead fingers." As a general thing this condition occurs shortly after the men first go to work in the morning, or until they have "warmed up," but it also occurs during cold weather when the hands are otherwise exposed.

First the little finger and the ulnar side of the left hand (in right-handed men) become pale and blanched; the same area soon giving rise to tingling or numbing sensations, sometimes even to slight pain. The ring finger and part of the middle finger may also be involved in this process. By swinging the arms or rubbing the hands the condition may be made to disappear, and when the hands are warmed the pallor rapidly gives place to diffuse flushing and reddening. The index finger and thumb of the right hand are occasionally affected, particularly in those workers who improperly control the exhaust by their finger or thumb. So far as could be determined this condition of the hands constitutes the sole trouble from which the stone workers complain insofar as the use of the pneumatic hammer in their work is concerned.

The fact that the trouble, when present, preëminently affects the left hand (which holds the chisel and not the hammer) indicates clearly that other factors than the hammer itself are of more signal importance in its causation. The cramped position of the chisel hand with the more or less continuously maintained contraction of the muscles is one of these important factors. However, the hammer or the grip on the chisel, either alone or combined, are not sufficient to produce the condition, as is proved by the fact that it does not occur in the warmer seasons of the year when the stone-cutting industry is at its height.

The disorder of the hands is of a vascular character and not due to changes in the circulatory system, but dependent on vasomotor reaction. The physiological reactions are occasioned by three factors incident to stone cutting: (a) Mechanical irritation of the skin, (b) continued muscular contraction of a cramping nature and (c) cold. Of these three factors, cold is considered most important because (a) the condition occurs during the very cold weather and never in the summer, (b) warmth and measures to restore circulation (rubbing, swinging the arms and the like) cause its disappearance.

It cannot be caused by the effect of the air hammer alone because (a) it occurs in those who have not used the air hammer, (b) it does not occur in warm weather when the stone-cutting industry is at its height and, therefore, when the air hammer is most in use; (c) it occurs mostly in the left hand and not in the right hand in which the hammer is held.

The vasomotor disorder is of temporary duration and is not known to have resulted in permanent disability of the hand, nor itself to have been the cause of development of any other local or constitutional disease.

It is possible that once having occurred the person is rendered more susceptible to its reappearance, just as the one has had his ears or fingers frostbitten or "nipped" by the cold is more susceptible in these parts to the subsequent exposure to cold. This explains the occurrence of "white fingers" in stone cutters when not actually engaged at cutting but otherwise exposed to low temperatures.

The institution of measures to warm the chisel before and while using, enlarging the shank of the chisel and covering it to make it possible to hold without so cramping a grip, the wearing of gloves, and the discontinuance of the prevalent custom of blocking the exhaust outlet, and thus forcing a draft of chilled air out along the chisel and onto the fingers of the left hand would do much toward the prevention of this trouble.

*Abstract from an article entitled "The Effects of the Use of Pneumatic Tools on the Nervous System," read before the Mining Section of the National Safety Council at the Seventh Annual Congress held at St. Louis, Mo., September, 1918.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The labor leaders in the coal industry must be credited with a desire to maintain and support the instruments to which they have set their names in accordance, in each case, with the instruction of the delegates of the union. Repeatedly they have argued in favor of treaty keeping. Again and again they have pleaded that an agreement should not be broken just because the mine worker has had his cupidity aroused.

It has been the rank and file which has advocated breaking the pledged word. When the union saw that standing manfully by its agreements meant martyrdom it came to the operators and the Fuel Administration with many pious professions and advocated a rewriting of the contract, professedly in the interest of the operator and the nation, but really in the interest of the mine worker and the union.

UNION LEADERS PREFER THE HONEST COURSE

Full credit should be given to the union leaders for their preference for an honest course. Since the war began they have not themselves troubled the waters. They have only acted after others did the troubling. To excuse the tergiversations of the members of the union, they have hunted, of course, some condition in the industry that put a fair face on a faithless conduct, and they have presented this condition to the public somewhat shamefacedly, it is true, but often with much excellent effect. But it makes little difference who is the ultimate cause of agreement breaking—the mine workers or the union leaders—in any event the contract is broken and every one must fear that the signing of any more contracts with such people would be little better than useless. The solemn compacts seem to be made only to be broken.

On Sept. 8, 600 free-lance delegates of the northern anthracite field vowed that they would rather dig and fight than dig and starve and then added: "Resolved, That we, the miners of the anthracite region, unable to make a living for ourselves and our families, do hereby ask the right to be inducted into the army, where we shall be recognized as willing to do our bit for God and country."

DEMPSEY AND MACK LOOK TO THE FUEL BOARD

It may be noted that John Dempsey, district president of the United Mine Workers of America in the northern anthracite region, and John M. Mack, the treasurer, refused to recognize this convention, declaring it unauthorized and untimely. The union is discussing the matter with the Fuel Administration. Nine members of the Government are investigating conditions in the Wyoming Valley and in consequence Dempsey and Mack believe that the mine workers should be content to go along, for a time at least, with the contract they have, which has already once been modified. They feel that the mine workers should trust the Fuel Administration to grant a further modification if such a change may be proved in any way reasonable.

Of course, some remarkable statements were made at the meeting. One man said that in two weeks of mining he had earned only $24 and had been at an expense of $26 for powder and labor. It would be well to have these matters investigated authoritatively. The operator whose books have been submitted to every kind of scrutiny should be empowered to gather the facts regarding the work of his operatives so that he can meet these startling statements with a complete rebuttal. As it is, it is hard for any one to know just how diligently any man works. The time has not yet arrived when the time clock is installed at each mine and yet the war surely should demand that every man "work or fight" every moment of the eight hours in every working day.

The movement for more wages is not wholly socio-economical; it is partly political also. There will be an election soon and a general reapportionment in the union of the seats of the mighty. By attacking the contract, the leaders who approved it, who commended it to the mine workers and who later defended it are themselves attacked in a most vulnerable manner. The unshipping of the union leaders is the end aimed for.

HOW MUCH OF THE TROUBLE IS POLITICAL?

But it must not be denied that much of the agitation has a more direct ground and that nearly all the followers of the agitators are actuated by socio-economical and not political motives. It would be absurd to say that the mine workers do not want more pay. Everybody desires just that, no matter what the wage received and no matter whether or not there is a union leader to be discredited.

The mine workers are still restive under criticism. They feel that all the good words said about the shipbuilders are a reflection on other workers, notably on the miners. They also feel resentful because the remarks on liquor drinking are made too generally inclusive. When the men from Raub, Haddock, Pyne, Kingston and Pettebone Shafts, of the Wyoming valley field, recently met they declared that mine workers were the factors in the closing of saloons at hours when liquor tempts the toiler on his way to his work. But this does not answer the statement that some are slacking to drink liquor. It only shows that there are good mine workers and bad, and it exhibits how powerful the better element is if it will do its utmost to promote temperance. These same mine workers declared that they had organized patriotic parades on pay nights, rounded up men from the saloons and had done all in their power to keep a desire for recreation, bibulous and other, from interfering with fullday progress, six days per week.

ANGER OF MINERS SHOWS THE RIGHT SPIRIT

On the whole, no man can blame the mine workers for being sensitive. *Coal Age* recently spoke plainly about the miserable coal loaded out at some certain coal mines throughout the country; and accordingly the honest folk who never sent out dirty coal and lived in a part of the country where a little competition still made careful preparation necessary wrote in and said: "The miner was wholly to blame. Operators never put out dirty coal," and so forth. An honest man does not like to hear evil of his less honest fellows. He feels besmirched with the rest. For this reason we fear it will serve few useful ends to tell the straight-laced temperate miner that all the admonishment against drunkenness was addressed to the man whom he rounded up from the saloon, whom he invited to a patriotic rally and whom he had prevented from securing a drink in the barroom before working hours of the morning.

After all is said everyone must be glad that the mine worker is so wrathful. The number angered is a good indication of the number who feel the needs of the time and lament the intemperance existing. If when the public raved the mine workers snapped their fingers we might fear for the outcome. But, as has been shown, they denounced the aspersions and the louder their denunciations the more sure we are that they purpose to make them untrue.

If the men from Raub, Haddock, Pyne, Kingston and Pettebone will kindly permit it we will mention a difficulty in Winber, Somerset County, Pennsylvania. This mining town, owned by the Berwind-White Coal Mining Co., has

a large foreign population which besports itself with christenings and holidays and even with funerals. It is hard for an American to realize the joy that some foreigners find in the obsequies of a fellow countryman. As a result of these three sources of jollification, celebrated, however, in but one way—by copious liquor swilling—it has been extremely hard to get a full week's work from many of the men.

But again foreigners are not all alike. Some are quite ready to make the sacrifice required. At Mount Carmel—to return to the anthracite region—the Russian Brotherhood has agreed to postpone its convention of Sept. 16 so as not to interfere with the operation of the mines. Michael N. Halkowicz, supreme secretary, received a letter from James B. Neale saying that the action of the brotherhood "is most gratifying to the Government."

On Labor Day 600 employees of the Temple and Raub coal companies, in the Wilkes-Barre section, worked as if it were a regular weekday. The Haddock mine also worked 50 per cent. strong. Cast your eye on the preceding page and note that the Raub and Haddock men were among those who protested against the aspersions on the coal miner. If they all worked like Raub and Haddock men the unkindly criticisms regarding slacking and drunkenness would probably never have been written. The operators in the Lackawanna district had planned for a full day's production, but none of the collieries operated. Nor was it any better in the Lehigh field, near Hazleton. An outing was celebrated and the mines were deserted. However, three of the washeries of the Hudson Coal Co. near Wilkes-Barre were operated, as usual.

Fairmonters Rest Sept. 2 but Work Overtime

On Sunday, Sept. 1, the West Side mining section, near Wilkes-Barre, held a parade in honor of the full day's production that they were proposing to produce on Labor Day. We have already noted how Monongah mine in the Fairmont field worked overtime on Aug. 30 and 31 so that the tonnage of that plant would not be reduced by the Labor Day holiday. The action at Monongah seems to have been that followed by all or at least nearly all the plants in the Fairmont field and vicinity. Dr. Garfield's request was not that Labor Day be not observed, but that, as in the week including July 4, the tonnage of the week should be maintained at its normal level.

In the Kanawha region of West Virginia, the operators of the Kanawha Coal Shippers' Association, 32 being present, met in Charleston, Aug. 30, to discuss bonuses for labor, the securing of clean coal, production and distribution. The bonus trouble is still worrying the operators, for if it is paid the mine workers press for its incorporation in the scale and if it is dispensed with the mine workers are up in arms at the reduction in pay.

The operators in the Fairmont field of northern West Virginia as a body have voted against a recognition of the union. A scale committee had been appointed by the operating committee of the northern West Virginia Coal Operators' Association to meet with the scale committee from the mine workers, who just recently have been unionized. The two committees agreed on the Flemington scale, which is in force in the vicinity of Grafton and at points adjoining the Fairmont field. When this agreement was presented to the directors of the operators' association they voted not to recognize the union at all. The operators, however, which desire to recognize the union, decided to do so individually, and as the Consolidation Coal Co., the largest operating interest in the field, favors this course it seems hopeless for the smaller interests to hold aloof.

The strike at the Brule mine in the Edmonton district, Alberta, has been settled, and 500 men who had been on strike several days about the condition of the washhouse have gone back to work.

A strong movement against double shifting at the mines has arisen in Fernie and Michel, B. C., and the attack on it has been based on its unsafe features in the mines of that section. The Crow's Nest Pass Coal Co. seems to doubt whether the agitation is really based on safety. It believes that the agitation has its origin in the inconvenience of the double shift. As a result the company proposes the placing of three men instead of two in each room, thereby maintaining the tonnage despite the introduction of the single shift.

But the men regard this as an assurance of lower earnings, and it will be argued that if it does not lower their earnings it will be because three men mine more coal than two, and, inasmuch as they mine more coal, will the firedamp be evolved in greater quantity and reach a more dangerous percentage. The larger quantity of gas, it will be said, will be evolved in one single shift and must be removed as generated. More men to injure, more gas to work the injury may seem to some the conditions thus proposed. The company is reducing the gas percentage by provisions taken and whatever action is decided on it is to be hoped that it will be such as will spare the mines from further disastrous accident.

Missouri Miners Promise Future Strike

The Executive Board of District No. 25 of the United Mine Workers, which has jurisdiction in the union affairs of Missouri, has a grievance against the Southwestern Interstate Coal Operators' Association. It appears that the employees of the Kansas City Midland Coal and Mining Co. and of the Western Coal and Mining Co. presented a grievance against those companies to the association, but W. L. A. Johnson, William Richardson and J. J. Ward, representing the association, sustained the coal companies against which the union made protest.

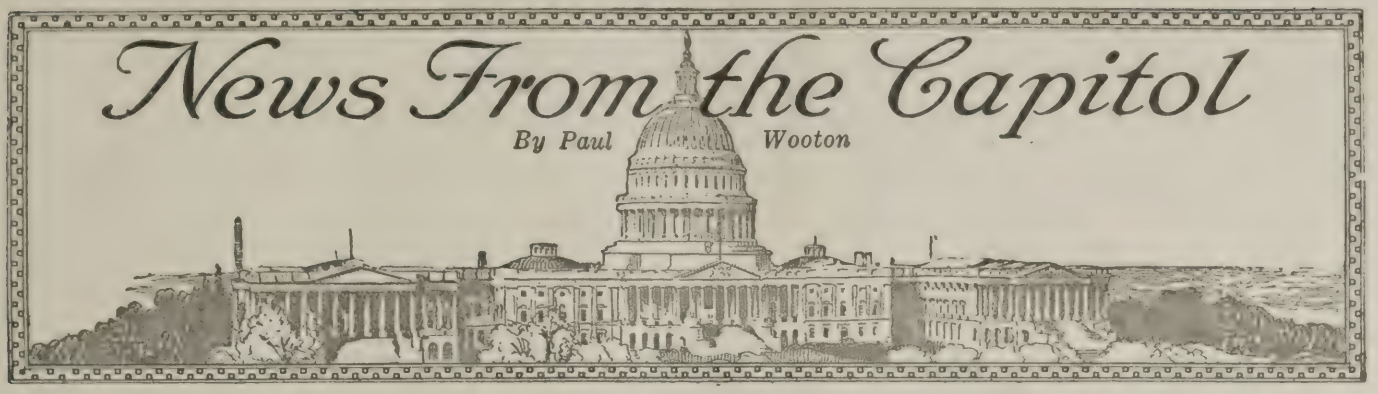
The Executive Board of the Missouri branch of the union says in a letter to F. W. Lukins, president of the association, that the decision of Johnson, Richardson and Ward was in conflict "with the letter and spirit of our joint agreement," and says "We wish to inform you that while under our contract, we have the right to call a strike, we decline to do so because the Government has urgently requested that nothing be done to disturb the production of coal."

The communication further declares that the union postpones the calling of a strike because of the loyalty of its members to the national interest, but "we want you to distinctly understand that we are not waiving our right to call that strike and that we are not waiving the principle in the contract that the operators have thus far refused to recognize. We wish further to inform you that, should your association and the above-named companies continue to do business with the United Mine Workers, some day in the future the contract which the above-named companies and the representatives of your association have ignored will be recognized."

Asiatic Labor for Canadian Coal Mines

In official, political and labor circles throughout British Columbia the recent declaration of Frank Carvell, Canadian Minister of Public Works, that Asiatic labor must be imported for Canadian coal mines if the fuel required for the absolute necessities of Canada cannot otherwise be produced, has occasioned much comment. The suggestion that orientals should be given access to Western Canada without restriction meets with general opposition, and any step having in view their employment in mines in larger numbers than at present would meet with vigorous action, not only from the mine workers' unions, but from every branch of organized labor. The press also opposes the idea, with the single qualification that it might be forced on an unwilling public by the exigencies of a coal famine. To quote one of the leading journals of British Columbia:

"The minister of public works may not understand all the objections to the policy he proposes. His conditional plan would find the strongest opposition in this province, which, of all others, is best acquainted with oriental problems. Nevertheless the statement of Mr. Carvell will have strong support among the people if they find a coal famine upon them. Fuel must be provided, and in the last emergency the Government would undoubtedly call on Asia or any other country for help. But the last emergency has not yet arrived and it should not be too late to avert it."



Reduction in Price of Byproduct Coke

A flat reduction of 30c. a ton in the byproduct coke price has been made by the Fuel Administration. An exception is made for byproduct coke produced in Alabama and in Washington. The principal reasons for the reduction are that the high-priced contracts for coal have expired and that a regular supply of coal now is obtainable at ovens. The price of coal also has been reduced 10c. since the previous coke prices were made.

Indiana and Illinois Coal for Michigan

Action on the part of the Fuel Administration last week makes it necessary for the lower peninsula of Michigan to become a heavy purchaser of Indiana and Illinois coal. All other coals have been zoned out of that territory. This action was taken only after it became evident that Indiana and Illinois coals would not be used voluntarily to any extent in the lower peninsula. There are considerable stocks of high-grade coal in the lower peninsula, which it is expected will be stored for use in the dead of winter. This is one of the steps being taken by the Fuel Administration to limit the use of high-grade coals to essential uses.

Investigating Electric Power Situation

Increased attention is being given to central power plants by the Fuel Administration. An effort will be made to improve the service being given by these companies. An inquiry is being directed by the Fuel Administration to operators securing electric power from central plants asking for certain information with regard to the power situation.

Federal Trade Commission Arraigned for Handling Coal Matters

On the Federal Trade Commission's handling of matters pertaining to the coal-mining industry was based the strongest of the indictments against the Commission by the Chamber of Commerce of the United States. The arraignment of the Federal Trade Commission came in the form of a report from the Federal Trade Committee of the Chamber of Commerce, of which Rush C. Butler is the chairman. The reference to coal in the report is as follows:

Before the Fuel Administration was established, the Commission undertook to influence distribution of anthracite coal, with the acquiescence of the operators. Even if the Commission's belief that there were beneficial results is accepted, it remains true that this was not a proper function for the Commission to exercise and that it did not have facilities essential for the task. It is common knowledge that distribution was so imperfect that proper supplies were not accumulated for the following winter and that widespread hardship ensued.

The Commission later perceived a similar function for itself to controlling the distribution of bituminous coal. It undertook to advise Congress that all bituminous coal should be sold through a common agency at one price for each quality and that the operators should receive individually their cost with an added profit. The Commission itself was to be the agency. This recommendation it made in a report which showed scant data regarding bituminous coal. Legislation under which the Fuel Administration was created authorized the President to utilize the Commission as a distribution agency, but this authority was not exercised and by proclamation of July 3, 1918, most of the remaining activities of the Commission with regard to coal were transferred from the Commission to the Fuel Administration.

In August, 1917, the Commission gave advice to the President which resulted in the prices fixed by him on Aug. 21. The Commission's prices were constructed upon a new computation of costs, which excluded, among other things, interest and depletion. The Commission stigmatized reserves as coal held out of use and allowed no interest for investment in reserves. Part of the data before the Commission was an anonymous estimate of costs in important fields. The correctness of the Commission's method of computing costs is not here in question. The objections on the score of public interest are that the method was new; that it was applied at a critical moment when customary and honest bases of costs should not have been questioned; that it was arbitrary in that it had not been subjected to scrutiny at such hearings of the persons affected and the public as any responsible public body should accord; and that it placed below the cost of production the prices of at least 40,000,000 tons of bituminous coal in the annual supply. In other words, the Commission was not prepared to undertake the highly important rôle it essayed, and dealt recklessly alike with national interests and personal rights.

Fuel Administration to Settle Power Controversy

Settlement of the controversy with regard to the charge to be made for power in Harlan and Bell Counties, in Kentucky, and the contiguous region in southwestern Virginia, has been put in the hands of the Fuel Administration. The action to this end taken by the operators is expressed by the following resolution:

"Resolved, that the committees from Harlan County, Kentucky, Bell County, Kentucky, and southwestern Virginia, representing the coal companies which are consumers of power from the above mentioned fields,

agree to submit the question of fixing the amount of increase necessary to provide the power companies the funds to serve the above consumers with satisfactory power to the Price Fixing and Engineers' Committees of the United States Fuel Administration, and we hereby agree to abide by the recommendations of the said committees, and will so recommend to the respective coal operators of our fields."

Storage Limitation Has No Effect on Prices

Establishment of a system of storage limitation was expected by some to result in breaking the coal price. The storage regulations, however, have gone into effect and no evidence has reached Washington of the price having fallen below the maximum fixed by the Fuel Administration.

Many Miners Worked on Labor Day

A large number of cases in which mine workers sacrificed their Labor Day holiday in order that coal production might be continued have been reported to James B. Neale, the director of production for the Fuel Administration. In some cases the miners worked throughout the day. In others they worked most of the night preceding, so as to be able to take part in the exercises of the holiday. In the Pocahontas and Tug river fields, 1219 cars were loaded on Labor Day. The normal day's loading is only 5 per cent. greater. The coal mines in the Connellsville district of Pennsylvania produced 75 per cent. of the normal output.

Government's Attitude Toward Nonwar Work

One of the clearest statements of the Government's policy toward unnecessary activities or work which can be deferred is contained in an announcement under date of Sept. 6, by Judge Edwin B. Parker, the priorities commissioner of the War Industries Board. Judge Parker, among other things, says:

While it is not the policy of the Government to unnecessarily interfere with any legitimate business, industry or construction project, it must be borne in mind that there is an imperative and constantly increasing demand for labor, material and capital for the production and distribution of direct and indirect war needs, to satisfy which much nonwar construction must be deferred. A full realization of this fact by all loyal and patriotic citizens, including state and municipal authorities, is all that is required to postpone such construction activities as interfere with the war program. The state and local representatives of the Council of National Defense are with confidence depended upon to fully acquaint the whole people of these United States with the pressing need for the most rigid economy, measured not only in terms of dollars but in terms of labor, materials and transportation service. The construction projects which must be now deferred may be undertaken when we shall have won the war and will then furnish employment to the returning artisan now on the battlefront as well as those who will then be released by strictly war industries.

Works which require new permits or licenses, are as follows:

1. After having first been cleared and approved by the War Industries Board, those undertaken directly by or under contract with the War Department or the Navy Department of the United States or the United States Shipping Board Emergency Fleet Corporation, the Bureau of Industrial Housing and Transportation of the United States Department of Labor, or the United States Housing Corporation.

2. Repairs of or extensions to existing buildings involving in the aggregate a cost not exceeding $2500.

3. Roadways, buildings and other structures undertaken by or under contract with the United States Railroad Administration or a railroad operated by such administration.

4. Those directly connected with mines producing coal, metals and ferro-alloy minerals.

5. Public highway improvements and street pavements when expressly approved in writing by the United States Highways Council.

To Save Coal in Power Plants

Consolidation of electric power plants is going ahead rapidly, due to the activity of the Fuel Administration along with the coöperation of other Government agencies. Since a kilowatt of electricity has the same power regardless of the amount of coal used to generate it, a great saving of fuel is effected when plants requiring five, six or eight pounds of coal to generate a kilowatt are eliminated and the electricity furnished from a plant which requires but two pounds of coal to make the same amount of electricity.

Furloughs from Military Service

Furloughs from military service will be used to a greatly increased extent now that the new man-power act is in operation. William M. Ritter, who is thoroughly familiar with the requirements of the coal-mining industry, as well as those of other activities, has been named the representative of the War Industries Board to look after industrial furloughs. He will be the point of contact between the War Industries Board and the office of the Adjutant General.

The Fourth Loan Is a Victory Loan



We Must All Grow Old Some Time, But—



We don't want to be crippled also. The old age of a man who has been unfitted for industry is full of sorrow and often of bitterness toward even his own family. As far as he possibly can every man should keep a whole skin so as to be useful to his fellowman in the war or in industry. Neither the army nor industry can use a cripple. Avoid, therefore, all the accidents you can.

EDITORIALS

ON PAGES 52 and 53 of the advertising section of this issue of *Coal Age* will be found an advertisement to which the attention of every reader is directed. It gives in detail a plan of preparing the way for the sale of the Fourth Liberty Loan. That announcement must command not only careful and immediate attention, but action also.

It is a poor mouth that just now pleads self-interest. The nation's need is not to be urged on any such narrow basis. Yet it is not difficult to see how the energetic carrying out of this plan will not only help to sell the Liberty Loan, but give an impetus to business—your business and that of your employees.

* * *

Business depends as much on enthusiasm as on anything else. Given a win-the-war spirit, the coal output will develop to full proportions. The miner will try to overcome the difficulties of coal transportation by a readiness to fill railroad cars whenever they are available and a willingness to wait for them whenever they are promised. He will put up with other drawbacks also—at least so long as he realizes that the operator cannot be blamed for them.

The win-the-war spirit will transform the mine worker into a catch-as-catch-can worker striving ardently for every opportunity to "boost the game." It is the "win-the-pennant" spirit that makes baseball players ready to act on the instant and ready to wait for the opportunity which only rarely comes to them.

When all the batters are pounding the ball to the outfield and the bases are empty, you won't find a baseman getting ready to go home, or slouching over to the players' bench. Note him! He is awaiting the unexpected with as much energy as if he knew it was coming. This is how it is on the baseball diamond. But put the same man in the mine and a similar condition will often send him home.

The electric locomotive on which he depends is, perhaps, gathering in another heading and will not reach his room for a while, so, discontented, he takes his pail and his coat, runs like a streak for the parting and goes home. He hasn't the win-the-war spirit. He is not in the war. The mine workers are not all of that kidney, but what of that? There are some who are, and they must be brought to the right point of view so that they may do their part and put further enthusiasm in all those who are already doing well. A meeting such as is advocated will serve to put ginger into the whole organization from superintendent down to trapper boy.

* * *

THE tremendous impetus which Charles M. Schwab has given to shipbuilding has been largely achieved by making every individual engaged in the industry feel a personal responsibility for results and a personal pride in helping to make great results possible.

This spirit of accomplishment in the shipbuilding industry has been brought about by the leaders—the employers—the bosses; whatever you choose to call them; making it a business to come in personal contact with the workers and to inspire and enthuse the men with a sense of the importance of their work for victory in the war—a sense of personal responsibility, and a spirit of teamwork.

* * *

The creation of that spirit among the workers of the nation in all lines of activity would be of incalculable benefit to the workers themselves, to employers, and to the nation.

Concretely two of these results would be: To quicken and increase the response to all war measures such as Liberty Loans—War Saving Stamps—the draft—food and fuel saving and to make the worker feel more keenly his responsibility to do a full day's work (no matter what its character) to the very best of his ability. It would make him feel the necessity of sticking closely to his job.

Employers generally should pursue with intelligent enthusiasm the plan of Win-the-War meetings proposed as a means to aid in the rapid flotation of the Fourth Liberty Loan. The results of such action will not only be helpful in the loan drive, they will be permanently helpful to the nation through the development of a keener realization by the worker of the importance and dignity of his individual job and the necessity for personal responsibility and helpful teamwork.

* * *

EVERY employer can be a leader and a center of influence in this work. The man who operates a small mine with relatively few employees may feel that his circle of influence is too small to be worthy of any effort. That is a mistake. It is the aggregate that counts, as the announcement of the plan very clearly points out.

The man who is in a relatively small circle may not hold so pretentious a meeting—it may not be formal or run under parliamentary rules—it may not be especially announced, or accompanied by music and oratory. But the man who will quietly call his employees around him and informally, thoughtfully, lead discussion into win-the-war channels, pointing out the importance to the individual of doing his best in support of Liberty Loans and all other war activities, can do a real service in this way. It can be so well done in no other way. And ten thousand such little meetings would produce an enormous aggregate result.

* * *

Some operators may feel a degree of reticence about calling a meeting at which it would be necessary to speak or, at least, preside. That feeling it is, of course, necessary to combat. An operator, manager or superintendent should be a leader of men. He should be able to address them, not only about the war, but about a hundred and one matters relating to industry and peace.

But if any mine official fears his inability to perform this duty and feels it embarrassing to talk to his

men, let him join with officials of other mines nearby and call a larger meeting. He can then avail himself of the oratorical ability, magnetism and leadership of others.

Whether his opportunity be great or small, every American mine official should carry out the idea presented in a definite systematic manner. The "program" booklet which is mentioned in the announcement will be found most helpfully suggestive in furnishing plans to meet all circumstances.

Safety Relies on "Come-Along" Spirit

SAFETY movements fortunately fell early into the hands of men who preferred "Come Along" to "Go Along," and their propaganda has, for this reason, been strikingly free from the word "Don't." In the measure in which they have sought to lead and not to drive has been their success. In most cases, without the help of the law, without the support of the power of discharge, without the entire good will of all elements in the management, without even the whole-hearted support of the men whose lives and limbs were to be saved, they have been forced to use the compelling powers of good will, sympathy and understanding. They have been obliged to praise what good they found and to be a little blind to the bad they encountered, and so they have been compelled to work only gradually and by moral suasion toward the best.

Their restrictions have done them no harm. The very weakness and halting character of their work have promoted a feeling of respect. For safety has, at no time, been rendered obnoxious by compulsion. It has been made a pleasant and alluring creed. No fierce penalties surround it. Jail sentences are not relied on to give it assistance, nor does it gain much strength from suspensions or discharges. The safety man does not fulminate. He coaxes, and the results follow. We would all always rather be led than driven. We would even prefer to have a suggestion from a safety man than an order from the executive head of our department. Safety does best when it is treated as a matter of sentiment. Hard-headed men will always regard it as a little mawkish, but thank Heaven, the hard-headed do not predominate; the men with sentiment and moral imagination always outnumber and outvote the others. The ideal wins. Was there ever a better industrial ideal than "Safety First"?

All Derailments Are Potential Casualties

AROUND the mines you hear mine workers talk glibly and with indifference about the derailment of a car or or the wrecking of a trip, though in nearly all derailments and wrecks abides the potentiality of accident to life and limb—of a casualty, at least, if not of a fatality. Until we get to the point of trying to avoid bloodless accidents as well as the other kind, until we begin to investigate them as seriously as others, we shall never reach the ultimate in safety.

But even in our investigations of a fatal mine accident we sometimes satisfy ourselves with the knowledge that it was caused by a derailment. It finds final record in just that way. It is not marked down as the result of tight gage, wide gage, lack of elevation, bad curve, low joint, no fishplate, lack of spikes, absence of rail brace, lack of guard rail, rotten ties, fallen roof rock, coal on road, room frog, light rail, excess speed, failure of brakes, steep grade, locked bumpers, broken drawbar, failed coupling, damaged bumper, bent axle, poorly built car, overload, pushing instead of pulling cars, starting trip, a too-rapid stop, a sudden change in grade which takes up slack, an ill-thrown switch, a high plank, props piled too close to the road, or a car pushed too near the traveling track.

There are many causes, and we should know just what they are. Diagnosis is two-thirds cure, but as yet we have little or no diagnosis. As the definition of a primary cause derailment is too wide of the mark. It serves as much, perhaps, as when we say in recording an accident, "Wife and six children left without support." It is the record of a result and not the record of a cause. It informs us that something is wrong, but not just what.

The reason is because we do not wish to face the real cause. Derailment is so delightfully vague. It does not uncover the real nature of the neglect. The question of safety will never progress unless it is approached in the proper statistical spirit. If we can say the low joints cost so many lives and so many hours of lost labor in 1918, and add that they even cost so much money, we shall have something to guide us as to the value of efficient track supervision. In fact we should also keep a record of the place where the accident occurred. We want no Deadman's Curves or Deadman's Hills in our mine, or even Casualty Curves and Casualty Hills. Let us mark all the danger points in our workings plainly. Perhaps they need a change of curve, or of grade, or of operating method, or it may be a guard rail, a road brace or some track elevation. .

What makes for safety makes for industrial surety. What kills a man, destroys a car or lames a mule. What throws a car off the track, spills coal along the roadway. What derails a locomotive, causes timbers to be torn down. What makes a wreck, makes also an idle tipple and sends men home before the day is done. Safety should be the first consideration. If you write it, however, as "Surety in operation is the first consideration," you make it less forceful and less true. Nevertheless, in doing so you put a new light on the matter.

Reckless road maintenance and carelessness in the repair of equipment never did and never will pay, apart from the accidents to persons resulting. In that last accident you had, how many men were laid idle, how long were you repairing cars, and how much material was needed? Even if no one was hurt you probably lost more than would have paid for the hire of a tracklayer for a month or more. When you are short of men, the repairmen are the first laid off. You then begin to lose more by accidents than you can ever hope to gain by all manner of such ill-placed economies.

In many mines may be found places where cars are handled with undue roughness, yet without casualties resulting at those particular points. Such places are the kickback gathering "pits" on tipples, the long gravity planes on hillsides and starting places for long electric locomotive trips. If we would have safety, conditions at these points must be modified so as to make operation less destructive to equipment. A little consideration of the trials of our mine cars may advantage us much in our quest for safety from derailments.

DISCUSSION BY READERS

Permissible Explosives in Mining

Letter No. 1—I read with interest what W. H. Noone had to say regarding permissible explosives, when discussing safety in shotfiring in mines, *Coal Age*, Aug. 1, p. 234. Having had charge of a large number of men and the oversight of shotfiring, in the last few years, I am convinced that the introduction of permissible explosives in coal mining has been the means of saving many lives.

It is a well-known fact that men who are the victims of accidents in blasting are very often those who have had a long experience in handling black blasting powder. Their experience, however, has not taught them to take the precautions that they know should be taken in blasting.

Experienced Miner Takes Chances in Blasting and Is Killed

A year or so ago, I made a special tour of a district in our mine for the purpose of discussing with each man the methods he employed in preparing and firing a shot. The last man I approached with some hesitation, because he was an old miner who had had 30 years' experience in cutting and blasting coal. I felt it would be an insult to ask him to show me how he prepared his squib, and to explain what precautions he took for his own safety and that of others. I dealt with this man very much as a cat would play with a mouse and, without injuring his feelings, got him to show me how he prepared a squib, and his answers to my several questions convinced me that he understood his business thoroughly.

The following morning, I missed several men from their places, and, fearing something was wrong, hurried along until I reached the man's place of whom I have just made mention. To my surprise and sorrow, I found him lying unconscious on the floor of his place, with several lacerations and a fractured skull, from which he died a few minutes later. Following my talk with him the night before, nothing could have convinced me that he would ever take the desperate chance that his laborer and others had seen him take on many occasions and which had, at last, cost him his life.

Shortens the Match on His Squib

A similar instance of foolhardiness occurred when I entered a place where a miner had just finished tamping his shot and was withdrawing the needle from the hole. He sent his laborer to the gangway, and I watched him start to prepare his squib. As he placed it in the hole, I walked leisurely to the crosscut about 15 ft. back from the face, on the other side of the room. The miner followed me to the place, on the run, and had barely turned the corner of the crosscut when the charge went off, throwing a large quantity of fine coal into the opening, almost catching him, myself and another miner who was eating his lunch in the place.

Knowing well that he doctored his squib after I left him, I asked him for his squib box. Taking one of the squibs from the box, I prepared it in the same manner as he had done in my presence a short time before. Then, igniting the end of the match, I timed the action of the squib as 1 min. 8 sec. Taking another squib from the box, and preparing it in the same manner, I broke off a portion of the match, about what I assumed he had broken off when firing the hole. The time for the squib to get action, in this case, was 8 sec. only. The man, then, frankly admitted his mistake in shortening the match. This is but one of the many chances experienced miners take with black powder, which they could not take in the use of permissible powders.

Those who have used permissible explosives will bear me out in the statement that such a cartridge rarely, if ever, becomes stuck in the hole; there is no loose powder spilt from the cartridge when charging; and the charge can be tamped as effectively with a wooden tamping rod as with a steel bar. The charge hole is fired with an electric battery, after the miner has gone over his wires and made sure that there are no breaks. The firing is done from a safe distance and there is no chance of a premature blast.

Should the hole misfire, in electric blasting, the miner at once disconnects his battery and, after a reasonable time, goes over his wires to ascertain the cause. On the other hand, if a misfire occurs when using a squib or fuse, there is always the danger of the shot exploding several minutes later, which leaves the miner in doubt and uncertainty.

Permissibles in Inflammable Coal

When working in coal that was highly inflammable, I have used "Monobel," "Aetna" and other brands of permissible powders. In driving more than two miles of narrow work and working 15 chambers 800 ft. long, in this district, I have never had reported a fire, or a feeder being ignited by the use of these powders. The men have adapted themselves readily to its use and no complaints have been heard. My experience convinces me that mine fires and accidents of this nature would be reduced to a minimum by the use of permissible powders. On the other hand, I believe that as long as blasting is done with squibs, fuse and black powder, such accidents will continue.

We sometimes hear the objection offered that the higher cost of permissible powders stands in the way of their general use. However, it should be remembered that to offset this increased cost, there is a far greater reduction in the amount that may need to be expended as compensation for injuries received in the mine. The Bureau of Mines is to be congratulated on the success of the work they have undertaken in introducing permissible powders in coal mining.

L. R. Thomas,
Section Foreman, Woodward Mine.
Edwardsville, Penn.

Squibs vs. Electric Fuse

Letter No. 2—Referring to the inquiry of "Miner," *Coal Age*, July 20, p. 145, regarding the relative safety of squibs and electric fuse in blasting with black powder or permissible powder, and the request of the editor for a general discussion in regard to the safety and adaptation of single and double-tape fuse, squibs, electric fuse and electric detonators in blasting coal, permit me to offer the following from my own personal experience in this line of work.

In my opinion, while the squib is the simplest and cheapest means to employ to explode a charge, it is the most dangerous. The common squib consists of a thin paper tube ⅛ in. in diameter and 6 in. long, containing fine black powder. At one end is the match. Either the twisted paper is dipped in sulphur, which flames when ignited, or touch paper is used, which smolders but produces no flame. On that account the latter is generally considered safer than the sulphur match.

Dangers in the Use of Squibs in Blasting Coal

The chief danger in the use of the squib lies in the desire of miners to hasten its action by shortening the match, or by bending the sulphur match downward so that the flame will climb quicker to the powder. The match is sometimes moistened with oil for the same purpose.

Again, when the hole pitches, which is generally the case in inclined seams, a train of powder frequently follows the needle as it is drawn from the hole. The powder train may extend to the mouth of the hole and be fired by the flame of the lamp when igniting the match. In a gassy seam the gas may issue from the hole, and its ignition would at once fire the squib and cause an immediate explosion. In such seams it is quite common to strike a strong feeder of gas when drilling a hole preparatory to firing a shot.

Gas Ignited When Squib Is Lighted and Causes a Premature Explosion

An incident that happened some years ago when I was working as a laborer in the anthracite coal fields impressed forcibly on my mind the danger of using a squib when blasting in a gassy seam. In that instance the hole had been tamped and the needle drawn, and I stood behind the miner as he prepared the squib and placed it in the hole. In igniting the match with his lamp the gas coming from the hole was ignited and the flame issued some distance from the mouth of the hole, causing us both to jump instantly for the crosscut, which fortunately was only 6 ft. away. Hardly had we reached cover when the charge exploded, throwing the coal in all directions. Such an accident could only happen in the use of a squib.

Of tape fuses there are three forms—single-, double- and triple-tape fuse. The ordinary tape fuse consists of a train of fine powder laid in hemp or cotton, which is then covered with one or more layers of tape to render it waterproof. The rate of burning is from 1½ ft. to 2 ft. a minute and this is generally specified by the manufacturer. Depending on this stated rate of burning, the blaster estimates the length of fuse required to permit him to reach a place of safety before the shot will explode.

By cutting a greater length of fuse, it is possible to lengthen the time should it be necessary to do so, and in that respect the fuse has the advantage of a squib. However, the rate of burning cannot be guaranteed. It is common for a tape fuse to be injured and hangfire for a considerable time. When that happens the miner often becomes impatient and, believing the fuse has gone out, proceeds to investigate. This has been the cause of many a miner losing his life, being blown to pieces by the delayed explosion.

To reduce accidents from this cause the mining laws of British Columbia provide that, in case of a misfire, the place shall not be entered within 4 hr., unless an electric igniter is used, when this interval is reduced to 15 min., which is the time that a miner must wait after attempting to fire a charge that misses.

The use of fuse gives the thoughtless miner every opportunity to display his recklessness. Strange as it may seem, I have observed miners who, in order to save 3 or 4 ft. of fuse in firing a deep hole, would cut a piece of fuse 2 ft. long, attach it to the powder cartridge, then "spit" the fuse and, with a dummy cartridge of tamping material, push the charge to the bottom of the hole, follow this with one or two more dummies and run.

Another dangerous practice is to lace the fuse around a dynamite cartridge or even pass it through the same, which may start the explosive to burning and prevent its detonation by the cap. All such practices are impossible in electric ignition.

Electric Fuses and Detonators

An electric fuse, or "squib," as it is sometimes called, is a paper shell containing a mixture that flames when an electric current passes through it. The lead wires conducting the current pass into and are made fast to the shell. The cap thus arranged resembles an electric detonator. The ignition of the charge is caused, however, by flaming and not by detonation.

The electric detonator is a cap or shell of copper, containing a fulminate, which is detonated by the electric spark that passes between the terminals of the lead wires attached to the cap and causes the explosion of the charge. This has been fully explained, however, by the editor, on page 145.

In electric firing it is important to choose a detonator whose strength is adapted to the work required. Too strong a detonator is better than one not strong enough. No. 6 or stronger should be used with permissible powders. Tests show that an explosion is quicker and more complete and a smaller volume of poisonous gas is generated when a strong detonator is used; also, with a strong detonator less difficulty is experienced on account of the age of the explosive.

Precautions To Be Taken in Electric Firing

Before closing, I wish to state that electric firing by fuse or detonator is, today, the safest means to adopt, as it avoids all uncertainty and the dangers so common in the use of tape fuse or the miner's squib. In electric firing the simplest precautions insure safety. In the interest of the great safety-first movement, firing by other means should be prohibited by law.

In my experience, the following are the precautions essential to safety in electric firing: (a) Make sure

that the electric detonator is firmly secured in the explosive. (b) Avoid the use of gritty tamping material that might injure the lead wires and short-circuit the current. (c) Make sure there are no kinks in the lead wires and avoid injuring these wires in tamping. (d) Clean the ends of the cable wires and the lead wires before joining them. (e) Insure a good contact of these wires by twisting them firmly together. (f) When connecting the cable wires with the terminals of the battery, insure a good contact by cleaning the wires and screwing them down firmly. (g) Examine the battery occasionally to see that it is in good condition and that the parts are not corroded, demagnetized, or the gearing damaged. (h) Never connect the cable wires with the battery, until the moment of firing and after making certain that no one is in the vicinity of the blast. (i) The shotfirer must have full possession of the key to the battery. In using the battery, the handle must be plunged or turned with a quick firm action.

J. W. POWELL.

Cassidy, B. C., Canada.

Letter No. 3—The question of firing shots with the old miner's squib or tape fuse, as compared with electric firing, takes me back, in memory, to the days when black powder was fired by squibs and fuse and many accidents were the result. Today, the use of permissible powders fired by electricity has greatly reduced the number of these accidents.

Briefly stated, the chief advantages in electric firing are that the charge can be exploded at the exact time desired. No time is wasted in waiting for the fuse to burn and the miner cannot take chances in firing, as he does in the old way. Formerly, it would occasionally happen that the squib was imperfect and the powder extended into the match, so that the shot would go off when the match was lighted before the miner had an opportunity to get away.

At other times (but this would happen more often in the use of fuse than when the shot was fired with a squib) the shot would hangfire, and the miner would come back thinking it was a misfire. At times, he would even start to drill a second hole to blow out the charge and would be caught by the explosion of the first charge.

When using fuse, the miner would often crimp the cap on the end of the fuse with his teeth instead of using a pair of pincers for that purpose. In some instances the miner's head would be blown off or he would lose a hand by the explosion of the cap when crimping it to the fuse. It is my belief that there is no safety for the miner in the use of either squibs or fuse.

REQUIREMENTS OF BATTERY IN ELECTRIC FIRING

A safe battery, for electric firing, must possess certain requirements. The parts of the battery must be inclosed in a tight substantial case so that no contacts will be exposed, except the binding posts or terminals to which the firing leads are connected when the battery is to be used. In order to provide against the unauthorized use of the battery, it is provided with a detachable handle or a key, without which no current can be generated.

The battery must be in charge of an authorized and competent shotfirer, who must never connect the firing leads with the terminals of the battery until all steps preparatory to the firing of the charge are completed. He must permit no one to make these connections but himself, and then only after he has made sure that everyone is in a safe place. Immediately after firing a shot he must disconnect the firing leads and remove the handle or the key from the battery.

Should the shot fail to go off the shotfirer must permit no one to approach the place for at least 5 min. after making the attempt to fire the charge and after the lead wires have been disconnected with the battery. To insure the proper working of the battery, it should be inspected from time to time and tested to insure that its capacity for firing a charge has not decreased.

Leckrone, Penn. SHOTFIRER.

Sealing Off Fire on Intake

Letter No. 13—I have been much interested in the discussion, in *Coal Age*, regarding the sealing off of a mine fire that has gained considerable headway, in an intake entry. Having had several years' experience fighting mine fires, in the Newcastle district of Colorado, I desire to add a few remarks giving my own ideas in reference to this subject.

In the first place, I believe in being prepared when operating a fiery and gaseous district in a mine. To this end, let me suggest that a wise precaution to take, in such a case, would be to build two frames of 6 x 8 in. timber, one in the intake and the other in the return airway of the section.

These frames should be walled into the rib to the depth of a foot, using concrete or brick for the purpose. To provide drainage, a short piece of pipe with a valve should be built in where the ditch passes under the wall. On the roadway, at this point, two short lengths of rail should be used, which can be quickly taken up and the floor prepared when there is need of closing the stopping.

Should the occasion arise requiring the stoppings to be closed, the work must be started on the intake by boarding up the opening in the frame. Starting at the top, the boards should be made to lap each other about a half-inch, which makes a better job when sealing the cracks with clay or plaster. This will allow of a space of 5 in. for concrete or brick.

The return stopping is now started about a third of the way down from the top and the boards made to lap about a half-inch and plastered, in the same manner as in the intake. A pipe or valve should be inserted in the stopping and left open until the stopping has set.

While building these stoppings, the air current should be short-circuited by making an opening in the next stopping outby. When the work has been completed thus far, further operations should be suspended for a period of 24 hr., after which both stoppings should be finished with brick or concrete.

In my opinion, it is a grave mistake to close the return stopping first. This would have the effect of shutting in a quantity of air behind the stopping, with the result that an explosive mixture would form and an explosion take place, which has proved to be the case, more than once, in the Newcastle district.

Reliance, Wyo. WILLIAM HARRIS.

Priming a Cartridge

Letter No. 2—Referring to the letter on this subject by "J. P. G.," *Coal Age*, Aug. 15, p. 327, permit me to say, that in the interests of safety and to secure the best results in blasting a detonating cap should never be inserted in the side of the cartridge or the lead wires laced around the same, as he has described.

My experience convinces me that there is only one safe method of inserting a cap in the primer. For this purpose, the end of the primer cartridge should be opened and the cap inserted until it is fully covered by the contents. The paper at the neck of the cartridge should then be securely tied about the lead wires with a string so that the cap cannot be withdrawn when charging the hole. An experienced shotfirer will provide himself with string for that purpose so that no time will be lost when preparing to shoot.

Taking a half-hitch with the lead wires about the cartridge is liable to cause a bad kink or injure the covering of the wires and cause a misfire. Also, when the detonating cap is inserted diagonally in the side of the primer it is apt to be drawn out of the cartridge, or even exploded, by rubbing against the sides of the hole when the primer is being pushed home.

Let me suggest, here, that where two or more cartridges make up the charge it is well to open the paper where the cartridges come in contact with each other, and insert the end of one cartridge into the open end of the cartridge below it, so as to form a better contact of the contents and make a more solid charge.

Perryopolis, Penn. R. W. LIGHTBURN.

Americanizing the Foreigner

Letter No. 3—After reading the interesting letter of "Experience," *Coal Age*, Aug. 8, p. 286, which deals with a subject in which I have taken much interest in recent years, I could not refrain from expressing my views, which I hope will be found worthy of publication.

It is hardly necessary to say that the coal-mining element, today, taken as a whole, is inferior both mentally and socially to the old-time Scottish, English, Danish and other nationalities that comprised the mining classes a few years ago. Then the miner took pride in keeping his place in A-1 shape and producing a good tonnage. In those days there was no little rivalry among mine workers, each of whom would strive to gain the notoriety of being the best miner in the camp.

Times have changed, however, and "shooters and loaders" are the substitutes of the old-time miners. This reference is not offered as a criticism of the present-day miner, but is intended merely as a comparison of the conditions brought about by the change in mining methods. The application of scientific principles to coal mining has so revolutionized the coal-mining industry that but a few days' experience is required to enable a man to load a tonnage far in excess of the average daily production in former days. A coal miner today is merely a shoveler of coal, which is cut by machine and drilled by a power auger attached to the cutting machine, after which the coal is blasted down by shotfirers.

These conditions have made it possible for the foreigner, with practically no education and often with little mining experience, to earn good wages in our mines. As a result the bulk of the mining element in this country, today, is comprised of this class, and it can be said truly that we would be handicapped by a shortage of labor, even in normal times, were it not for the foreign classes employed in our mines.

I cannot agree with "Experience," when he states that the work of the executives of coal companies and operating officials has "seemingly failed in its purpose." On the contrary, I think that much lasting good has been done through their efforts. It is my belief that coal executives and officials are not competent judges of the results of their own efforts.

Let me ask such as feel discouraged in this line of work, whether they are not attempting to undo, in a few years, what has been many years in the making. The foreigner is not in his present plight through choice, but is the victim of circumstances and environment. Our desire to Americanize him, by changing his mode of living to which he was born and bred, must be tempered with almost infinite patience and perseverance. Progress will be slow and we must not be discouraged.

WELFARE WORK A NECESSITY AT ALL MINES

To insure the greatest measure of success, efforts to improve the foreigner must not be confined to the larger companies. It is necessary that like efforts be put forth by those in charge of smaller operations. During the past few years, I have frequently noticed the difference in the customs of those foreigners who have been employed at plants where social welfare was in progress, and those where no such efforts were put forth. I have observed that foreigners coming from places where the company was interested in their welfare not only inquired as to the conditions in the mine, but they were particular to find out about the living conditions, and to inquire what schools were available for the children, etc. On the other hand, the foreigner who had not experienced these advantages was only interested in knowing whether a good working place would be given him. Apparently, it mattered little to him what his family might have to endure.

A good illustration of the improvement already made in the mode of living of the average foreigner, today, is that seldom more than two men are observed to occupy the same sleeping apartment, while, formerly, it was a common thing to see from 10 to 15 men accommodated in a three or five-room house. The problem of improving the foreigner would be greatly simplified if it were possible to retain the same employees at one camp. The mine practicing the social uplift of their employees would, then, soon have a higher class of labor than operations where no such work was attempted.

The fact that there are some families among the foreigners whose customs it is difficult to change and whom it is hard to influence is no reason for condemning the foreign classes, since there are just such families born and bred on American soil. We must strive to surround such with improved conditions, in the hope that environment will at last effect a change.

In closing, let me urge all mine officials who feel discouraged after making an honest effort to Americanize their foreign-born employees, to observe the effect their efforts have had on the children. I venture the assertion that some improvement will be there observed.

Rosemont, W. a. J. A. H.

INQUIRIES OF GENERAL INTEREST

Air-Cylinder Lubrication

Will you kindly state, in the columns of *Coal Age* what are the essential requirements in the lubrication of the air cylinder of a compressor. There seems to be a variety of opinions in regard to the best lubricant to use for this purpose. I had supposed that a cylinder oil that gave good results in the steam cylinder would give equally good results in the air cylinder of a compressor, until I found by sad experience that it would not. It is claimed by some engineers with whom I am acquainted that soap and water gives as good results in the lubrication of the air cylinder of a compressor as any of the best lubricants on the market.

Indianapolis, Ind. ENGINEER.

There is hardly any subject connected with the industry of coal mining that requires more constant hammering, in the effort to educate new engineers, than the question of the proper lubrication of the air cylinder of a compressor. As this correspondent has learned by experience, the air cylinder is quite a different proposition from that of the steam cylinder, a different lubricant being required in each case.

Much trouble is experienced in the lubrication of the cylinder of any engine, air, gas or steam, unless the lubricant is adapted to meet the special conditions involved in the operation of such engine. A lubricant that will give excellent results in the steam cylinder will fail absolutely when used in an air cylinder. The same is true in respect to gas engines, which require a lubricant of high flash point.

In colliery practice, in air-compression work, one of the chief difficulties arises from the dust commonly drawn into the cylinder with the air. This dust mixed with the oil used to lubricate the cylinder forms a deposit or sediment that obstructs the air ducts and valves, causing the latter to leak, thereby raising the temperature and making more difficult the lubrication. On this account, a lighter oil having a gravity of, say from 31 to 33 Baumé has been found to give better results than an oil of less gravity. In this respect, air compression at collieries, except where the air is thoroughly washed and cleaned before being drawn into the cylinder, may differ from that in other operations.

In general, it may be stated that the points to be emphasized as matters to be avoided in the lubrication of an air cylinder are the following:

1. Avoid excessive feeding of the oil. Too much oil in the air cylinder will generally give more trouble than too little. Experience in operation must determine the rate of feeding, which may vary from two to three drops a minute.

2. Avoid the use of a heavy oil, which unnecessarily increases the friction, while a lighter oil lubricates with far better results. High viscosity of the lubricant in the air cylinder is objectionable, owing both to the increased deposit of a carbon residuum and the greater adherence of the lubricant to the cylinder walls.

3. Avoid the use of an oil having a flashing point lower than 375 deg. F. In this connection, attention has been drawn to the fact that the flashing point of an oil is determined, in the laboratory, under atmospheric pressure, and is considerably higher under the greater pressure in the air cylinder. In this respect, the flashing point of oil is assumed to be affected by pressure in very much the same manner as the boiling point of water, which rises with the pressure.

4. Prevent, as far as possible, the entrance of dust-laden air into the air cylinder. The trouble resulting from this cause is often attributed to the lubricant, and the continued trial of oils and greases affords no relief.

The dust mixed with the oil forms a residuum that frequently lines the walls of the receiver to a depth of 1 or 2 in. The discharge valves become coated and leak, with the result that much of the air is churned back and forth in the cylinder, causing a rise in temperature, and, perhaps igniting the residue deposited in the receiver and air line. The burning out of this residue has, at times, caused the air line to become red-hot, destroying the gaskets and doing other damage.

In the intelligent operation of an air compressor, it can be said that there is little danger of an explosion taking place in the compressor. Instances on record, where explosions have occurred in the cylinder, have generally been shown to have resulted from improper management. A practice of which a few engineers are guilty and which is extremely dangerous, is that of introducing into the cylinder kerosene or a light volatile oil, for the purpose of cutting out the oily film deposited in the air ducts and valves of the machine. Such an oil having a low flashing point, it would be remarkable if the oil or the vapor was not ignited at once and an explosion follow.

Many good engineers in charge of compressors advocate strongly the use of soap and water, which they claim furnishes as good lubrication as the best cylinder oil on the market, without the attending difficulties experienced with many oils. For this purpose, a good quality of castile soap, or one free from acid, should be used. It can be arranged so that the same soap and water mixture can be used over and over again, as it does not deteriorate except when mixed with impure air.

One engineer states that he has never obtained better results, in air-compression work, than when lubricating with a good quality of lubricating grease, introduced into the air inlet from a grease cup. He claims that he found this method more convenient and giving less trouble than any he had ever used.

The proper lubrication of air cylinders is important, and *Coal Age* will be glad to have this subject freely discussed by engineers, who are invited to state their difficulties and the way they have overcome them.

EXAMINATION QUESTIONS

Kansas Firebosses' Examination Pittsburg, May 15, 1918

(Selected Questions)

Ques.—What is a safety lamp? Describe the essential features on which a safety lamp is based.

Ans.—The words, "safety lamp," as used in coal mining, refer to a lamp the flame of which is protected by a wire-gauze chimney, which allows air to enter the combustion chamber of the lamp but prevents the flame of the gas burning in the lamp from passing out and igniting the gas-charged air outside.

The essential features on which the safety of the lamp depends are the following: (1) The complete isolation of the flame, by means of a perfect gauze of standard mesh (784 openings per square inch), which forms the chimney and covers all openings to the combustion chamber of the lamp. (2) The perfect fitting of all the parts of the lamp when these are properly assembled. (3) The proper proportionment, in size, of the combustion chamber and the lamp chimney. (4) Sufficient protection in the upper portion of the lamp, by means of double gauzes, or a gauze cap or a metal shield or both. (5) A steel bonnet surrounding the chimney of the working lamp. (6) A safe non-volatile oil burned in the lamp. (7) The proper handling of the lamp, in gas, by a competent person.

Ques.—What is firedamp? What are the lowest, highest and maximum explosive points of firedamp?

Ans.—In this country the term "firedamp" refers to any inflammable or explosive mixture of gas and air. Methane or marsh gas unmixed with air is sometimes wrongly called "firedamp." But, to enable this gas to fire, it must be mixed with certain proportions of air, which renders it inflammable or explosive according to the proportion of air present in the mixture, and such a mixture is firedamp.

The *lowest explosive limit* of pure methane and air occurs when the proportion of gas to air is 1:13; or when the mixture contains 7.14 per cent. of gas. The *maximum explosive point* of pure methane and air occurs when the proportion of gas to air is 1:9.57 or when the mixture contains 9.46 per cent. of gas. The *highest explosive limit* of pure methane and air is reached when the proportion of gas to air is 1:5, or when the mixture contains 16.67 per cent. of gas.

Ques.—What is afterdamp? What gases are found after an explosion of firedamp at its maximum explosive point?

Ans.—The term "afterdamp" refers to the variable mixture of air and gases that results from and remains after an explosion of firedamp or dust, in a mine. While its composition is quite variable, owing to the varying conditions under which the combustion takes place, the general composition of afterdamp consists of carbon dioxide, (CO_2), carbon monoxide (CO), nitrogen (N_2), together with some unburned methane and air or oxygen.

The explosion of a firedamp mixture, at its maximum explosive point, produces carbon dioxide (CO_2), water vapor (H_2O) and the unburned nitrogen, (N_2) of the air, in which case the combustion is said to be complete. All of the carbon of the methane then combines with the oxygen of the air to form carbon dioxide and all of the hydrogen of the methane combines with the oxygen of the air to form water vapor, while the nitrogen of the air remains unchanged.

Ques.—What is a dangerous atmosphere?

Ans.—A dangerous atmosphere is one that is poisonous to breathe, or unsafe because it is inflammable or explosive or approaches this condition. Also, an atmosphere is dangerous when it is deficient in oxygen, or when the oxygen content falls below the normal per centage (20.9 per cent.)

Ques.—What are the explosive gases found in mines, and how are they detected?

Ans.—The gases that form an explosive mixture with air are methane or marsh gas (CH_4) and carbon monoxide (CO). While olefiant gas (C_2H_4) and hydrogen sulphide (H_2S) are explosive when mixed with air, these gases do not occur in sufficient quantities, in mines, to consider them separately.

Methane or marsh gas is detected, in mine workings, by observing its effect on the flame of a safety lamp. A small percentage of this gas causes the flame to "spire" or lengthen. As the percentage increases, the flame becomes unsteady and increases in volume. This effect depends largely on the quality of the gas and is more observable when olefiant gas is present. In a Davy lamp, a gas cap is observed above the flame of the lamp when 2 or 2½ per cent. of gas is present in the air. The height of this cap increases with the increase in the proportion of gas.

Carbon monoxide, when present in the mine atmosphere, is detected by observing its effect on small caged animals such as birds and mice, which show signs of prostration much quicker than a person exposed to the same atmosphere. This is the safest and most reliable means of detecting the presence of this gas in the mine.

Ques.—How would you carry your safety lamp when entering a known dangerous place in the mine?

Ans.—Proceed slowly and with caution, holding the lamp in an upright position near the roof, stopping at short intervals to make a careful test of the air. To do this the current flowing at the roof must be disturbed, by a slight motion of the hand or by blowing against the roof so that the gas will descend to the lamp, which should be held in an upright position close to the roof, and not turned on the side, as is the practice of some firebosses. Care must be taken never to swing the lamp, and to protect it against strong air currents, especially when advancing against the air.

COAL AND COKE NEWS

Harrisburg, Penn.

The Federal Trade Commission has accepted the proposal of the Anthracite Consumers' League to investigate the cost of anthracite coal, with a view to a reduction in price if the profits are regarded as exorbitant. In a letter to Hon. Frank C. Reese, the Commission declares it will be glad to receive all the information in the hands of the league as to the cost per ton of coal. The league has demanded that the price be reduced in September instead of raised, as coal at present prices is producing big earnings over expenses. One of the practices of the coal companies to which the league particularly objects is that of billing deteriorated coal reclaimed from the refuse banks at prices which obtain for fresh mined coal. It is alleged that the coal from the banks is being produced at a cost of little more than 25c. a ton.

Uniontown, Penn.

Inspection of coke shipments from all regions in the country, with an established basic price for low-grade coke in prospect if that measure does not substantially improve the quality of coke being delivered to the foundries, was inaugurated in the Connellsville coke region following the conference with 200 operators here of Warren S. Blauvelt, coke director for the United States Fuel Administration. R. C. Glazier, of Johnstown, a practical furnace man and coke expert in the employ of the Cambria Steel Co., has been named chief coke inspector and has already assumed his duties at Washington.

Should the projected inspection system not produce the desired improvement in the quality of coke, Mr. Blauvelt told the operators a basic price of $5 per ton would be established for low-grade coke, which would in effect be a penalty of $1 per ton for its foreign content. There will be no change in the fixed price of $6 for coke, he said, but if the two prices are established, the present figure will represent the selling price of first grade coke passed by Mr. Glazier's inspectors.

For some time the fuel administration has contemplated some measure looking toward the improvement in quality, Mr. Blauvelt stated, and told the operators that the recent meeting of the country's steel men in Washington when the steel needs of this country and the Allies were outlined precipitated action. He said that the furnaces were not producing the tonnage of metal in proportion to the quantity of coke delivered and had found after thorough investigation that the trouble lay principally in the quality of the coke.

Charleston, W. Va.

Labor Day coming in the first week of September did not make for a propitious production start for the month, not only because of the holiday itself but because of the aftermath. Nevertheless West Virginia coal men were sanguine that they would not have to contend during September against the paucity of cars which retarded production so much during August. Whatever the claims of the railroads may be as to why there was a decrease in production in the West Virginia fields during August, those in touch with conditions know that it was meager transportation facilities which prevented the industry from going ahead in production. However, as a result of the representations made by production officials in various West Virginia districts, it is believed that most of the West Virginia mines will receive in the future close to a 100 per cent. car supply. At the same time no company will be furnished any more cars than it can possibly load.

Some impetus was given to production in the Fairmont field during the last week in August and the first week in September by a better car supply, but late placing of cars and two holidays—Sunday and Labor Day—tended to make it impossible to get away to a flying start during the month. The district had on Saturday, Aug. 31, 969 cars, which was somewhat in excess of the usual Saturday supply. However, not all of the supply available was placed in time to make full loading possible. Indeed, late placing has brought to a focus the question of what constitutes "cars available," operators contending that cars in yards but not in sight for loading, as it were, should not be classed as available cars. An extra number of cars were asked for Saturday in order that some of the mines might be operated Saturday night but the additional supply was not forthcoming.

In the Kanawha District, Labor Day reduced the usual output a sixth or nearly so, and of course made it impossible to forge ahead at the outset of September. Mines on Cabin Creek were unable to muster their full complement of men for several days after Labor Day. On Coal River Labor Day did not interfere with production, miners going right ahead despite the fact that it was a holiday. Cars were plentiful for several days following Labor Day, but since the railroads had had several days in which to accumulate a supply the operators could not be certain as to whether the supply would be maintained.

With both miners and operators joining in the production movement in the Tug River and Pocahontas regions, a spurt in production was recorded during the week ending Aug. 24, a gain of 8961 tons being recorded. For the period mentioned the total production was 446,507 tons as against 437,546 tons for the previous week. While cars were somewhat more scarce, still only 109 hours were lost because of such a shortage, that loss being met in part by a small margin of a gain in the number of hours worked, the total time the mines worked being 7368 hours. From all causes there was a tonnage loss of 48,592, or something like 7000 tons less lost than for the week preceding. The two districts combined showed a total of 47,714 tons of coke produced.

Birmingham, Ala.

Coal production on Monday, Sept. 2—Labor Day—was up to normal. Miners and mine employees disregarded the great labor holiday, or rather marked it by unusual effort on their part to produce a maximum quantity of coal, and the announcement of their intention to put in a full day's work resulted Saturday, Aug. 31, in an order by local representatives of the Railroad Administration to have all needed cars at the mines Monday, and rail facilities were ample to handle the output.

While there are some mines which reported a loss of a day or two during the week as a result of car shortage, the production for the week ended Aug. 31 promises to be most satisfactory. For the four weeks starting with the week ending Aug. 3 and including the week ending Aug. 24, the coal production in this state has amounted to 421,532 tons a week.

It is estimated that the output at the mines for the last week in August will go 10,000 tons above this figure. If the production can be kept around 431,000 tons a week it would bring the rate of production to approximately 22,412,000 tons for the year. It is believed the maximum production of 433,738 tons recorded during the week ending July 27 will be exceeded. If this is realized it will bring about a recovery in the loss in output suffered during the first six months of the year and provide for a possibility of equalizing the production of last year, which amounted to 20,413,811 tons.

The fact that coal production is being kept at top speed is having a noticeable effect on the coke production in this district, which according to reports this week is holding up remarkably well. The government has started compiling statistics on coke production in this district which will be announced at regular intervals.

Vancouver, B. C.

The price of domestic lump has been raised from $8.80 a ton to $9.50 by most of the retail dealers. This increase, it is assumed, is the result of the recent action of the Canadian Fuel Controller in permitting certain of the Vancouver Island collieries to raise their selling prices. The view taken by the controller on the occasion in question was considered rather unusual, inasmuch as he authorized a maximum selling rate of $6.55 a ton to all the Island mining companies with the exception of the Canadian Western Fuel Co., which was not sanctioned to raise its quotations beyond the maximum which had previously prevailed—namely, $5.80 a ton. The explanation given was that investigation had proved that owing to circumstances over which they had no control, all other collieries were subject to greater production charges than the Canadian Western Fuel Co. and that the latter was the only one which was making what might be considered a fair profit on the capital investment. The Vancouver public, however, takes the position that dealers handling Canadian Western Fuel Co. coal, as well as others, have raised prices and that some must have gone beyond the power given them by the controller when he set their maximum profits at 50c. a ton. It is suggested that an investigation is in order.

The July tonnages for British Columbia are most encouraging, as the figures show that the production is holding with the pace set at the beginning of the year and indicate that there is a good chance that the Province will, when the statistics are compiled at the end of the twelfth month, be found to have outstripped all previous records. Following is the production in tons of the various collieries for the month:

	Tons
Crows Nest Pass Coal Co., Coal Creek	37,992
Crows Nest Pass Coal Co., Michel...	19,407
Corbin Coke and Coal Co., Corbin..	13,454
Middlesboro Collieries, Merritt.....	7,988
Fleming Coal Co., Merritt.....	3,504
Coalmont Colliery, Coalmont.....	347
Princeton Colliery, Princeton.....	3,145
Canadian Western Fuel Co., Nanaimo	61,563
Canadian Collieries (D) Ltd., Comox	46,698
Canadian Collieries (D) Ltd., Extension	18,650
Canadian Collieries (D) Ltd., South Wellington	2,122
Pacific Coast Coal Mines, South Wellington	6,775
Nanoose Colliery, South Wellington	2,285
Granby Colliery, Cassidy's.....	2,718

It will be noted that there are three mines on the producers' list which have not been there for some time, two of which have been newly opened. The latter are the Canadian Collieries' mine at South Wellington, which has 2122 tons to its credit, and the other the Granby Mine at Cassidy's with a production of 2718 tons. These, while comparatively small at present, will grow and no doubt will become a material factor in British Columbia's coal output. The Coalmont Colliery is the other referred to and, although it starts with the modest tonnage of 347 tons for the month, more may be expected of it in the near future.

PENNSYLVANIA

Bituminous

Uniontown—The Connellsville coke region for the week ending Aug. 24 set a new high record for coal production. The tonnage for the week aggregated 716,954 tons, a greater output than has been recorded since the compiling of statistics was commenced by the Fuel Administration. Coal reduced to coke aggregated 335,214 tons, a gain of 11,133 tons, while coal shipments amounted to 214,133 tons, an increase of 24,099 tons. An improved car supply and mild weather conditions were mainly responsible for the excellent showing, but the labor supervising system was also a factor in the increase.

In order that the 200 coal miners in the Connellsville coke region may be supplied with electric power, the War Industries Board, through the local fuel administration, has ordered that all day power be discontinued at nonessential plants in this section. This action makes certain that the mines will receive "juice" and assures a larger output of coal and coke, so necessary to steel manufacture.

Cost sheets from all thin-vein coal operators must be submitted to the fuel administration before any action is taken on the application for an increase in fuel price on such coal in Fayette County. This report was made to the thin-vein operators at a meeting held in Uniontown by the committee named at a previous meeting.

Uniontown—Phillip Colliery, an Italian employed by the Republic Iron and Steel Co., drew $327.25 for 14 days' work, an average of $23.38 a day. Between Aug. 16 and 31, he loaded 374 cars. He is 5 ft. 4 in. in height, weighs 160 lb. and is married. Until this record he was averaging about $80 per week.

Berlin—Harry Pyle, a coal miner, is believed to have broken all records of earnings in war-times by drawing $516.10 for 26 consecutive days' work in the mines. This miner works in the thin vein of coal, where only pick mining is pursued. Pyle is employed at the Blande mine of the McGregor Coal Co. During a period of 26 days, beginning July 16, and ending Aug. 15, Pyle mined 410 long tons, excavated 44 yards of entry, for which he received $4, and put in two hours on outside labor.

Brownsville—The Elliott Estate tract of coal properties, totaling about 300 acres, has recently been acquired by Julian Kennedy and associates at a price said to be about $2200 an acre. It is understood that the new owners will operate the property.

Fredonia—A vein of coal has been located on the Sherman Harsh farm, near here. Stoneboro parties have secured leases on this and adjoining farms and are having tests made to sink a shaft. The vein is reported to be from four to six feet thick.

Anthracite

Minersville—The Lytle Coal Co. has started a series of first-aid contests. This marks the ninth annual drill of its kind, the contests being held after quitting time at the various collieries during the month of September.

Hazleton—Figures made available on Sept. 4 show that fuel production for August in the Lehigh region was considerably ahead of that of the same month last year. Officials of the Lehigh Valley Coal Co., the largest producer in the field, estimate that its total would run 25,000 tons over August, 1917. The daily output of the valley now averages between 8500 and 9000 tons.

Harleigh—Some of the women are helping their husbands load coal from the abandoned slate banks at nearby collieries in efforts to increase the output of anthracite. They are doing the work voluntarily in order that the monthly pay envelope may run above the usual average and at the same time are giving the Government a lift.

Shenandoah—The Locust Mountain Coal Co. has had plans drawn for a number of 1½-story residences for employees at its properties. The structures will be of the three-family type.

WEST VIRGINIA

Charleston—Following complaints of the Kanawha Coal Operators' Association to the Fuel Administration for the lack of cars in the Kanawha Valley mining section, the Chespeake & Ohio R. R. has been instructed to keep a supply of cars on hand at the mines at all times.

Elkins—Extensive improvements have been made at the plant of the Edward O'Toole (trustee) Co.'s plant in Barbour County, the company having installed a generating plant, two mining machines, a 13-ton locomotive, electric pump. New mining cars have also been added to its equipment.

Arden—The Lee Collieries Co. will extend its operations by opening another mine a mile or so from the company's present operation at Arden, and as a forerunner of operations there will put up miners' houses. At the Arden plant a new tipple has just been completed and put in commission.

Buckhannon—In addition to building a number of houses for miners, the Buck Coal Co. is putting in new scales at its Lorentz plant. A new store and office building has also been added to the plant.

Clarksburg.—In connection with the opening of a drift mine in Harrison County by the Catherine Coal Co., it is learned that the company plans to have a mine with a capacity, when completed, of 50,000 tons per year, work having already been started on this plant, which will be ready for operation by Oct. 1st. The superintendent of the company is C. S. Hornor, of Clarksburg.

Philippi—Coal is now being shipped from the plant of the Wolf Coal Co., located near this place. Construction work was recently completed on this plant.

Progress is being made by the Buckeye and West Virginia Coal Co. at Lorentz in the installation of new machinery under the direction of Superintendent O. M. Malcolm.

The Meadowvale Coal Co. whose plant is at Arden, will be ready for operations within a short time, the plant having been completed. A number of houses for miners have also been built.

The Ford Run Coal Corporation, with a plant at Meriden, has erected a tipple at its No. 6 mine where it will begin producing coal in a short time. Lee J. Sandridge is general manager, being also largely interested in the company.

Grafton.—The Gaymont Coal Co. has decided to depend upon its own power and the directors of the company have authorized the construction of a power plant at Bolder, where the company has its plant. The operating official in charge is B. C. Cence.

Just as soon as a siding which is now being laid is completed, the Cordell Coal Co. hopes to be able to begin the shipment of coal from its new plant at Wilt. At this point the company has a thick vein of Pittsburgh coal to mine. J. J. Delaney will be in charge of operators.

ALABAMA

Birmingham—The Big Four Mines, near North Birmingham, have been acquired under lease by the Sandstone Coal Mining Co., operating in this district. The present capacity of the plant, aggregating 125 tons a day, will be increased, and extensive development work inaugurated. W. M. Holt is president.

Birmingham—John Pennington, white, and Jack Jones, colored, were killed, and a number of other mine employees placed in jeopardy, when the Mary Lee mine of the Alabama Co. was flooded on the afternoon of Sept. 2. A heavy rain approximating a cloudburst swelled a branch near the mouth of the slope beyond its banks, the water pouring into the slope and manway and carrying everything before it. All other mine workers are thought to have been rescued. The slope tracks and retaining walls at the entrance to the mine were inundated and washed away, as was also the approach to the manway, the property damage amounting to several thousand dollars. At the time of the accident most of the employees, numbering about 400, had finished their tasks and come to the surface.

Delmar—The Glen Mary Coal Co., operating in the Natural Bridge section, has acquired about 400 acres of land adjoining its properties, and plans for extensive development work for increased output.

KENTUCKY

Greenville—O. C. Evans, operating local coal properties, is planning for the installation of new electric equipment at his mine.

OHIO

Martins Ferry—Work is progressing in the opening of the new mines of the Y. & O. Coal Co. on Little Short Creek, west of Rayland on the Wheeling & Lake Erie R. R. The tracks leading to the mines are being graded and two steam shovels are at work cutting away the hillside and filling in the hollows. Several miles of track will be necessary to reach the proposed openings. A town is to be laid out on the site and already several houses are under construction.

Gloucester—Fire recently destroyed all the buildings at the Hunterdon mine of the Ohio Valley Collieries Co.

Coshocton—George Sloan, of Zanesville, who recently purchased the Edward Nash farm near Adamsville from G. H. Lapp, has sold the property to Lloyd Amore of Coshocton, who expects to begin work on the development of a coal mine.

ILLINOIS

Alton—Prolonged drought, only recently broken, enabled the reclamation of abandoned workings in Coal Branch, on the outskirts of Alton. These plants had been abandoned for several years on account of the encroachment of water. During the drought it was discovered that the water had receded, and arrangements have been made to resume operation of several of the pits. When they were abandoned they could not be operated profitably, both on account of the comparatively limited output and the water difficulties, but money can be made out of them now by supplying the local demand. W. T. Davies has a force of men getting pits on the James Wilson property ready for producing. Precautions will be taken against renewed flooding of the workings.

Hillsboro—A report that after Sept. 1 the mines in this vicinity would not be permitted to supply local consumers caused a run on the mines in the closing days of August. Vehicles of every description were pressed into service by anxious consumers, who stood in line for hours at the mines. The mine managers say, however, that they have not yet received orders to withhold coal from local consumers.

IDAHO

Coeur D'Alene—Work has been started by the Oregon Short Line Railway Co. on the construction of a 12-mile branch from its main line to the coal mines of the Brown Bear Coal Co., in Teton County. The branch will run from Driggs to Teton. R. C. Talbot is manager for the coal company.

WASHINGTON

Chehalis—D. W. Proebstel, electrical engineer for the Portland Railway, Light and Power Co., Portland, Ore., is here while superintending the installation of electrical machinery at the plant of the Superior Coal Co. The equipment will consist of an electrical hoist, said to be the largest in the state, an electrical locomotive to haul the coal to the foot of the 1600-ft. entrance slope, and an electrically driven conveyor to the tipple. T. R. Campbell is manager of the mine and states that when the equipment is installed the operation will be producing about 400 tons a day.

Seattle—The school board has accepted the bid of the Hyde Coal Co. at $4 per ton for 1250 tons of steam coal and that of the Roslyn Coal Co. at $3.30 per ton for 1000 tons of mine-run.

Spokane—Preliminary development work is being undertaken by the Colville Valley Coal Co. on its property, which consists of 320 acres at Valley, near this city. The coal vein is contained within sandstone and shales. A shaft 300 ft. deep has been driven on the vein, which is 6 ft. wide, and according to the company geologist contains 10 per cent. moisture, 14 per cent. ash, 37 per cent. volatile combustion and 38 per cent. fixed carbon. Frank Weatherwax, of Valley, is president of the company; A. N. Cantril, secretary-treasurer. The company is considering putting in a 60-ton capacity briquetting plant.

Tacoma—An explosion at the Burnett mine of the Pacific Coast Coal Co. on Aug. 28 cost 12 miners their lives and seriously injured three others, 170 who were at work in the mine escaping unhurt. At this writing the cause of the explosion is undetermined. It is believed that the explosion, which occurred at 4:30 p. m., was due either to gas or a "shot" of dynamite that went wrong. State Mine Inspector Bagley believes that dust was undoubtedly a contributing factor in either case.

Foreign News

Victoria, B. C.—During the first six months of the present year coal production in British Columbia has reached the total of 1,375,230 tons, or 247,922 tons in excess of that produced for the same period of last year. The tonnage produced in the three districts is as follows: Crowsnest Pass, 404,472 tons. Nicola-Princeton, 109,483 tons; Vancouver Island, 861,314 tons.

Personals

J. F. Healy, of Huntington, W. Va., for nearly three years allotment commissioner for the Chespeake & Ohio, has resigned to become manager of the Reliance Coal and Coke Co., of Kentucky, with office at Glomar, near Hazard. Mr. Healy will continue to reside in Huntington.

F. K. Day, chief engineer of the West Virginia division of the Consolidation Coal Co., of Fairmont, W. Va., has been granted a furlough for the duration of the war. He has been appointed assistant production manager for northern West Virginia by James B. Neale, director of production of the Fuel Administration.

W. T. Lucey, of Harrisburg, Penn., has assumed charge of the Birmingham (Ala.) Mine Rescue Station of the United States Bureau of Mines, succeeding W. T. Burgess, who has been superintendent of the station for some time. Mr. Burgess resigned recently to accept the position of superintendent of the Belle Ellen mines of the Bessemer Coal, Iron and Land Co.

Austin Riggs, assistant division engineer of the West Virginia division of the Consolidation Coal Co., of Fairmont, W. Va., has been appointed division engineer, to succeed F. K. Day, who has been furloughed to the United States Fuel Administration,

as mentioned elsewhere in these columns. Mr. Riggs has been in the employ of the Consolidation company for seventeen years. The position of assistant division engineer will not be filled at this time.

Obituary

William Cameron, Secretary of the St. Louis Coal Traffic Bureau, and chairman of the freight committee of the eastbound lines, died a few days ago at Denver, Colo., where he had gone in the hope of benefiting his health. He was stricken in July and spent a month in a sanitarium before going to Denver. The body was brought to St. Louis, Mo., for interment. Mr. Cameron had a wide acquaintance among coal men.

Publications Received

Thirty-Sixth Annual Coal Report of Illinois. Department of Mines and Minerals, 1917. Unillustrated, 302 pp., 6 x 9 inches.

Report of the Department of Mines of Pennsylvania. Part I—Anthracite, 1916. Commonwealth of Pennsylvania. Unillustrated, 900 pp., 6¼ x 9¼ inches.

Report of the Department of Mines of Pennsylvania. Part II—Bituminous, 1916. Commonwealth of Pennsylvania. Unillustrated, 1404 pp., 6¼ x 9¼ inches.

Monthly Statement of Coal Mine Fatalities in the United States, May, 1918. Compiled by Albert H. Fay. Department of the Interior, Bureau of Mines. Unillustrated, 23 pp., 6 x 9 inches.

The Tars Distilled from Bituminous Coal in Hand-Fired Furnaces. By S. H. Katz. Department of the Interior, Bureau of Mines. Technical Paper 195. Illustrated, 17 pp., 6 x 9 inches.

A Convenient Multiple-Unit Calorimeter Installation. By J. D. Davis and E. L. Wallace. Department of the Interior, Bureau of Mines. Technical Paper 91. Illustrated, 47 pp., 6 x 9 inches.

Annual Report on the Mineral Production of Canada During the Calendar Year 1916. John McLeish, B. A., Chief of the Division of Mineral Resources and Statistics. Canada Department of Mines, Mines Branch. Unillustrated, 343 pp., 6¾ x 9¾ inches.

Methane Accumulations from Interrupted Ventilation, with Special Reference to Coal Mines in Illinois and Indiana. By Howard I. Smith and Robert J. Hamon. Department of the Interior, Bureau of Mines. Technical Paper 190. Illustrated, 42 pp., 6 x 9 inches.

Trade Catalogs

Jeffrey 35 B—Shortwall Mining Machine. The Jeffrey Manufacturing Co., Columbus, Ohio. Bulletin 241. Pp. 12; 6 x 9 in.; illustrated. Features the latest type of Jeffrey shortwall coal cutter.

Jeffrey Electric Rotary Coal Drills. The Jeffrey Manufacturing Co., Columbus, Ohio. Bulletin 243. Pp. 12; 6 x 9 in.; illustrated. Describes the A-5 electric rotary drill for drilling in any material which can be penetrated with an auger bit.

Sullivan Straight-Line Air Compressors, Sullivan Machinery Co., Chicago, Ill. Circular 58-W. Pp. 30; 6 x 9 in.; illustrated. Instructions for the installation and operation of classes WA-3 and WA-4 (steam driven) and WG-3 and WG-4 (belt driven) compressors.

The Lincoln Wheel for Mine Cars. Lincoln Steel and Forge Co., St. Louis, Mo. Bulletin 102. Pp. 12; 9 x 11⅞ in.; illustrated. This bulletin is in convenient form for filing and calls attention to the many points which make the Lincoln wheel meet the approval of the operator.

Condensers, Pumps, Cooling Towers, Etc. Wheeler Condenser and Engineering Co., Carteret, N. J. Bulletin 112-A, pp. 32; 8 x 10½ in.; illustrated. Describes condensers and condensing machinery. One page is devoted to the Wheeler feed water heater and two pages to multiple effect evaporators and dryers.

C-H Iron-Clad Solenoids. Cutler-Hammer Manufacturing Co., Milwaukee, Wis. Booklet F. Pp. 4; 8½ x 11 in.; illustrated. Describes solenoids particularly adapted for operating brakes used in connection with crane, elevator and hoist motors. Booklet lists four sizes and gives the stroke, gross pull, dimensions, weights and other interesting data.

Bulletins. Electrical Engineers Equipment Co., Chicago, Ill. Illustrated, 8 x 11 in. The loose-leaf bulletins contained in this binder give a complete description of all the products manufactured by this company. All information and illustrations have been prepared with the idea of making the selection of the proper apparatus as simple as possible for prospective buyers.

Recent Coal and Coke Patents

Safety Stop for Mine Cars. S. Verbitisky, St. Clair, Penn., 1,269,983. June 18, 1918. Serial No. 214,297.

Furnace. C. Zulver, London, Eng., 1,270,679. June 25, 1918. Filed June 25, 1917. Serial No. 176,854.

Boiler. E. C. Meier, Phoenixville, Penn., 1,263,586. Apr. 23, 1918. Filed May 10, 1917. Serial No. 167,840.

Stoker. W. A. Casler, Louisville, Ky., 1,263,035. Apr. 16, 1918. Filed Mar. 23, 1915. Serial No. 16,454.

Ash Sifter. Kempler, Newburgh, N. Y., 1,270,166. June 18, 1918. Filed Dec. 21, 1917. Serial No. 208,246.

Holder for Miner's Lamps. J. M. Roberts, Fredonia, Ky., 1,271,368. Filed Oct. 13, 1917. Serial No. 196,433.

Mine Apparatus. J. Chabala, Cuddy, Penn., 1,271,777. July 2, 1918. Filed Feb. 9, 1918. Serial No. 216,277.

Smoke Purifier. W. L. Boyd, Hayden, Ariz., 1,263,197. Apr. 16, 1918. Filed May 12, 1917. Serial No. 168,182.

Dumping Car. C. O. Flowers, Flint, Mich., 1,271,303. July 2, 1918. Filed July 17, 1917. Serial No. 181,118.

Bottom Dump Car. O. G. Petersen, Somerset, Ky., 1,263,285. Apr. 16, 1918. Filed July 3, 1916. Serial No. 107,295.

Stoker Bridge. P. L. Crowe, New York, N. Y., 1,262,647. Apr. 16, 1918. Filed Aug. 5, 1914. Serial No. 855,105.

Locomotive Boiler. J. G. Broman, Chicago, Ill., 1,263,844. Apr. 23, 1918. Filed Apr. 24, 1916. Serial No. 83,149.

Coal Mine Drill. J. A. Walker, Springfield, Ill., 1,271,396. July 2, 1918. Filed Nov. 10, 1916. Serial No. 611,603.

Mechanical Stoker. H. E. Kleffel, New York, N. Y., 1,270,171. June 18, 1918. Filed Nov. 16, 1917. Serial No. 202,374.

Coal Car Cover. G. B. Miller, Gloversville, N. Y., 1,270,646. June 25, 1918. Filed Mar. 15, 1918. Serial No. 222,664.

Signal for Mine Railways. J. A. Muir, Smithboro, Ill., 1,274,072, July 30, 1918. Filed Mar. 23, 1916. Serial No. 86,129.

Stoking Apparatus. J. H. Cooper, Pittsburgh, Penn., 1,264,369. Apr. 30, 1918. Filed June 30, 1914. Serial No. 37,165.

Safety Mine Cage Device. J. Matthews, Plymouth, Penn., 1,268,260. June 4, 1918. Filed Apr. 14, 1916. Serial No. 91,160.

Miner's Combination Tool. W. W. Weber, Fort Myers, Fla., 1,263,720. Apr. 23, 1918. Filed Oct. 19, 1917. Serial No. 197,450.

Coal Elevator and Loader. J. Chabala, Cuddy, Penn., 1,263,528. Apr. 23, 1918. Filed Nov. 14, 1917. Serial No. 201,962.

Adjustable Coal Boring Auger. F. W. Armstrong, Clinton, Ind., 1,270,092. June 18, 1918. Filed Apr. 15, 1916. Serial No. 91,407.

Brake for Uphauls for Mines. W. J. Mow, Grass Valley, Cal., 1,274,071, July 30 1918. Filed May 18, 1917. Serial No. 169,555.

Water Back Construction for Furnaces. F. A. Hurlburt, Kansas City, Mo., 1,269,083. June 11, 1918. Filed June 24, 1916. Serial No. 105,725.

Self-Feeding Device for Furnaces. J. H. Turnbull, Edmonton, Alberta, Can., 1,262,876. Apr. 16, 1918. Filed May 16, 1917. Serial No. 169,119.

Mining Machine. E. C. Morgan, assignor to American Morgan Co., Chicago, Ill., 1,271,197. July 2, 1918. Filed May 28, 1904. Serial No. 210,174.

Boiler Furnace. A. C. Mott, Jr., assignor to Abram Cox Stove Co., Philadelphia, Penn., 1,262,229. Apr. 9, 1918. Filed July 10, 1917. Serial No. 179,678.

Chain Grate Stoker. W. W. Holland, J. R. Carringer and W. Bacheldor, Woodriver, Ill., 1,268,845. June 11, 1918. Filed Jan. 12, 1918. Serial No. 211,528.

Roller Bearing Mine Car Wheel. J. L. McDowell, assignor to American Car and Foundry Co., New York, 1,256,149. Feb. 12, 1918. Filed Sept. 5, 1917. Serial No. 189,861.

Forced Draft Furnace Grate. L. H. Simmons, assignor to Simmons Forced Draft Co., Goldsboro, N. C., 1,270,065. June 18, 1918. Filed Jan. 30, 1917. Serial No. 145,442.

Feeding Mechanism for Gas Producers. C. W. Lummis, assignor to Morgan Construction Co., Worcester, Mass., 1,270,962. July 2, 1918. Filed Mar. 10, 1916. Serial No. 83,396.

Roller Bearing Mine Car Wheel. F. Helmick, assignor to Helmick Foundry and Machine Co., Fairmont, W. Va., 1,270,155. June 18, 1918. Filed Apr. 16, 1918. Serial No. 228,934.

Shaking and Dumping Device for Furnace Grates. H. W. Dockray, assignor to Dockray Brass and Iron Co., Zanesville, Ohio, 1,270,126. June 18, 1918. Filed Nov. 17, 1917. Serial No. 202,619.

Industrial News

Barbourville, Ky.—The Trace Branch Coal Co. has increased its capital from $1500 to $5000.

Louisville, Ky.—The Collins Mining Co., of Lackey, has increased its capital from $20,000 to $50,000.

Chicago, Ill.—The Lakewood Engineering Co. has opened new offices in Chicago in the Lumber Exchange Building.

Richmond, Va.—The Bens Run Coal Co. has been incorporated with a capital of $50,000 to develop coal mines at Hyer in Braxton County.

Prestonsburg, Ky.—The Anchor Coal Co. has increased its capital stock from $10,000 to $20,000, to take care of planned improvements to its workings.

Louisville, Ky.—The Walnut Coal Co. has been incorporated with a capital of $3000. The incorporators are W. F. Burwinkle, J. S. Miller and R. E. Godon.

Madisonville, Ky.—The Richland Coal Co. has been incorporated with a capital of $9000. John G. Salmon, Tom Logan and C. M. Logan are the incorporators.

Pineville, Ky.—The Greasy Gap Coal Co. has been incorporated with a capital of $25,000. The incorporators are I. Glickman, Lewis Jones and Morris Euster.

Columbus, Ohio—The S. M. Hudson Coal and Coke Co., of Steubenville, has been incorporated with a capital of $200,000. S. M. Hudson is the principal incorporator.

Indianapolis, Ind.—The Lincoln Coal Co., of Lincoln City, has been incorporated with a capital of $15,000. David Ellison, C. F. Wilson and M. P. Dixon are the incorporators.

Louisville, Ky.—The Farris Coal Co., of East Bernstadt, has been incorporated with a capital of $2000. The incorporators are W. R. Ballou, B. B. Farris and James Farris.

Dover, Del.—The Garfield Coal Co. has been incorporated with a capital of $100,000. The incorporators are John C. Draper, C. L. Rimlinger and F. A. Armstrong, of Wilmington.

Big Chimney, W. Va.—Improvements on a rather extensive scale will be made to the plant of the Empire Coal Co. at this place, just as soon as material and equipment can be secured.

Louisville, Ky.—The Uniontown Coal Co., of Henderson, has been incorporated with a capital of $100,000. The incorporators are C. C. Potter, Dandridge Spotswood and J. H. Turner.

Spokane, Wash.—The Colville Valley Coal Co. has filed articles of incorporation with a capital of $100,000. J. E. Rudersdorf, A. W. Doland and A. N. Cantrell are the incorporators.

Cleveland, Ohio—The Elm Coal Co. has been incorporated with a capital of $1000. E. L. Maag, Frank H. Maag, H. W. Stohlmann, Fred Maag and John H. Reik are the incorporators.

Philippi, W. Va.—The Byrer Coal Co. is preparing to enlarge its capacity by the installation of new equipment, the company also having under construction more houses for miners.

Louisville, Ky.—The Baird Jellico Blue Gem Coal Co., of Gatliff, has been incorporated with a capital of $1000. The incorporators are I. C. Bryant, L. D. Baird and Charlotte Baird.

Oklahoma City, Okla.—The Banner Coal Co., of McAlester, has been incorporated with a capital of $10,000. W. E. Beaty, R. E. Jones, L. C. Cramer, all of McAlester, are the incorporators.

Charleston, W. Va.—The Gauley Mountain Coal Co. has added to its equipment by purchasing two rotary conveyors among other new machinery. R. H. Harris is the manager at this operation.

Louisville, Ky.—The Elkhorn and Jellico Coal Co., of Whitesburg, has been incorporated with a capital of $50,000. M. K. Marlowe, P. E. Marlowe and James Marlowe are the incorporators.

Louisville, Ky.—The Kentucky River Mining Co., of Cannell City, has filed articles of incorporation with a capital of $3600. W. E. Bach, W. L. Day and T. J. Barr are the incorporators.

Tulsa, Okla.—The Gunther City Coal Mining Co., of Tulsa, has been incorporated with a capital of $150,000. The incorporators are S. A. Gaskill, of Claremore, A. C. Gunther and E. A. Vernon, of Tulsa.

Columbus, Ohio—The Packard Coal Mining Co., of Columbus, has been incorporated with a capital of $50,000. The incorporators are M. L. Yuster, Richard Patton, E. E. Fox, W. J. Etchen and C. F. Bookman.

Charleston, W. Va.—With a view to extending operations the Long Branch Coal Co. has trebled its capital stock from $50,000 to $150,000. The operation of this company is at Long Branch, Fayette County.

Canton, Ohio—The Albert Coal Mining Co. has been chartered with a capital of $95,000 to mine coal. The incorporators are John D. Gardner, Charles K. Welch, W. J. Bentram, John O. Cole and A. R. Milner.

Pittsburgh, Penn.—The Charles T. Topping Machinery Co. has merged its interests with the Pittsburgh office of the Lakewood Engineering Co., Cleveland, Ohio, manufacturers of construction plant and industrial haulage.

Charleston, W. Va.—The American Eagle Colliery Co., recently incorporated with a capital of $600,000, is planning for the development of coal properties in this vicinity. L. V. Black and George S. Couch head the company.

Louisville, Ky.—The Central Kentucky Block Coal & Mineral Co., of Hawesville, has filed articles of incorporation with a capital of $200,000. Charles E. McDavitt, Harry Myers and Stanley Allen are the incorporators.

Indianapolis, Ind.—The Elk Run Coal and Mining Co., of Hymera, has been inporated with a capital of $150,000. The incorporators are George E. Elkins, Joseph L. Hampson, Forrest Chenoweth and Lueppo D. Buenting.

Nelsonville, Ohio—The Athens-Hocking Coal Co. has been incorporated with a capital of $35,000 to mine and sell coal. The incorporators are Frank Brown, A. P. Stedem, Rudolph Brown, J. W. Wion and Ira Blackstone.

Cleveland, Ohio—The P. & M. Coal Co. has been incorporated with a capital of $75,000 to mine and sell coal. The incorporators are Philip M. Platten, S. H. Holding, Tracy H. Duncan, May E. Gardner and B. M. Parker.

Salem, Ore.—The Fern Valley Coal Co., of Medford, has been incorporated with a capital of $5000. The incorporators are Leonard Carpenter, Frederick H. Cowles, Alfred S. V. Carpenter, Waldo W. Williard and Lincoln McCormack.

Cincinnati, Ohio—The Lawrence County Coal and Clay Co., of Ironton, has been incorporated with a capital of $10,000. Chester Pendleton, Huldah Brucklacher, A. E. Kerns, Garnet Roberts and Grover C. Mills are the incorporators.

Corinth, W. Va.—The Freeport Coal Co. is planning for extensive improvements at its plant to increase the present capacity. The company recently filed notice of an increase in its capitalization from $25,000 to $100,000, to provide for this work.

Madisonville, Ky.—The Finley Coal Co., capital $10,000, has been chartered at Madisonville to operate coal mines. The incorporators are Thomas E. Finley, Mrs. Finley and Dr. C. B. Johnson, the latter of Earlington, these three holding all of the stock.

Louisville, Ky.—The Union County Mining Co. has been incorporated with a capital of $200,000. Fred Reiss, William Jarvis and R. F. Peters are the incorporators.

Charleston, W. Va.—The Kanawha Collieries Co., which will mine coal in Nicholas County, perfected its organization this week by electing W. G. Conley, president; Edward Gebhart, vice president and H. P. Tompkins treasurer and general manager.

Princeton, Ky.—The Betsey Mining Co., recently incorporated with a capital of $20,000 by J. M. Phillips, and others, plans operations on a 43-acre tract at Crider. The concern will install open mining machinery, including pumps, boiler, compressors, washer, etc.

Charleston, W. Va.—The Cass Hill Coal Co. has been incorporated with a capital of $50,000 to develop coal lands in Cass district, Monongalia County. The incorporators are Bernard J. Lynch, William F. Coal, Carl C. Hetzel, G. Howard Hetzel and Robert L. Stallings.

Charleston, W. Va.—The Big Bottom Coal Co. has been incorporated with a capital of $50,000 to develop coal lands in Malden District, Kanawha County. The incorporators are J. S. Cheyney, H. S. Cheyney, James Raisbeck, M. W. Raisbeck and T. S. Clark.

Birmingham, Ala.—The Phillips Mining Co. has been incorporated with a capital of $75,000 and will conduct mining operations at Sipsey, Walker County, Ala. The new operation is reached by a branch line from the Frisco which serves the Sipsey and Empire mines.

San Francisco, Cal.—A sum approximating $7500 has been collected by State Fuel Administrator Albert E. Schwabacher, from the retail coal dealers of the state for overcharging. This sum will be turned over to the National Red Cross, according to the plans of Mr. Schwabacher.

Clarksburg, W. Va.—The Diamond Fuel Co., of Clarksburg, has been incorporated with a capital of $50,000 to develop a coal area in Simpson district, Harrison County. The incorporators are J. Edgar Long, Carl E. Hornor, Charles B. Johnson, Wayne B. Hornor and Paul E. Reutter.

Charleston, W. Va.—The Ohio Valley Fuel Co. will have a small operation in Brooke County. The headquarters of the company will be at Wellsburg. The company is capitalized at $10,000 with J. K. Wells, Nera Wells, Lillian S. Wells, S. G. Wells and Millard Wells as incorporators.

Birmingham, Ala.—An interesting tabulation has been made by local coal interests showing the increase in production in the state during the past months. The weekly averages of coal production since April are: April, 353,409 tons; May, 371,268 tons, June, 371,214 tons; July, 406,233 tons; and August, 421,631 tons.

Charleston, W. Va.—Coal lands in Malden District of Kanawha County will be developed by the Buffalo-Kanawha Coal Co. of Buffalo, N. Y., which has taken out a West Virginia charter, with an authorized capital of $150,000. The incorporators are George Carson, E. E. Johnston, W. H. Farnsworth, M. E. Preisch and I. S. Given.

Henryetta, Okla.—The Block No. 1 Coal Mining Co. has been organized and charter has been filed with Secretary of State Lyon at Oklahoma City. The company is capitalized at $125,000 and will develop coal lands known as Block No. 1. The incorporators are Barclay Morgan, C. H. Lockhart and James Hepburn, all of Henryetta.

Charleston, W. Va.—A general coal mining, selling and shipping business will be done by the Sewlmont Coal Co., just chartered with an authorized capital of $150,000. This company was chartered by J. W. Graham, E. F. Graham, W. A. Charlton, C. B. Cottle and J. Q. Hutchinson. The company will have its operation in Fayette County.

Frankfort, Ky.—The Court of Appeals has recently handed down a decision of interest to coal interests in this section, in the case of the Lawrence Tierny Coal vs. Smith, guardian. The court holds that a minor's land may be leased for coal or other minerals by an order of the Court, but that such lease becomes void when the minor becomes of age.

Fayetteville, W. Va.—Organized with a capital stock of $300,000, the Sunrall Coal Co. incorporated by some of the leading citizens of Fayette County, will operate coal mines in that county just as soon as all Government requirements can be met. The incorporators are Dr. Gory Hogg, C. B. Hogg, C. W. Dillon, former State Tax Commissioner, J. P. Stevens and E. L. Nuckolls.

Newark, N. J.—A new coal briquet manufacturing plant to cost about $150,000 will be erected by the Burnrite Briquet Co., 142 Broadway, New York, on property at Alpine St. and Avenue A, recently acquired. The initial works will consist of a group of buildings for manufacturing, handling, loading, etc. The Mashek Engineering Co., 90 West St., New York, is engineer for the company.

Philadelphia, Penn.—The Lehigh Coal and Navigation Co. has awarded contracts to the Dodson Realty Co., Bethlehem, Penn., for the erection of a number of new homes for employees at its different properties. Ten double residences and a large boarding house will be constructed at Seek, Schuylkill County; and twelve double residences, each 2½ stories, 30 x 50 ft., will be located at Kaska Williams, Penn.

Birmingham, Ala.—Ammonia naphtha and other coke byproducts will be manufactured at Boyles, near here, by the Birmingham Coke and Byproducts Co. The plant will cost $3,000,000 and manufacture its products for use in the Government nitrate plant at Sheffield, the War Department having contracted for the output of the new plant. The daily consumption of coal will be 1000 tons with an output of 700 tons of coke.

New York, N. Y.—The Quigley Furnace Specialties Company, New York, has secured the contract for a powdered coal plant from the Whitaker Glessner Co., Beech Bottom Works, West Virginia, to furnish four tons of powdered coal fuel per hour to supply 20 furnaces for heating 6-in. shell forgings. This equipment is arranged for large extensions for future applications in other departments in the mills, including boilers.

Dallas, Tex.—Marked development of the coal mines in western Texas is reported as a direct outgrowth of the continued drouth throughout that section which has driven many of the farmers from their homes in search of other employment. Many of these drouth refugees are finding work in the mines in Young and adjoining counties, and a greatly increased coal output is now reported. Numerous new mines are being developed and operations are being carried on on a larger scale than heretofore.

Toledo, Ohio—A slight falling off in tonnage for lake shipment was noted during the week ending Aug. 31 as compared with some former weeks. The falling off is not considered serious, however. The Hocking Valley docks during the week mentioned loaded 180,878 tons as compared with 199,413 tons the previous week, making a total of 2,862,289 tons loaded for the season. The Toledo & Ohio Central docks during the same week loaded 81,000 tons as compared with 90,000 tons the previous week. The total for the season is 1,291,000 tons.

Buffalo, N. Y.—The Buffalo-Kanawha Coal Corporation has been organized here with capital stock of $150,000. The company owns mines in the Campbell Creek valley, near Charleston, W. Va. Six openings have already been made and coal is ready to ship as soon as the railroad spur is finished. The coal goes by barge down the Kanawha River after a short rail haul. Capacity of 500 tons a day is promised in six months. E. G. Johnson is president; G. A. Corson, vice president and manager; O. W. Davenport, secretary, and W. H. Davenport, treasurer, all of Buffalo.

Charleston, W. Va.—The annual meeting of the Kanawha Coal Shippers Association on Aug. 30 was featured by a banquet at the Kanawha Hotel, new officers being elected and the executive committee enlarged. The roster of officers and of the executive committee as now constituted is J. R. Thomas, of the Carbon Fuel Co., chairman; M. H. Tomb, secretary and treasurer. Executive Committee—J. R. Thomas, Quinn Morton, John L. Dickinson, J. C. Blair and F. B. Stewart, the last two being the new members of the committee. Voting to become affiliated with the West Virginia Coal Association, the Kanawha organization selected C. A. Cabell general manager of the Carbon Fuel Co., as a member of the executive committee of the State Association.

Seattle, Wash.—Judgment in the sum of $2,009,242, including $20,000 in attorney's fees, has been awarded by Judge C. M. Easterday at Tacoma, Wash., in favor of W. V. Rinehart, as trustee for Lindeberg, Inc., against the American Coal Co. and the Southwest Coal Co. as the result of action brought to foreclose on a mortgage given by the coal companies to float $1,500,000 bonds. The court has ordered the sale of the mines to satisfy the judgment. The property of the coal companies lies in or near Morristown, Wash. A review of the case shows that the American Coal Co. executed 3000 negotiable mortgage bonds on Mar. 1, 1912, aggregating $1,500,000, and to mature Mar. 1, 1942. The bonds were certified by the Seattle Trust Co., the trustee named, and are now owned by Lindeberg, Inc. The bonds provide for the payment of interest at the rate of 5 per cent. semi-annually, interest coupons being attached. The interest, however, was not paid, resulting in the foreclosure.

MARKET DEPARTMENT

Weekly Review

Production of Bituminous Not Equal to Demands—Whether Mines Will Make Up Deficit During Coal Year Depends on Railroads and Labor—Conservation and Curtailment Watchwords of Fuel Administration—Anthracite Output Breaks Record—Lake Shipments Show Betterment

THOUGH 1,586,000 net tons more of soft coal was produced during the week ended Aug. 31 than was mined during the corresponding week of 1917, yet the output for the last week in August just closed—12,642,000 net tons—was considerably below the mean requirements set by the Fuel Administration as necessary to meet essential needs. Again it must be emphasized that there will not be enough soft coal produced this year to satisfy all demands. Not only are nonwar industries being divorced from their fuel supply, but it is highly problematical if even the so-called war industries will be enabled to keep their fires burning with the intensity necessary to carry on their part of the recently magnified war program. Already more than 13,000,000 net tons behind for the coal year, the soft coal mines must produce at the rate of over 12,000,000 net tons a week for every week until Mar. 31, 1919, if the goal of 628,000,000 net tons of bituminous coal required to meet the country's needs is to be attained.

Are the soft coal mines equal to the task? The answer is both yes and no. Yes, if the railroads live up to the promise made by Mr. McAdoo that the movement of cars to and from the mines will suffer no delay in the future, and the miners labor efficiently for at least eight hours a day, six days a week. No, if Mr. McAdoo's promises of an improved car supply fail to materialize, as has so often proved the case in the past, or the miners lose sight of the larger national interests to further selfish ends by working half-heartedly, or only when the spirit moves them.

With the approach of cool weather also come recollections of the deplorable transportation conditions from which the country suffered last winter. Inadequate motive power, broken down rolling stock, poor track, depleted repairshop forces—why continue the harrowing details? The question is, Are the railroads in shape to meet similar conditions if they should arise this winter? It is like flying in the face of Providence to assume that the coming winter will be less severe than that of last year, as seems to have been done by the Railroad Administration to judge from recent statements emanating from that quarter. True, it is human nature to hope for the best, but at the same time it is the better part of wisdom to prepare for the worst.

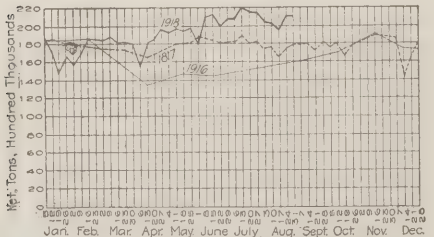
Unlike the Railroad Administration, the Fuel Administration deals only with actualities. It is going ahead constructively on the assumption that there will not be coal enough for all. The Fuel Administration is not attempting to fire the furnaces of the country's industries next winter with the empty promises of today. Curtailment and conservation are Dr. Garfield's watchwords, and underlying them both is the thought that war industries must not cease to function for lack of fuel. Toward the accomplishment of this end, fuel experts have been busily engaged in devising practical ways and means by which coal can be saved. For example, by the elimination of wasteful practices in the power plants of the country millions of tons of coal will be conserved. The domestic consumer, too, by means of pamphlets and other mediums, is being taught how to obtain the greatest efficiency from every pound of coal shoveled into the furnace, and sections of the country which had been under the impression that they could burn only certain grades of coal, which had to be shipped to them from distant mines, have been shown that they could burn with equal efficiency coal produced by mines which were at their very doors.

No such gloom as surrounds the bituminous industry is discernible in the anthracite region, though at this writing rumors of a strike in the anthracite field are rife. Undoubtedly a way will be found to settle or adjudicate the questions at issue in the hard coal region, as a let up in the production of anthracite at this time would result in suffering for a large majority of those who live on the Atlantic seaboard. During the week ended Aug. 31 a total of 2,259,715 net tons of hard coal was produced, which is the greatest output recorded during the present calendar year. During the period from April 1 to July 31, the actual distribution of the domestic sizes of anthracite virtually equaled the allotments made to the different states. The total production of hard coal for the coal year to date is estimated at 44,028,000 net tons.

Coal is moving to the lakes, for transshipment to the Northwest, in much better volume than heretofore. Shipments for August were 4,805,049 net tons, which is just under the mark of 4,900,000 net tons set by the Fuel Administration for the month. Thus far this season shipments to the lakes are approximately 1,089,000 net tons behind.

WEEKLY COAL PRODUCTION

The output of bituminous coal in the United States during the week ended Aug. 31 was approximately the same as the week preceding. Estimates place production during this week at 12,642,000 net tons, as against 12,620,000 net tons during the week of Aug. 24 and 11,056,000 net tons during the corresponding week of 1917. The average production per working day for week ended Aug. 31 is estimated at 2,107,000 net tons, an increase over the corresponding week of last year of 14 per cent. and over the average daily requirements for the coal year of 4.7 per cent. The schedule of the Fuel Administration, however, calls



for an increased rate of producing during the six months beginning with April, and production in the first five of these six months has been nearly 13,000,000 tons below this figure. To overcome ths apparent shortage it will be necessary to maintain the average daily rate of production during the seven months remaining in the coal year at 2,037,000 net tons, or 2.9 per cent., in excess of the average daily production in the five months, April to August. In the period beginning with the second week of June to the last week of August, the average daily rate of production has been approximately 2,061,000 net tons, compared with an average daily rate in the period from the first of April to the first of June of 1,864,000 net tons. It is thus evident that only by maintaining production at the level of the last three months through the good weather portion of the coming seven months of the coal year, will the estimated requirements be met. These figures of estimated requirements are based upon 628,000,000 tons for the year, divided between 52 weeks of six working days each, with no allowance for national holidays.

Reports from the carriers for the week of Aug. 31 show increased shipments of bituminous coal from western Pennsylvania, Cumberland-Piedmont and Somerset, Fairmont, Ohio, the district including northeast Kentucky, high-volatile of south West Virginia and smokless fields of West Virginia, the district including Iowa, Texas and Southwest States and from the Rocky Mountain and Pacific Coast States. Material decreases occurred in Tennessee and Kentucky where shipments declined 6.8 per cent. and in Alabama where shipments declined 6.4 per cent. Decreases also occurred in Central Pennsylvania, in Michigan, South West Virginia and the district including Illinois, Indiana and Western Kentucky. Compared with the corresponding week of 1917 all districts show improvement. For the coal year to date all districts with the exception of Michigan report shipments in excess of 1917.

Bituminous coal loaded on vessels at lake ports (including bunker coal) during the week ended Aug. 31, 1918, is estimated at 1,168,583 net tons, an increase over the week preceding of 1.5 per cent. and over the weekly average during July and August of 11.6 per cent.

New England shipments of bituminous coal, during week of Aug. 31, declined approximately 6 per cent. Receipts through the rail gateways declined slightly, while shipments from all harbors, with the exception of Hampton Roads, fell behind the performance during the week of Aug. 24. The current week's shipments, however, both by rail and tidewater, exceeded the weekly average during the coal year to date.

Shipments of bituminous coal from all North Atlantic harbors and Hampton Roads, during the week of Aug. 31, are estimated at 922,545 net tons, approximately 6 per cent. less than the shipments during the week of Aug. 24, but slightly in excess of the weekly average of the coal year to date. Shipments during the week, compared with the week previous, declined from all harbors, New York and Philadelphia falling behind 6 per cent. Baltimore 14 per cent. and Hampton Roads 5 per cent.

Beehive Coke—Production of beehive coke in the United States during the week ended Aug. 31 was estimated at 617,000 net tons as compared with 592,000 net tons during the week of Aug. 24, an increase of slightly over 3 per cent. The daily average during the current week is estimated at 103,000 net tons as against 99,000 during the week preceding. Operators in the Connellsville, Greenburg and Latrobe districts of Pennsylvania report production of beehive coke during the week ended Aug. 31 at 381,977 net tons and an operation of their plants at 75.1 per cent. of full time, as against 74.6 per cent. during the week preceding. Yard labor conditions improved slightly during the week.

CARLOADS OF COAL ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended: Aug. 10	Aug. 17	Aug. 24	Aug. 31
Bituminous shipments, 123 roads	217,254	210,431	223,117*	222,814†
Anthracite shipments, 9 roads...	39,280	36,857	40,865	41,281

* Revised from last report. † Subject to revision.

BUSINESS OPINIONS

Bradstreet's—Government buying and manufacture on war account make new records, but civilian trade reflects more irregularity, due to a combination of varying crop reports, more acute labor scarcity and increased and still growing difficulty in getting supplies of merchandise and of materials for the manufacture of civilian goods. Over and beyond this, also the new draft legislation, signed at the close of last week, is reported to have had the dual

effect of still further discouraging buying of men's apparel, and in some instances of causing closer scrutiny of credits by wholesalers pending clearer views of the extent to which their customers are likely to be affected by the raising of the draft age.

American Wool and Cotton Reporter—Apportioning of wool on any reasonable basis is likely to be exceedingly difficult. The questionnaire which has been sent out may be intended as a basis for equalizing the supply of raw material which the mills have available; that is, those who have a supply will receive a small apportionment, while those who have no supply will receive a relatively large apportionment. The cotton crop condition of 55.7 per cent. of normal was the feature of the week under review. Some feel that cotton will reach 40c. within a few weeks.

Marshall Field & Co.—In spite of the reductions effected by the price-fixing committee of the War Industries Board in the prices obtained by mills for their product, it becomes increasingly difficult to replace stocks of merchandise at prices prevailing last season either in piece goods or manufactured garments. Mills are looking for a higher basis of price to be announced Oct. 1 and are withholding their product in many cases in anticipation of being allowed a higher level to compensate for the recent rise in the raw cotton market and the increasing difficulty of their labor situation, which is reducing their output to a large extent. Road sales for current delivery were heavier than for the corresponding week in 1917. A few lines are now being offered for spring delivery and the orders indicate that merchants are eager to cover their spring requirements. Current shipments were largely in excess of the same period a year ago. Collections continue good.

The Iron Age—August pig-iron production fell below that of July. It was at a less rate also than the outputs of April, May and June, but was higher than that of any other month since May, 1917. The total was 3,389,585 gross tons, or 109,341 tons a day, against 3,420,988 tons in July, or 110,354 tons a day—a falling off in the daily rate of about 1000 tons. Furnaces in blast Sept. 1 were 372 with capacity estimated at 112,390 tons a day, against 363 furnaces on Aug. 1, with daily capacity of 111,300 tons. Leaders in the industry realize that even the present insufficient rate of production cannot be maintained unless special measures are taken in connection with the new draft. More important still is the maintenance of existing hours and the safeguarding of the industry for the period of the war against such restrictions of output as have commonly accompanied union control. The Lake Superior ore movement in August fell 934,000 tons below that of July, owing to the diversion of vessels from ore to grain.

Atlantic Seaboard

BOSTON

Flow of coal as yet undiminished, although radical reduction is now looked for. Still difficult to unload steamers. Hampton Roads situation causes anxiety and bottoms are in for detention. Byproduct coal again ordered west in heavy volume. Coastwise situation on bituminous is now reversed from what it was last spring. Fuel authorities at work on shutting off coal to plants having on hand more than the permissible stocks. All-rail movement expected therefore to be reduced materially. Expectation that movement to New York piers will be somewhat increased. Awkward situation continues with respect to Washington ruling as to limits for stocks in reserve. Gateways as yet show no falling off in bituminous, but figures will be closely watched the next fortnight. Anthracite screenings tonnage sags. Practically no spot market for the latter. Domestic sizes come forward about on August level. Slight improvement noted in movement of barges.

Bituminous—The second week of September shows no interruption in the flow of coal to New England. Steamers are still arriving from Baltimore and Hampton Roads faster than there is berth room to handle their cargoes promptly. There is congestion at all the railroad berths at Providence, Boston and Portland, and together with a general lack of labor at the wharves the awkward situation reported last week still continues. It is the judgment of the more farsighted in the trade that several of the ships now bringing coal here should be turned into other service temporarily, but naturally there is reluctance on the part of others to take such a responsibility. As far as can be seen now the ships will be needed in another 60 days or so if New England is to be supplied with anything like current requirements. Then, too, the recent taking of three large self-trimming colliers, their tonnage aggregating 17,000 tons, for over-sea service is an indication that the better class boats will be withdrawn from the trade in increasing numbers. The substitutes are slower, take much more time to discharge, and for that reason cannot be figured as a ton for ton replacement.

At Hampton Roads there is real reason for apprehension. At this writing the coal at Newport News and at the Norfolk piers aggregates only 65,000 tons, while there are steamers and other bottoms waiting to the extent of 178,000 tons. In other words, the expected has happened. A considerable volume of steam and byproduct coal has been ordered west and steamers are allowed to bunch at tidewater while someone is busy ordering the coal elsewhere. A lack of coördination is obvious and the trade is beginning to wonder when this will be remedied and New England consumers relieved of paying the bills to the tune of 25c. per ton per day. At Baltimore the outlook is relatively the same. The whole coastwise situation on bituminous is now entirely reversed from what it was last spring. At that time there was a real shortage of boats; today, if it must be said, there is a surplus of boats.

Meanwhile, under directions from Washington, state fuel administrators are working hard to see that coal is distributed equitably. At times, in the congested areas, it is more a question of getting it distributed at all, but the effort is being made to have deliveries withheld from those consumers who have more than seasonable reserves and to see that such coal as comes forward reaches only those whose low reserves justify further receipts. It is all a most difficult situation to administer. Coal pours in from several directions and no system of reporting could be really adequate. Tidewater distribution is easy to control but to divert properly at the gateways is a task beyond any machinery now in operation. It is impossible, under the conditions, to catch even one car in three.

One result of the weekly reports, however, will soon appear in the diminished volume of coal all-rail. So far the September receipts are on a parity with August, the August average having been 725 cars daily, including railway fuel. The District Representatives have now been advised what shipments to curtail and what to increase. The net result will be heavier movement to the New York piers to supply important requirements on Long Island Sound and inland in Connecticut. A better volume to the piers would also enable the Fuel Administration to send coal to ports all the way to Eastport, Maine, which the heavy movement of steamers from Hampton Roads to Boston and Portland has not been able to reach. The next problem will be whether the New York piers will be able to handle all the coal that will be sent in that direction.

Anthracite—The most prominent feature is the extent to which the tonnage of steam sizes has fallen off. The volume of bituminous coming forward has led many consumers to resume their former boiler-room habits, and undeniably the use of screenings has decreased the past month. Today there are practically no requests for barley or silt, and the spot market has all but disappeared. The difficulty of getting these coals forward during the winter has apparently been lost sight of.

As to domestic sizes, the receipts continue about on the August level. The average daily number of cars passing the New England gateways last month was 438, and the first few days of September showed that that level was being maintained.

The improvement in the movement of barges is noticeable, although only slight. The New York piers have thus far shown better results than was expected, although it develops that best results can be had by using both Philadelphia and New York for loading Reading barges. Otherwise the latter would almost certainly fall into delays.

The 30c. advance was effective Sept. 2 on domestic sizes, f.o.b. Philadelphia and New York. It seems to have caused not a ripple of comment, and as yet there have been no increases authorized in retail prices.

NEW YORK

Hard coal situation favorable. Consumers of bituminous well supplied. Little free coal.

Anthracite—In most of its aspects, the anthracite situation continues highly favorable. Production is heavy, and, after all, the fuel problem is more readily solved by a larger output than by the introduction of new methods of distribution and conservation. Official figures show that the high peak of the year was reached in the last week of August, when over 1,800,000 gross tons was shipped out of the hard-coal region. This was the largest weekly output during the present calendar year and was 214,000 tons ahead of the corresponding week of 1917. For the first time this year the average daily production exceeded 300,000 tons for a full week. That this was not due to any abnormal increase in washery output is indicated by the fact that almost precisely two-thirds of the tonnage consisted of domestic sizes, of which pea coal is now counted as one. This is about the average percentage as established by the records of past years.

Of course, the output was kept down last week by the Labor Day interruption, but it is to be noted in this connection that operations were not interfered with to so great an extent as usual, for the number of men who reported for work on Tuesday morning was in striking contrast to the number who, under the old order of things, were accustomed to show up on the day following a holiday.

The same tendency toward keeping the wheels turning with the least possible interruption was observed at this end of the line, for about 25 per cent. of the usual number of cars were dumped over the local piers on Labor Day and about the same number on the preceding Sunday. And with unusual large dumpings for the two or three days following, the week's record was a fairly good one.

The piers in the harbor handled 6713 cars in the week ending Sept. 6 as compared with 7358 cars in the previous week. Locally the hard coal problem has resolved itself, to quite an extent, into the matter of getting more stove and egg coal, particularly stove; of cleaning up the vast number of one- and two-ton orders and of taking care of customers in certain sections of Greater New York where the growth in facilities has not kept pace with recent increase in population. On none of the other domestic or steam sizes is there anything approaching the shortage in stove and egg. Broken coal has been in fairly good supply for some time past and there is no great complaint on the part of most retailers as to the current receipts of chestnut, although the situation varies materially in different parts of the city.

Pea coal is none too plentiful, but a good many consumers who formerly depended on this size have switched to No. 1 buckwheat. The latter size is now in very good supply, although shipments to tidewater are being regulated so as not to crowd the market too hard in view of the fact that its use is now restricted to apartment houses, hotels, office buildings and a few other classes of consumers. The shortage in rice coal has also been overcome except in the case of the highest grades, of which there is seldom enough to meet the demand in full. Barley and No. 4 buckwheat are in oversupply, but railroads have taken steps to see that shipments to the buyers are kept within bounds.

Current quotations, per gross tons, f.o.b., tidewater, at the lower ports are as follows:

Circular	Individual	Circular	Individual
Broken..$6.75	$7.50	Buck...$5.10	$5.90
Egg.... 6.65	7.40	Rice.... 4.65	5.10
Stove... 6.90	7.65	Barley.. 4.15	4.30
Chestnut 7.00	7.75	Boiler.. 4.60	
Pea..... 5.50	6.25		

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates. Prices for buckwheat, rice, barley and boiler are not fixed by the Government.

Bituminous—In this immediate section, at least, a great many bituminous consumers are so well supplied that they have little cause for apprehension over the prospects for the near future. The greatest problem in the soft coal trade has to do with meeting increased demands from the steel industry, the Navy and the United States Shipping Board. These requirements involve the use of certain grades of coal, such as West Virginia smokeless and coking coals from western Pennsylvania, which do not figure in the New York market to any great extent.

Of the ordinary steam coals and low grade gas coals there appears to be enough to go around, even though these are being called for in greater volume by industrial consumers whose usual sources of supply are now shipping almost their entire output to the Shipping Board or to the Navy.

The new plan of supervising the storage of soft coal, so as to prevent some consumers piling up huge stocks while others

are unable to make reasonable preparations for the winter, promises to correct the situation which it was designed to relieve. Many consumers,, especially those not on the preference list, have more coal on hand at the present time than they are supposed to have, and in many cases further shipments to such concerns have been ordered discontinued. This has naturally made it easier for other consumers not so well stocked to round out their storage piles, so that by the middle of next month, when transportation troubles may be expected, there will probably be few concerns not reasonably well protected against any temporary interruption to deliveries.

For the last two or three weeks there has been a slight falling off in tidewater shipments of bituminous to New York harbor, which may be accounted for by the diversion of some coal to Baltimore and Philadelphia for transshipment by water to New England. The local piers handled about 1000 cars less of soft coal in August than in July.

In the week ending Sept. 6 the dumpings aggregated 6662 cars as against 6844 cars the week before. The difference is not marked, owing to the fact that operations were carried on at some of the loading ports on Labor Day and on Sunday of last week.

The up-turn in bituminous output recently recorded for the country as a whole, and the announcement that the central Pennsylvania mines turned out a record week's tonnage late in August, seem to confirm the belief that the midsummer decline in production was due to weather conditions interfering with the prompt discharge of cars at points of destination, rather than for any change for the worse on the railroads or as regards labor at the mines.

From the jobber's standpoint things have not changed much, except that tonnage contracted for comes along in better volume as output increases. There is still little coal to be picked up in the open market, the bulk of the shipments continuing to move through regular channels under arrangements entered into months ago.

Current quotations, based on Government prices at the mines, net ton, f.o.b., tidewater, at the lower ports, are as follows:

	Mine Gross	F. o. b. N. Y. Gross
Central Pennsylvania:		
Mine-Run, prepared or slack	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of-Mine	3 08	5.23
Prepared	3.36	5.51
Slack	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite settles down to busy routine. Consumers still anxious. Dealers experience trouble with labor. Local shipments better. Steam coals well taken, with an occasional tendency to weakness. Bituminous car distribution better. Local receipts fair. New distribution plan in effect.

Anthracite—All dealers have plenty of orders on hand and small stocks, and while the coal arrives somewhat slowly yet there seems to be an increasing steadiness and we hear little these days of teams standing idle, as was the case at times during July and August. The consumers, of course, are still anxious to have deliveries made and are keeping after their dealers with little let-up.

The dealers are anxious, naturally, to accumulate some coal in their bins, as ordinarily at this time of year their yards are quite full as contrasted with the present empty state. As a result they continue to harass the shippers, to whom they are prone to exaggerate their troubles. After a careful survey of the situation, and accepting the judgment of those high in the trade, we are more confident than ever that the severe trials of last winter will not be repeated. We are also of the opinion that labor shortage with the retailers will be the cause of more trouble than coal shortage. Dealers who have tried to speed up their deliveries by offering bonuses to their drivers for every ton over a certain number delivered each day, are not so sure that it is a wise policy. It proved satisfactory when the stock of coal on hand warranted overtime and extra effort to deliver. When the stocks dwindled and the same opportunities to make extra pay did not exist, then the yard help became dissatisfied and immediately asked to have their wages raised and this feeling still prevails.

The new price effective the first of the month caused practically no comment. The shippers did not announce the advance by circular and some dealers for a few days actually lost sight of the fact that coal was costing them more.

This week the anthracite distribution committee announced that they had accomplished their plan of giving a heavy advance tonnage to the New England territory and had actually exceeded the tonnage that they had hoped to place there during the summer. While good shipments are understood to be continued in that direction it is the general opinion that from now on this territory will begin to get every week a greater percentage of coal.

The retail men were again called upon the other day to furnish further details of their business to the local administrator, Mr. Lewis persists in being kept informed as to the number of tons of coal ordered, undelivered, in stock, and in transit to every yard in the city. The information is always forthcoming, but the trade with the short help does tire of the detail work involved.

The anthracite committee of the United States Fuel Administration is now sending to the producers and distributors the allotments by cities in the various states. There has been no particular interest aroused here as yet because they have not heard of the required tonnage to Pennsylvania: neither has New York or New Jersey been covered at this writing.

Broken continues to be consigned to the gas companies, public utilities and brass foundries, with little or none for domestic use. In order to see that these industries received the necessary amount of this size the authorities have recently apportioned the tonnage to the different shippers, as this is a size that must be made to order. Egg coal is comparatively free in the city proper and many of the smaller dealers have filled all their orders for it. In the outskirts, where the houses are larger and where most of the city's requirements for that size is consumed, the dealers continue to plead for it. Stove is by all odds in the shortest supply and by far the largest percentage of unfilled business calls for this size. The dealers claim it is still too early to persuade their trade to accept another size as a substitute. Chestnut is the next in proportionate demand, while pea coal is the easiest of the four popular family coals. The first cold snap is likely to change conditions and cause a quick demand for pea coal from the small buyer for small houses. Ordinarily all dealers were anxious for a large stock of pea with which to start the fall season.

Several shippers report a weakening in the steam sizes, noticeably on barley and culm. It is also true that fewer inquiries are coming in not only for these two sizes but on No. 1 buckwheat as well. The increased production of the washeries and dirt banks is having its effect there. Of course the cutting off of No. 1 buckwheat and the changing to bituminous by certain manufacturers is noticeable, especially as none of these sizes are yet in use for domestic heating purposes. There are some who predict that No. 1 buckwheat will be fairly easy before the end of the month, a condition, however, that is not likely to exist far into the season.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.25	Buckwheat	$3.40	$4.45
Egg	4.80	6.15	Rice	2.90	3.80
Stove	5.05	6.40	Boiler	2.70	3.70
Nut	5.15	6.50	Barley	2.40	3.30
Pea	3.75	5.00	Culm	1.25	2.15

Bituminous—There has been a noticeable change for the better in bituminous lately. In fact during the last ten days the car supply has been running close to 70 per cent. of the present capacity of the mines. Many shippers, however, report labor conditions more acute than ever, as the men have a tendency to float around from one mine to another with the varying car supply.

With the entire production in the hands of the distribution committee these men are making the most of the production at hand. They have now arranged that all war industries shall have a 30-day supply, while those on non-war work have been put on a 15-day basis. As a consequence of this there is quite an accumulation of stocks all around this territory. While the local market in this way is being fairly well taken care of, it is understood that extra efforts are being made to take care of out-of-the-way places in New England. With the changed aspect in distribution many of the very largest plants who succeeded in getting from a 60- to 90-day supply are somewhat held back and they are skirmishing around to find means to continue the rate of stocking which they have enjoyed all summer. One plan is to send representatives into the region, which has been done to an increasing extent of late.

BALTIMORE

Bituminous situation continues fairly easy, but about one-third of the local tonnage continues to come in box-cars. Much coal of unsatisfactory grade. Hard coal men still lack tonnage. Apportionment for Maryland points announced.

Bituminous—Handlers of bituminous and officials connected with the local fuel administration report a fair tonnage now moving here. More than 1000 tons a day average for local use is now coming through. The heavy movement of coal in box-cars, which means both a greater initial cost and an extra cost for unloading, is an element of concern to consumers. This is the more pronounced as a considerable part of the coal coming in box-cars, as well as some of the fuel reaching here in open-top cars, is of most unsatisfactory grade. Baltimore has been particularly hard hit in the matter of good coal supply for industries outside of the war-industry and Government class, because of the fact that of the fuel left in this zone the Government has taken practically all the highest grade for its own use and has eaten heavily even into secondary coals. A considerable part of the coal reaching here outside of the tidewater pool on outside the capes movement is to the account of the Maryland Fuel Administrator and is being distributed by him to the most needy consumers through the purchasing agents, who file claims for coal.

Anthracite—Hard coal dealers here still lack the tonnage now being urgently demanded by consumers, many of whom have had orders in since April and May and have not as yet received even part of their expected tonnage. The fuel administrator is now compiling the August figures of tonnage received and distributed, and of orders still unfilled. At the outset of August there remained 322,725 tons of unfilled orders on the books of dealers. For April, May, June and July there was a total of 232,218 tons received here. The entire city allotment was definitely announced this week as 713,318 tons. This means that less than one-third of the city allotment was received here in the first four months of the coal year. As the allotment was fully 10 per cent. under the estimates of extra coal needed to meet war-industry demand and shortage in yards here at the outset of spring, it can be seen that the situation is far from assuring. The allotment announced for other Maryland points was as follows: Arlington, 17,244 tons; Annapolis, 15,000; Hagerstown, 14,585; Frederick, 11,601; Walbrook, 9671; Notre Dame, 7958; Chevy Chase, 6807; Cambridge, 6378; Catonsville, 6849; Bethesda, 6198; Easton, 6014; Havre-de-Grace, 6000; Towson, 5997; Chestertown, 5601; and Salisbury, 4936 tons.

Lake Markets

PITTSBURGH

Important cases of stocking coal discovered. Lake shipments behind. More allocations.

Investigations indicate that there has been more stocking of coal by consumers than was generally realized, but the stocking has not been uniform by any means, some consumers having nothing at all. The official ban upon stocking Pittsburgh district coal until after lake shipments are ended is as rigid as ever, and would be more rigid if the authorities had means for making it so. Production has increased slightly, except for the backset given by Labor Day, which was rather generally celebrated. The miners did not celebrate the day after as much as formerly, however. Lake shipments are decidedly behind schedule and are not picking up. The situation will probably make it necessary to continue shipments beyond Oct. 15, by which time it had been hoped the movement would be concluded. The period in which line consumers can stock up for the winter will be correspondingly reduced.

Allocations of coal are more frequent, and shipments are cut off now and then to consumers not recognized as essential, or who have stocks upon which they can draw readily. Brokers are doing scarcely anything. The market remains quotable at the set limits: Slack, $2.10; mine-run, $2.35; screened, $2.60, per net ton at mine, Pittsburgh district, with 15c. brokerage allowed to be charged consumers by regular brokers.

TORONTO

Dealers overtaking delayed deliveries. Price of anthracite advanced. Possibility of curtailed allotments for Canada. Plenty of soft coal, but consumers must do delivery.

Coal is coming forward fairly well, and dealers are gradually overtaking orders in arrears. New orders are generally refused. The price of anthracite has been advanced 50c. per ton by most dealers owing to increased cost at the mines and additional freight charges, though some are filling orders on hand at the former price. The possibility of curtailed allotment for Canada is causing some anxiety, as it is feared that there may be a diversion of anthracite shipments to supply the New England States. The city authorities are considering the issue of an order stopping deliveries of hard coal to those consumers already partly supplied until those having none are supplied. Soft coal is readily obtainable by those who can provide for its delivery.

Quotations for best grades per short ton are as follows: Retail anthracite, egg, stove, nut and grate, $11 to $11.50; pea, $10 to $10.50; bituminous steam, $9.25; slack, $8.25; domestic lump, $10.50; cannel, $13, wholesale f. o. b. cars at destination, three quarter lump $7; slack, $5.82.

BUFFALO

Bituminous rather quiet. Canadian trade not active. Supply not coming this way heavily. Anthracite local prices higher. Lake shipments fair.

Bituminous—Jobbers are finding it about as hard as ever to get a supply, especially since so much of the Pittsburgh coal has to go to the lakes. When that movement drops off this district ought to be better supplied. It is always that way in early fall, but when there is a real surplus the consumers are willing to wait. The fuel administration is now cutting off the local consumers who have a large amount stored up, but promising more when the supply runs down.

Bituminous prices have not been changed lately, being $4.65 for thin-vein Allegheny Valley, all sizes, $4.45 for Pittsburgh lump, $4.20 for Pittsburgh mine run and slack, $5.65 for smithing and smokeless, and $6.10 for cannel, all per net ton, f.o.b. Buffalo. Most shippers prefer to sell at mine prices.

Anthracite—The demand is quite as active as formerly, but the supply does not increase, so the local distribution has fallen considerably below the former average. The fuel authorities say that the amount allotted to the city and county is sufficient and that the plan is to keep long-distance shipments up more closely than such as can be made with little additional expense in cold weather. An advance of local prices was made on the first of the month, the amount being 30 cents a ton on all sizes but grate and buckwheat, which are unchanged. The wholesale price to retailers is $7 for grate, $6.90 for egg, $7.20 for stove and chestnut, $5.75 for pea and $5.75 for buckwheat. The retail price to the curb is $1.85 more, with 50 cents additional to the man who houses it.

The shipments by lake appear to have been cut down by the holiday, being for the week 91,044 net tons, of which 44,100 tons cleared for Duluth-Superior, 14,344 tons for Milwaukee, 9600 tons for Sheboygan, 8600 tons for Marquette, 7700 tons for Fort William, 3200 tons for Green Bay and 3200 tons for Hancock.

CLEVELAND

Hopes that the closing of the lake season would make additional supplies of bituminous available in this district have been shattered by the semi-confidential information that the urgent coal demands of the Allies will compel the diversion of large tonnages to Buffalo and Pittsburgh. Ohio mines, however, are to be relieved of practically all of their railroad fuel, coal to come east from Illinois and Indiana for that purpose. Lake shipments in August set a new high record, but with Labor Day, labor seems to have ended its spurt and has proved more unsteady than at any time so far this season.

Bituminous—According to semi-confidential reports in circulation among operators here the Allies, particularly Italy, have made unprecedented demands upon the United States for coal. As a result, so the report has it, the lake season may arbitrarily be ended Nov. 15, or a large tonnage that ordinarily would proceed to the Northwest in late November and early December be held in the lower lake regions to supply domestic and industrial consumers. The lake season at an end, Ohio coal is to move east to Buffalo and Pittsburgh, and western Pennsylvania coal forwarded to tidewater. In order to make this movement as large as possible it is said that Ohio mines are to be relieved of the necessity of providing any railroad fuel at all, and already some operators are said to have received notice to forward their railroad fuel to the lakes, in anticipation of an eastward movement from Illinois and Indiana mines. This turn of affairs has not made operators feel any more optimistic concerning an adequate local supply this winter. Railroad fuel is quite an item with Ohio operators, since every New York-Chicago line crosses the state. The labor situation at mines in the No. 8 district of southern Ohio this week has been the worst of the season, due to the Labor Day hangover. At one mine employing a few over 500 men 91 were absent the day following the holiday. The reduced production, however, is said to be less than would seem probable, inasmuch as car supply has gone back to its steady gait. No industrials are getting any bituminous until operators are satisfied that their stocks do not exceed the Fuel Administration's maximum limits. Retail dealers are not getting one quarter, if that much, of the tonnage they could dispose of. The detailed report of the Pittsburgh Vein Operators' Association of Ohio on the car supply in August shows the average shortage for the month to have been 21.98 per cent. The best car supply was on Aug. 5, when it was only 8.18 per cent. short, and the worst on Aug. 21, when the shortage was 39.24 per cent.

Lake Trade—The Ore and Coal Exchange, Cleveland, which is conducting the pool of Great Lakes tonnage this year, reports that in August the lake fleet loaded 4,805,049 tons of bituminous, exclusive of bunker fuel. This is a record. In September, 1917, the fleet loaded 4,699,000 tons, the record up to August's performance. Since August was a 4,900,000-ton month on the Federal Fuel Administration's schedule, the season up to Sept. 1 is approximately 1,089,000 tons behind. Receipts at lower lake docks this week have been remarkably good, despite the Labor Day cessation at the mines and the attendant difficulty in getting back to the schedule. Tonnage is available plentifully so far this week, though in the latter part of last week the congestion at the ore docks held considerable back.

DETROIT

Shortage of domestic coal continues a harassing factor of Detroit trade. Anthracite supply is not improved. Lake trade is stronger.

Bituminous—Domestic coal users in Detroit received a sharp reminder of unfilled coal bins this week with a sudden drop in temperature and cold rain. Despite a slight increase in the proportion of domestic sizes coming into Detroit, the bituminous received is still chiefly mine-run stock, which is not suitable for satisfactory consumption in hot air furnaces and baseburners. Domestic lump and prepared sizes are not so plentiful as should be the case to provide for requirements of the many homes which will be unable to obtain anthracite.

In the effort to increase the supply for domestic use, manufacturing plants are instructed to obtain their coal supply from Illinois and Indiana mines. Quite a number of steam coal users, some of whom have had unsatisfactory experience with coal from those fields, are objecting to the substitution of what they regard as inferior stock for the West Virginia coal they have been accustomed to receive. Some have expressed a willingness, it is said, to close their plants rather than use coal which they assert would injure their furnaces.

Anthracite—Householders who are dependent on baseburners and who have been unable to place orders with retailers are making application to the fuel administration this week, through a clerical force in the Board of Commerce. Each home is permitted to order 3 tons, and the opportunity for placing orders will be terminated on Sept. 10. More than 5000 applications were received the first two days. Owners of hot air furnaces are to get no anthracite until those using baseburners are supplied. Meantime the movement of anthracite into Detroit is extremely light.

Lake Trade—Coal is moving over the lake routes in better volume than heretofore. August shipments were 4,805,049 tons, just under the mark of 4,900,000 tons set by the fuel administration for the month.

COLUMBUS

Special efforts still being made to supply the Northwest with fuel. As a result limited quantities are apportioned to the domestic and steam trade.

The Federal Fuel Administration is making every effort to supply the upper lake region with fuel before the close of navigation. Coupled with this movement is a demand from Michigan which is taking much of the available tonnage. Some coal is apportioned to the domestic and steam trades, but there is a shortage, especially in the former. Generally speaking, the tone of the trade is good.

Lake trade is moving along smoothly as far as vessel transportation is concerned. But shortage of cars and lack of motor power are reducing the output in practically every producing field of the state. Consequently some concern is expressed over the fuel situation in the Northwest. The movement of tonnage from the docks to interior points in the upper lake region is good and there is no congestion as in former years. Lake prices are still firm at Government levels.

Domestic trade is active, although limited receipts are holding up deliveries to householders. Retailers who had surplus stocks are in a position to take care of their retail trade. Some coal is arriving from mines which do not have lake shipping licenses. Pocahontas is now entirely out of the Columbus market and there is little anthracite to be had. The bulk of retail coal is supplied from Hocking Valley and West Virginia. Retail prices are firm at former levels, which takes into account the recent reduction of 5c. in most Ohio districts. A survey of the state shows that a larger amount of domestic coal has been stored than in any previous year.

Steam business is strong and the demand is firm. There is a considerable amount of screenings finding its way into the local trade, as many mines in the Hocking Valley are shipping prepared sizes to the lakes. The recent ruling curtailing storage of steam plants has produced a wider distribution of the available tonnage. Schools and public institutions are now fairly well supplied.

CINCINNATI

Increasing anxiety on the part of manufacturers to secure fuel features the market, but contracts depend upon Government's view as to whether operation is essential. Deliveries are good.

The coming of the first fall month has brought home to numerous manufacturers the fact that winter is just ahead, and their anxiety to secure an assurance of an adequate fuel supply, as well as for regular power consumption, is keener than ever. There has at no time been any cessation in the inquiry for industrial fuel, but of late this has assumed a more insistent note, due to the development in a number of cases that the Government was still to be shown that the industry in question was to be considered as essential. Several delegations of business men have gone to Washington to attend a series of conferences on this matter, and they hope to be able to secure definite classification of their several industries as essential, with orders to the Fuel Administration to give them listing that will entitle them to a regular supply of fuel. It has become self-evident that many manufacturing concerns will have to go on short fuel rations or none at all, and it follows that the available coal will go to those rated as indispensable. The volume of fuel going forward is large, but figures below the amount required to meet all demands. The Labor Day holiday, while in some instances dispensed with or only partly observed, none the less cut into production as usual, and while the following day's let-up was not expected to be as bad as formerly, on account of the prohibition laws prevailing, especially in West Virginia, the loss is felt. Domestic consumers are already well taken care of, although dealers are still after coal for current delivery.

LOUISVILLE

Better supplies of eastern Kentucky received. Stocking demand good on this grade. Western Kentucky stocking slowing down for present. Cold weather expected to bring late rush. Steam demand fair.

A better movement of coal has been experienced from the eastern Kentucky field during the past few days, although most of this coal is straight mine-run, the producers not screening under the present heavy demand from the lake region. Mine-run is taking care of the steam consumption, but is not producing the much needed lump for domestic stocking. Retail demand for eastern Kentucky lump is heavy, with dealers holding considerable orders for such coal provided they receive it and can make delivery.

At the present time domestic stocking on western Kentucky grades has slumped somewhat, and the dealers are well up on deliveries and managing to take care of

all inquiries. Production in both fields is fair considering the labor situation. Cars are in better supply than they have been for some time past, and shipments as a whole are standing up well.

Jobbers have been handling as much western Kentucky coal as they needed, but have been having trouble in securing eastern Kentucky grades, and some of the producers have been buying up the output of small mines to take care of their demand. Some of the jobbers have been handling small supplies of Indiana coal during the past few days.

BIRMINGHAM

Pressure for steam coal has eased off some, though the demand is still greater than the supply. Domestic trade strong, dealers having many unfilled orders on file. Production for past week will approximate 430,000 net tons in Alabama. Slackers continue to throttle the output.

Reports in trade circles indicate a little slackening of the pressure for steam coal, though ample business is offered and in hand to more than absorb the production. Otherwise there is no change of a material nature in local market conditions. There is no indication of any let-up in the demand for domestic coal, each succeeding month from Apr. 1 showing a substantial gain in coal deliveries by dealers over the preceding month. Receipts are inadequate to meet the abnormal demand at this season, and the yards are kept cleaned up.

Production at the mines in Jefferson County on Labor Day was fairly good. Reports from the Cahaba field indicate about a half normal output, while many mines in Walker County were idle the entire day, no men reporting for duty. Mines on the Southern Ry. suffered some from an inadequate car supply at times during the past week. Operations on other lines were not materially affected by car shortage.

Coke

CONNELLSVILLE

Operators trying to make better coke. In three months beehive coke production decreases much more than byproduct increases.

Efforts are being made to bring about steadier operation of coke ovens and more careful selection of coke, so that the poor coke some furnaces have been complaining of will be eliminated.

Production of pig iron in August was at a rate about 1 per cent. lower than the July rate, but this is attributed to high humidity of the atmosphere rather than coke conditions. Shortages of coke and cases of poor quality have been fairly regular, not distinguishing one month from another particularly. On the whole, however, coke supplies lately have not been altogether so good as three or four months ago. This fact is receiving the careful attention of the Fuel Administration and representations were made to the Railroad Administration some time ago.

The best coke production of the year, taking the country as a whole, fell in the four weeks ended May 18, when production averaged per week 683,000 tons of beehive and 481,000 tons of byproduct, making a total of 1,164,000 tons. In the four weeks ended Aug. 24 production averaged 589,000 tons of beehive and 535,000 tons of byproduct, a total of 1,124,000 tons. Thus there was a decrease in the total of 40,000 tons a week.

A more startling fact is that the production of beehive coke actually decreased by 94,000 tons, and the decrease of only 40,000 tons in the total was caused by the byproduct output increasing 54,000 tons. As new byproduct ovens were being completed in the past few months fears were entertained that they might draw so much coal from beehive fields as to decrease the output of beehive coke, but the development has been very much worse than that. The Connellsville region has practically a clear record in this matter, however, as while its beehive coke output may have decreased a trifle, it has been shipping much more raw coal than formerly.

The market is without incident, furnace coke being allocated before there is opportunity to offer it in the open market. Foundry coke continues to be offered rather freely, giving foundries an opportunity to stock. Set prices control furnace and foundry coke, at $6 and $7 respectively, crushed, over 3-in., being limited to $7.30. Carefully prepared material from old dumps, over 3 in., is bringing $6.75 for the best grades, for distribution to domestic consumers.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended Aug. 31 at 338,250 tons, an increase of 545 tons over the week previous.

Buffalo—The situation is not materially changed. All furnaces in this territory are active, but they are so dependent on a scant supply of coke that their operations are in a sense curtailed by it. The byproduct ovens here are run at full capacity and they supply most of the needs of the district, so that the beehive districts are drawn on only in a moderate way. All breeze coke placed on the market is eagerly taken by jobbers, who as a rule sell it to regular customers at a moderate price. The iron-ore movement by lake continues heavy, receipts for the week being 337,400 gross tons.

Middle Western

MILWAUKEE

Hocking coal advanced in price to meet increased freight rates. Lake receipts of bituminous coal heavy. Conservation measures advanced.

Milwaukee coal dealers have been directed to advance Hocking coal 38c. per ton, beginning with Sept. 1, because of increased freight rates. Screened Hocking now sells at $7.93; pile run at $6.93 and lump at $6.68. A charge of 50c per ton is added when coal is carried in to bins. There have been no changes in prices of other grades of coal.

The month of August went over the top in regard to receipts of bituminous coal, and beat the record of any previous month. Cargo receipts of coal since May 1, when the docks were practically bare, were as follows:

	Anthracite Tons	Bituminous Tons
May	85,700	389,547
June	53,947	434,094
July	106,037	554,711
August	119,293	768,060
Total	364,977	2,146,412

September's record, including the first four days, foots up 3300 tons of hard and 82,656 tons of soft coal.

State Fuel Administrator Fitzgerald says Milwaukee is in no danger of a shortage of coal if proper economy is practiced. Householders are being instructed in furnace firing and an expert is supervising the conduct of power plants. The intent is to grant more coal to plants which are efficiently managed than to those where carelessness prevails. Essential war industries will be provided with a ninety day supply of coal. Nonessentials will have to take their chances with the fuel administrator.

The lightless order has been extended from two nights per week to four, beginning with the first week in September. Milwaukee country clubs will have to close their houses the coming winter, as they will not be allowed coal for heating after Dec. 1, and it is possible that surplus stocks in bins at these resorts will be taken over by the fuel administrator. Wood will be permitted, however, if it is not received by rail. At present summer cottagers on Wisconsin lakes are denied the use of anthracite for cooking purposes. Wood or soft coal only are permitted.

Some coal dealers find it difficult to compete for business in the present state of hide-bound regulation and have resorted to the practice of mixing poor coal with a better grade. The fuel administration office has given notice that any dealer found guilty of this kind of fraud will be denied the right to purchase coal.

ST. LOUIS

A quiet and slow market, with no demand from any source. No domestic business developing. Cars continue short on some roads and transportation shows slight improvement. Steam business quiet and a surplus of coal is on the market.

The situation is extremely easy in St. Louis. There is no demand for domestic coal other than that for Carterville, of which the supply still continues short. Steam business is unusually quiet. The steam plants do not seem to feel that they should store much coal ahead, and they are not storing any. Even the large public utility plants are not storing coal to the extent that the Fuel Administration desires, and up to the present the Terminal R. R. has no storage coal on the west side of the river. The Terminal was the cause of much trouble last winter, as it confiscated coal going to dealers and essential plants on account of its failure to store a sufficient supply, and it is not profiting by last winter's experience.

Business from the country is extremely quiet. There is a little domestic coal moving, but not in the volume that might be expected. In the Williamson and Franklin County field car shortage still continues somewhat severe, but transportation has proved better in the past week. Labor shortage is the cause of many mines making a poor showing.

A large tonnage of this coal still continues to go for railroad purposes and a small portion goes to the St. Louis market. In some sections in Missouri steam plants are using this coal that should use Standard or Mt. Olive, but lack of regulation permits this, and the same is true generally of steam plants in Illinois and Arkansas. Somewhat similar conditions obtain in the Duquoin field.

The Standard mines to a great extent have a surplus of steam sizes and in the past week No. 2 nut became heavy.

For two or three days there has been plenty of 2-in. lump coal. As a matter of fact, there has been more than the market could absorb, while 6-in. lump and 3 x 6 egg are in good demand at the Government maximum. Two-inch lump went down to $2.40, screenings are around $1.50, and mine-run is from $2.15 to $2.25. Car supply in a general way is somewhat better and transportation shows improvement.

The Standard field situation looks better. The railroad tonnage is good, and were it not for this the Standard mines would be idle on account of having no place to market their product. There are no eastern coals coming in and a light tonnage of Arkansas.

The prevailing market price per net ton f.o.b. mines is:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.55@2.70	$2.55@2.70	$2.40@2.70
3x6-in. egg	2.55@2.70	2.55@2.70	2.35@2.55
2x3-in. nut	2.55@2.70	2.55@2.70	2.35@2.55
No. 2 nut	2.55@2.70	2.55@2.70	.....
No. 3 nut	2.55@2.70	2.55@2.70	.....
No. 4 nut	2.55@2.70	2.55@2.70	.....
No. 5 nut	2.05@2.20	2.05@2.20	.....
2-in. scrgs	2.05@2.20	2.05@2.20	1.25@1.50
3-in. lump	.....	.....	2.25@2.40
2-in. lump	.....	.....	2.25@2.40
Steam egg	.....	.....	2.25@2.40
Mine run	2.35@2.50	2.35@2.50	1.85@2.00
Washed:			
No. 1	2.75@2.90	2.75@2.90	.....
No. 2	2.75@2.90	2.75@2.90	.....
No. 3	2.55@2.75	2.55@2.75	.....
No. 4	2.55@2.75	2.55@2.75	.....
No. 5	2.05@2.20	2.05@2.20	.....

Williamson and Franklin County rate is $1.10; Duquoin field, $1; Standard and Mt. Olive fields, 95c.

General Statistics

ANTHRACITE OUTPUT FOR FOUR MONTHS

Figures showing the distribution of anthracite during the four months Apr. 1 to July 31 reveal that each of the New England States received tonnage in excess of its allotment, while the Middle Atlantic States, with the exception of Virginia, ran behind. In all cases, however, the departure from schedule, based on the 1916 distribution, was relatively slight and was accounted for in the main by the carrying out of the Fuel Administration's policy of favoring far-away sections in the early part of the coal year and making up the deficit in nearby states by heavier shipments later on.

Details are shown in the following tabulation:

State	Due on Allotment Apr. 1-July 31 Tons	Distribution Made Apr. 1-July 31 Tons
Maine	220,000	244,363
New Hampshire	125,000	141,022
Vermont	110,000	135,642
Massachusetts	1,896,332	2,102,466
Rhode Island	266,768	268,778
Connecticut	825,568	914,235
	3,443,668	3,806,506
New York	5,285,100	5,046,306
New Jersey	1,820,260	1,746,141
Pennsylvania	2,686,568	2,635,827
Delaware	81,952	74,450
Maryland	342,440	341,368
District of Columbia	221,932	219,429
Virginia	34,132	54,776
	10,472,384	10,118,297
Nine Central and Northwestern States	2,002,313	1,780,681
Canada	1,200,668	1,251,942

COAL AGE

Volume 14 New York, September 19, 1918 *Number* 12

John and the Ton of Rock



ON a certain payday in March John James paid $36.50 to a representative of "The Fatherless Children of France, Branch of the American Society for Relief of French War Orphans." This amount, he had been told, would keep a fatherless French child one year. In due time John received a letter from France, which his French neighbor translated as follows:

Dear American:

My mother and I salute you. My father was killed in battle. They say he had to make a defense on one of the days when there was not enough ammunition, so he did not have a chance, but he was very brave. My mother works every day as a laborer, as there are not enough men now to do the work that must be done. She is not strong, so has a hard time of it; but she says the Americans are so patriotic and will change all of these things soon. I will pray that you may help us and that we may thank you as we should.

MARIE.

That night John had a dream.

During the day he had loaded something like 300 pounds of rock into every car of coal that he sent to the top. Since the demand for coal had become so acute dockage rules were like scraps of paper and there were few who paid much attention to them. Seven cars of coal John loaded that day, and the rock in these cars amounted to about one ton.

In the dream it was **exactly** one ton of rock, and floating above it was a large banner calling attention to the fact that here was a ton of rock. On the other side of the banner was the legend, "Hoch the Kaiser, whom we serve." As John looked at the banner, first one side was visible and then the other—the reference to rock on one side, the legend about the Kaiser on the other.

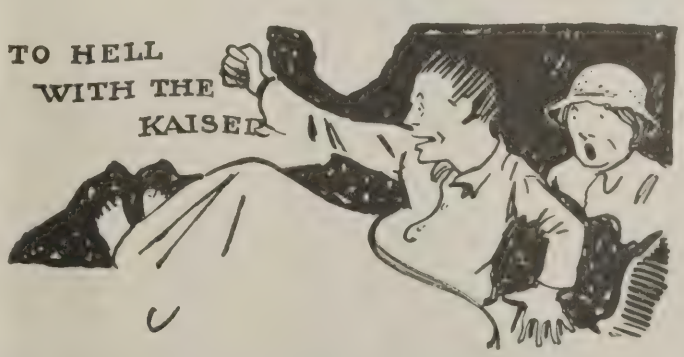
That Kaiser stuff didn't appeal to John, even in a dream. He made a lunge at the banner, but the mass of rock blocked him.

"You put me here," said the ton of rock. "I was in your power then, now I'm out of your power. Half of me will get into a railroad locomotive tomorrow, and because of me the fireman will lose his steam; his train will be delayed three hours. Think what that means to friend Kaiser, with freight congested as it is now and not enough men to handle it. All of your women will soon be at work. The other half of me will be sent to a coke oven to be turned into blast-furnace coke. My, but that blast furnace will cut up when that coke gets dumped into it! Furnaces can't melt iron with rock. Maybe friend Kaiser won't like that, also; the iron from that furnace goes to a steel works and then into ammunition."

With that the pile of rock seemed to melt away, and in its place stood only the banner; but the wording on the banner had changed. Now it ran: "You Americans are so patriotic."

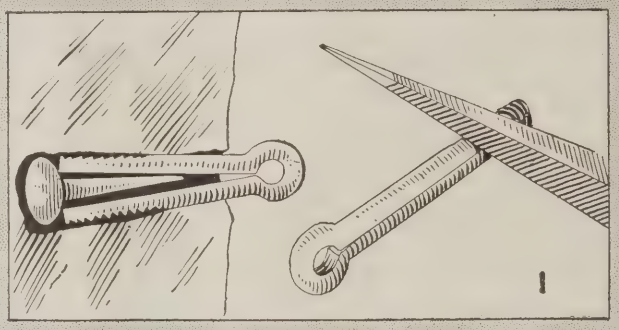
Just then John frightened his sleeping wife almost out of her senses by springing up in bed, yelling frantically, "To Hell with the Kaiser and all who serve him."

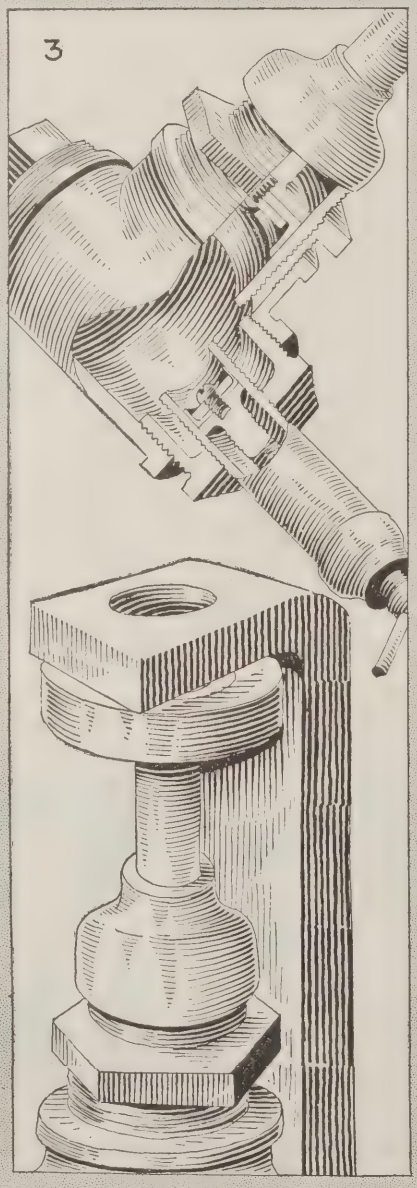


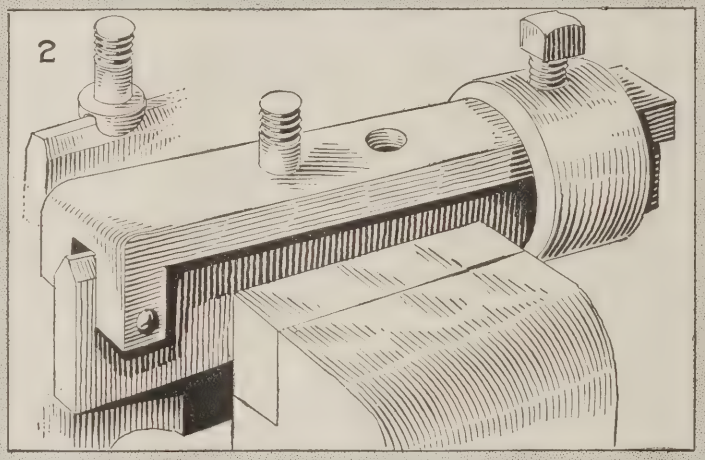


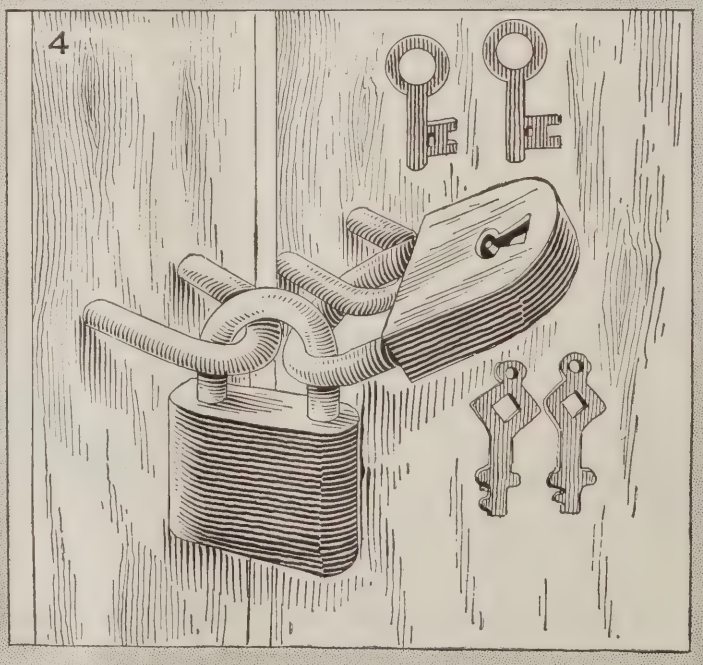
IDEAS AND SUGGESTIONS

1. Cotter pin and nail make fine expansion bolt.
2. Holds machine screws tight without marring.
3. Small hydraulic press.
4. Four men have access to locker by this arrangement.

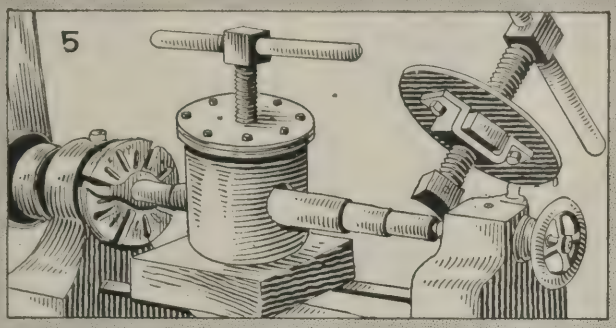




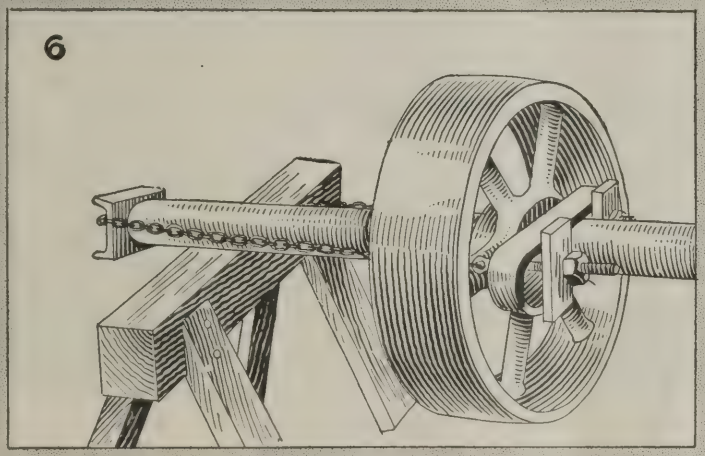


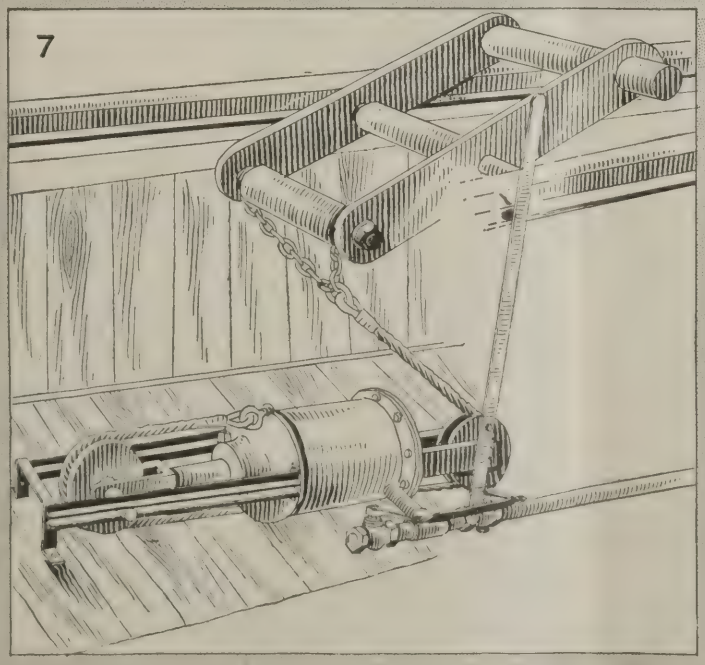


KINKS FOR USE AROUND THE MINE



5. Axle straightening device.
6. Simplifies removal of pulley.
7. Car hoist made of pipe fittings.
8. The cylinder and piston.





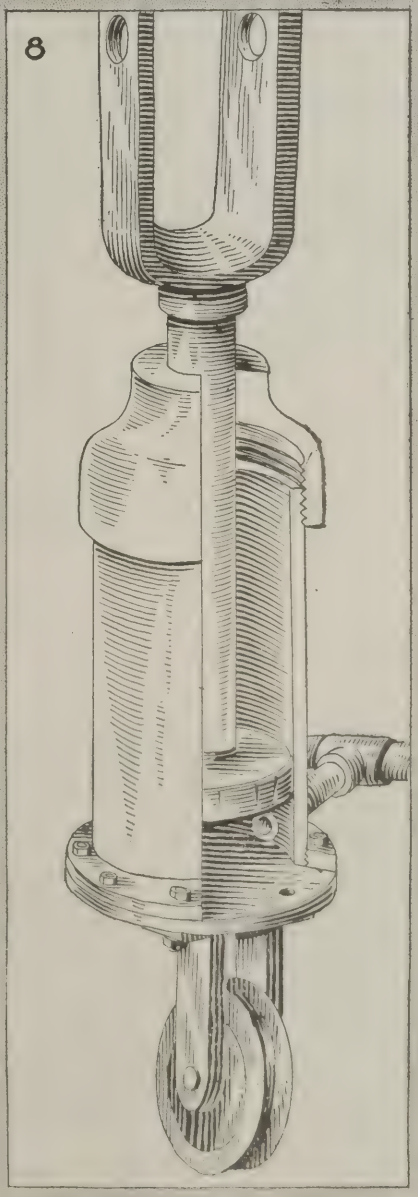




FIG. 1. UNION MINE OF THE LA SALLE COUNTY CARBON COAL CO. IN ILLINOIS

Machine Mining at La Salle, Illinois

By GEORGE W. HARRIS
Editorial Staff "Coal Age"

INDIVIDUAL preference in mining should not be challenged any more than a person's choice of political parties or any other matter about which people differ. Some men prefer to work in a three or four-foot seam, longwall mine rather than in an eight to ten-foot room-and-pillar mine. They become accustomed to the longwall top doing the hard work of breaking down the coal for them and appreciate the good, clear air always sweeping along the working face. Many times longwall men leave their jobs only to return to them again in a short time. If the arduous task of undercutting the coal is done by machinery, then the work of mining is largely reduced to loading the coal into cars, taking care of the top at the face and building pack walls on the part of the longwall miner, or "loader," as he then is called.

One of the best-known longwall regions in the country is in the northern part of Illinois, and here this method of mining reaches its greatest development in Bureau and La Salle counties. It is of historical interest to note in this connection that the first mention of coal in the country which afterward became the United States was in the Illinois River territory. At the end of June, 1917, there were only 14 longwall commercial shipping mines in the first inspection district of Illinois, and their tonnage was only about 2⅓ per cent. of the total produced by the state.

Nevertheless, there are some important mines in this section, and among these are the four plants of the La Salle County Carbon Coal Co. These four plants produced over half a million tons of coal in the year ended June 30, 1917, out of a county production of 885,774 tons. The La Salle company uses Sullivan "Ironclad" longwall mining machines at two of its plants—those which have reached the greatest development. A description of the La Salle plant of this company, together with notes about longwall mining, appeared in the Aug. 8 issue of *Coal Age*.

An illustration showing the Union plant of the La Salle County Carbon Coal Co. is given in Fig. 1. This mine was opened in 1874 and is in Peru, at the west end of the town of La Salle. The newer construction at this

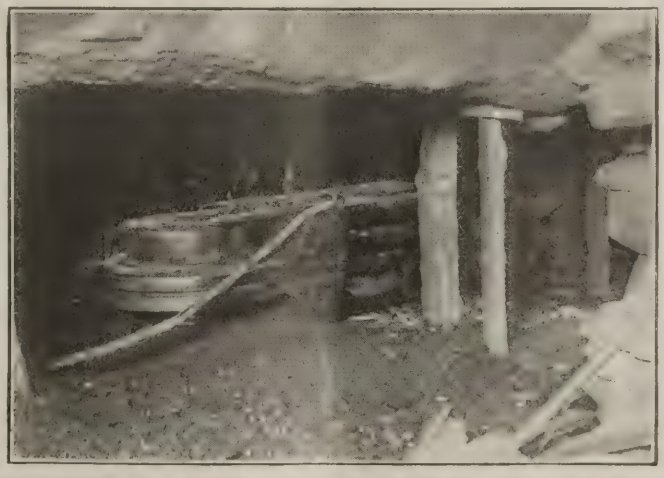
plant is plainly evident in the masonry engine house, the boiler-house stacks and the steel concrete fan. The wooden tipple is probably a survival of the day of timber structures. One of the latest plants of this company, its No. 5 mine, has a fine steel tipple.

At the Union, as well as the La Salle mine, undercutting is done by Sullivan longwall machines, which are shown at work in the mine in Figs. 2, 3 and 4. The seam here averages about 40 in. in height and the undercut is made in the coal. Longwall machine mining is of comparatively recent development in the United States, and it has been stated by one thoroughly acquainted with coal-mining conditions in Illinois that machines will lengthen the life of the longwall field. A few years ago it seemed as if the thin coal field would have a limited life on account of the cost of mining. The introduction of machinery has turned the scale on many other occasions in mining.

Longwall mining machines are made less than 18 in. in height and of a width permitting them to pass inside props set 30 in. from the face. Years ago the chain had three cutter positions; today it has nine in certain types. These longwall machines require no guide rails or props to hold them up to the working face, and they exert no side pressure on roof props, thus eliminating the danger of falling props due to side pressure of the machines. The anchor jack ahead of the machine is usually sufficient support for the chain which constitutes the feed system while the machine is at work. Figs. 3 and 4 show a machine working under bad top. In Fig. 2 the top seems to have held up at least long enough for the cut to have been made. These illustrations represent the working face at the end of a room or haulageway. In Figs. 3 and 4 the top rock either broke flush with the coal or it was in such shattered condition that it was taken down as a matter of safety. At the right side of Fig. 3 the top seems to be so loose that it might fall at any minute. The chain-feed system of handling longwall machines at times constitutes an element of safety for the machine runner. Thus, in Fig. 3, it may be possible for the machine to proceed by itself, to travel without attention from the runner for a time, or until that portion where the roof is exceptionally broken is passed. The runner may follow it after it has passed the danger point or meet it at the next opening. Also, it is stated that the narrowness and solid construction of the cutter bar make it possible to readily free the bar when jammed by falling coal due to roof pressure. Occasionally the top drops down in a solid mass at the face and it may be necessary to dig out a way back of the fall to allow the mining machine to get by.

The scheme of permitting the machine to proceed unattended would be effective only where there would be no interruption to the steady running of the machine. In the mines of northern Illinois sulphur balls and bands are found in the No. 2 seam and destruction of bits occurs at times when sulphur is encountered. At other times a machine runs along steadily for some distance without the bits having to be changed.

A number of details of machine operation and methods of mining are apparent in Figs. 2, 3 and 4. In Fig. 3 the machine is shown sumping under at a room or haulageway. The cutter bar is partly under the coal; and the method of cutting under to begin work is indicated. In Fig. 4 the machine is emerging from behind the gob and pack wall into view at a room; the runner is at his post at the operating end of the machine, holding the power lever in his right hand. He should keep the machine in the right position relative to the seam, blocking it up with loose coal or rock when necessary on account of uneven bottom. The positions of the feed chain and power cable relative to the machine while in operation are quite clearly indicated.







FIGS 2, 3 AND 4. SULLIVAN IRONCLAD LONGWALL MINING MACHINE AT THE WORKING FACE IN UNION MINE

Fig. 2—Machine under fair top. Fig. 3—Machine sumping under. Fig. 4—Forward or operating end of machine with runner at his post.

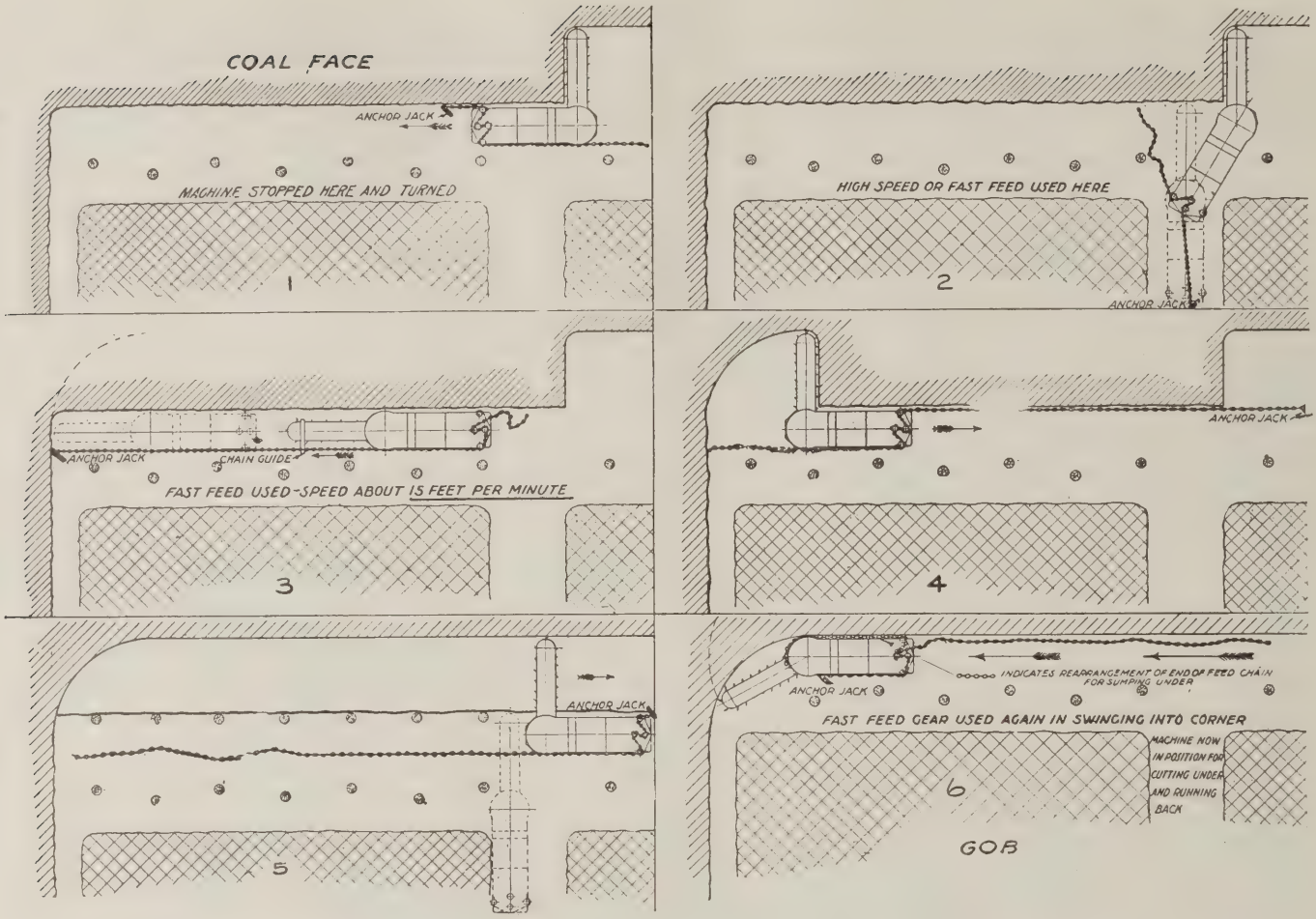


FIG. 5. VARIOUS POSITIONS OF A LONGWALL MINING MACHINE UNDERCUTTING A CORNER IN A MINE

In Fig. 5 is shown one of several methods of undercutting a corner with a longwall mining machine. The cutter bar is arranged so that it can swing through an arc of 190 deg. It may be sumped or cut under the coal with the cutter bar in line with the body of the machine. Under its own power and by manipulation of the feed chain and regular feed, the cutter bar can be swung around into various positions, some of which are shown in Fig. 5. When cutting in either direction the main part or body of the machine travels in advance of the cutter bar. The controlling levers are operated from the front end of the machine, as shown in Fig. 4. The runner also largely controls the movement of the cutter bar, giving it a slight inclination either above or below the horizontal position by blocking up or removing loose material from under the main body of the machine.

Longwall mining has been employed for many years in Great Britain and on the continent, but it has never attained wide popularity in the United States on any extensive scale. It has been confined to a comparatively few localized districts in this country, but its use is likely to be extended as its applicability to the mining of thin seams becomes better known and miners get more accustomed to longwall methods. Longwall mining machines were introduced into Great Britain a number of years ago, and this system of undercutting coal has made rapid advances in British mines. But it is only recently that machine mining has gained much of a foothold in longwall workings in the United States. For many years there has been a determined effort on the part of operators to produce a greater percentage of the larger sizes of coal and reduce the amount of screenings attendant upon both mining and preparation. This incentive and the increasing tendency to utilize machinery about the mines at every possible vantage point indicates a further extension of undercutting machines in longwall work.

For the excellent illustrations accompanying this article *Coal Age* is indebted to the courtesy of the Sullivan Machinery Co., of Chicago, Ill., and to Adam Currie, the superintendent of the La Salle County Carbon Coal Co., through whose assistance the photographs were taken.

Distillation at low temperatures favors the formation of light hydrocarbons of the paraffin series which contain more hydrogen and less carbon than the hydrocarbons of the aromatic group, which are distilled at high temperature. The hydrocarbons of the paraffin series are more stable at high temperatures and on account of their higher hydrogen content are more apt to burn completely without depositing soot than the compounds containing more carbon. It requires one molecule of oxygen to burn completely one atom of carbon, whereas one molecule of oxygen burns completely four atoms of hydrogen. Thus of two compounds having the same number of atoms in a molecule, the one having more hydrogen requires less oxygen for its combustion, and therefore, in the same concentration of oxygen will burn more readily.

What Is the Matter with the Miner?

By A. H. STOW
Pocahontas, Va.

SYNOPSIS—*Why does not the miner load more coal? The average coal digger will produce enough coal ordinarily to enable him to live in his accustomed style, but little more. If the haulage can be so planned that no loader is compelled to wait for cars, he can perform his self-apportioned stint in a short time and may even be induced to raise his standard of a day's work.*

THE question on everyone's lips, the burning question of the hour, is "What is the matter with the miner?" He is certainly paid enough, it is unquestionably his patriotic duty to work, and yet neither of these considerations appears to incite him to mine out more coal. Nevertheless, a simple and natural explanation for this attitude occurs to one familiar with the entire situation. The miner, by dint of industry, could unquestionably double, or nearly double, his earnings of a year ago. Yet were he to double his wages, life, to the average miner, would not be materially brightened thereby, strange as this may seem to the factory worker of the large cities or to the public in general.

In the larger cities, the pleasure that one can get out of life is largely measured by the amount of money that he can get to spend. This, in the average mining camp, is anything but true. The pleasures in the average mining camp are almost too entirely negligible to be worth enumeration. To anyone familiar with the miner's work and with the conditions under which he labors, it is entirely clear that the miner gets about as much pleasure out of a holiday with his friends or with his family, as the case may be, as it is possible for him to get under the circumstances.

Miner Is Actuated by Selfish Motives

From a patriotic standpoint, the miner has not an inch of ground to stand on, so to speak, for not putting his shoulder to the wheel in this critical period. But in the districts remote from the larger cities, which include practically all the mining camps, the people have not awakened to the realization of the seriousness of the situation. Naturally, under these circumstances, the miner is largely actuated by purely selfish motives.

There have been wonderful strides made recently in improving the living conditions around the mines. Within the last few years the improvements in dwellings and in the mining camps generally, owing to the keen competition to secure labor, has been almost startling; and yet, necessarily, the camps are in small isolated communities that do not admit of as large a variety of amusements as the larger cities.

The improvements in the mines have also been equally marked. The mule has been largely superseded by the latest and most carefully designed haulage locomotives. Attempts have also been made, with some degree of success, to improve the mine cars. Speaking generally, the improvements seem almost amazing to one familiar with the conditions that prevailed a few years ago. More, of course, can be done along the lines indicated, and the betterments made by the larger and more progressive companies will no doubt become more general.

However, there is one essential factor that does not appear to have received the attention that it demands or deserves—and a chain is no stronger than its weakest link. The factor referred to is secondary mine haulage. It is not to be inferred that secondary mine haulage is of itself more important than other problems; it is merely that the question of secondary mine haulage today has not received the same amount of attention as other important matters. Naturally, therefore, secondary mine haulage has not shown progress.

Advantages of Secondary Mine Haulage

Until comparatively recently, labor has been in excess of the demand. When this condition prevails, the minimum cost of secondary mine haulage is attained when a sufficiently large number of miners are on any given secondary haul, so that the mule driver or the motorman can always find a loaded car ready almost anywhere. This necessarily means that the miner spends a considerable time waiting for cars instead of being at work. Under the conditions in which the miner lives, it is the number of hours he has to spend underground rather than the actual amount of work done in those hours that he considers a day's work.

With a smaller number of miners on any given secondary mine haul than would be good practice with an excess of labor, the mule driver or motorman occasionally has to wait on the miner to load cars. This results in a somewhat uneconomical secondary haulage cost, and yet it reduces the number of hours that are necessary for the miner in that particular section to stay underground in order to load a given number of cars. Under present conditions this is an important item.

Under normal conditions the increased cost of the secondary mine haulage just referred to can largely be obviated; first, by an ample supply of mine cars, and second, by ample storage space for cars at the gathering parting. Under present conditions it is impossible to make substantial improvements of this kind.

Reducing the average number of miners on the secondary haulage means increasing the number of gathering units, and to add to the number of gathering motors at this time is a serious proposition. For a group of five mines, however, putting one on a mule-haulage basis would give one extra gathering locomotive for the remaining four of the mines—that is, assuming this mine previously had four gathering motors.

Were all mines to make exactly the same improvements along the lines indicated, the result would probably be the same as has accrued from a uniform increase in wages to everyone. The improvements suggested in actual practice are anything but simple and require intelligent handling in order to get results.

Suppose, for example, one mine among a group can materially reduce the amount of time necessary for the

miner to stay underground in order to load the average number of cars requisite for reasonable, comfortable living. When this has been demonstrated to the entire satisfaction of the miners of that mine, the management has a grip on the employees that can be used to material advantage if handled intelligently.

Let us suppose that, at the mine under consideration, a miner can load eight cars in the same time that is required to load five at adjacent mines. The chances are that for the reasons previously given the miner would prefer to load only the five cars, assuming, of course, that it requires only the five cars to afford him the comfort and pleasures in living that he has been accustomed to. However, it is also probable that rather than lose his place at the mine where he can load coal quickly, he will be willing to load six or seven cars.

Unquestionably the improvements suggested mean an increased cost of operation, insofar as the secondary mine haulage in itself is concerned. On the other hand, if the production of a given mine could be augmented through the increased average loading per man, the total average mining costs would be reduced automatically.

Liquid Oxygen Explosives

The Germans have devoted considerable attention to the use of liquid air for blasting purposes, and the Springluft Gesellschaft s.b.H. possesses plants capable of supplying 22 lb. of rectified liquid oxygen per hour, at a net cost of less than one penny per pound. The liquid oxygen is stored in a modified dewar flask, usually of brass or thin steel, the jacket space being filled with charcoal, which absorbs any small amount of gas escaping through the pores of the metal. In utilizing the liquid oxygen for blasting, lampblack has been found the most satisfactory combustible material. Cartridge cases of cardboard are filled with the lampblack, and then immersed for some time in a tank containing the liquid oxygen, so that they become thoroughly impregnated just before use. They are usually fired by a small primer, preferably ignited by electricity. Oxyliquite is stated to be efficient for mining work on account of its *brisant* qualities, but is less suitable for quarry work. It is considered safer than the explosives generally used, since the cartridge is only explosive for 10 minutes ater saturation with oxygen.



Coal will win the War

THE COAL ARMY

Written expressly for COAL AGE
by BERTON BRALEY

The Trapper

I'm only a kid at a swingin' door
  Who's lettin' the coal cars through;
But I guess I'm helpin' to win the war.
I'm doin' my best—an' I can't do more;
  I'm right on the job, are you?

The Pumpman

I keep my pumps a-runnin' an' drive the water out
  So men can do their duty, from collar to the sump;
I'm helpin' lick the Germans, there isn't any doubt,
  By stickin' like a soldier, a soldier at the pump.

The Shaftman

I'm one of the shaft division, who's keepin' the cables fit
  An' watchin' the plates an' timbers, an' seein' that things is right;
For doin' my daily labor is part of my soldier's bit,
  I'm one of the coal mine army, that's helpin' to win the fight;
By lookin' the long shaft over, an' tendin' to its repair
  I'm backin' the boys in khaki who're riskin' it "over there."

The Hoisting Engineer

Hand upon the lever, eye upon the drum,
  Snatchin' up the loaded cars, droppin' empties back,
That's the job they pay me for, makin' cages hum,
  Helpin' put the Kaiser an' his army on the bum!
Coal to make munitions that'll hit the Hun a crack,
  That's the stuff I'm bringin' up, hoistin' from the mine,
Hand upon the lever, eye upon the drum,
  Backin' up the soldiers in the fightin' line!

In the Breaker

Seem's like we're nearer to the front, we boys,
  Than other guys who work around the coal.
You see the breaker makes a lot of noise
  Rumblin' like cannons where the battles roll.
So we kin think we're soldiers in the war
  Fightin' against the dirt an' waste an' slate.
Yes, that's the duty that we're put here for,
  An' we can help by tendin' to it, straight!

The Miner

I'm a sapper, diggin' deep to get the coal,
I'm a first or second cousin to the mole,
  An' my job is to attack
  All the coal seams, rich an' black
An' to make old Mother Nature pay her toll;
So I arms myself with powder-stick an' drill,
An' I works with all my cunning an' my skill,
  For we've got to win, it's clear,
  An' a miner, over here,
Has to do his share in lickin' Kaiser Bill!



Do your share in lickin' Kaiser Bill

Rewinding and Testing Direct-Current Locomotive Armatures

By FRANK HUSKINSON
Lafayette, Colo.

THE average mine electrician is familiar with the rewinding and testing of direct-current armatures, but at the same time I believe that practical men are at all times ready and willing to read a description of the methods and "stunts" employed by the other fellow. It has always been my policy to pass information along, and I feel confident that this short article will not only be welcomed, but that it is needed to clear up mental cobwebs and prevent the rust from accumulating.

A familiar scene is shown in Fig. 1. This is a W-H No. 58 locomotive armature ready for rewinding. In Fig. 2 the same armature is shown partly rewound. Take a glance at old "Long Tom," Fig. 3. This is a Goodman 10-ton locomotive armature, partly rewound, one of the oldtimers. In the foreground of Fig. 4 we have a Crocker-Wheeler 7½-hp. pump motor armature, ready for rewinding, while in the background may be seen a Jeffrey and a Goodman locomotive armature stripped of all coils.

The windings used in direct-current armatures may be divided into two classes—multiple or lap winding, and series, two-circuit or wave windings. The series, two-circuit or wave winding is the kind that will generally be found employed on mine-locomotive armatures, and this type is found in use on nearly all direct-current armatures intended for service in and around coal mining plants.

The characteristic shape of the coils for lap-wound armatures is shown in Fig. 5, while those for wave-wound armatures is shown in Fig. 6. The open-slot type of armature is used almost exclusively in direct-current armatures. The mold-wound coils, which can be used with open slots only, have many electrical and



FIG. 2. ARMATURE SHOWN IN FIG. 1, PARTLY REWOUND

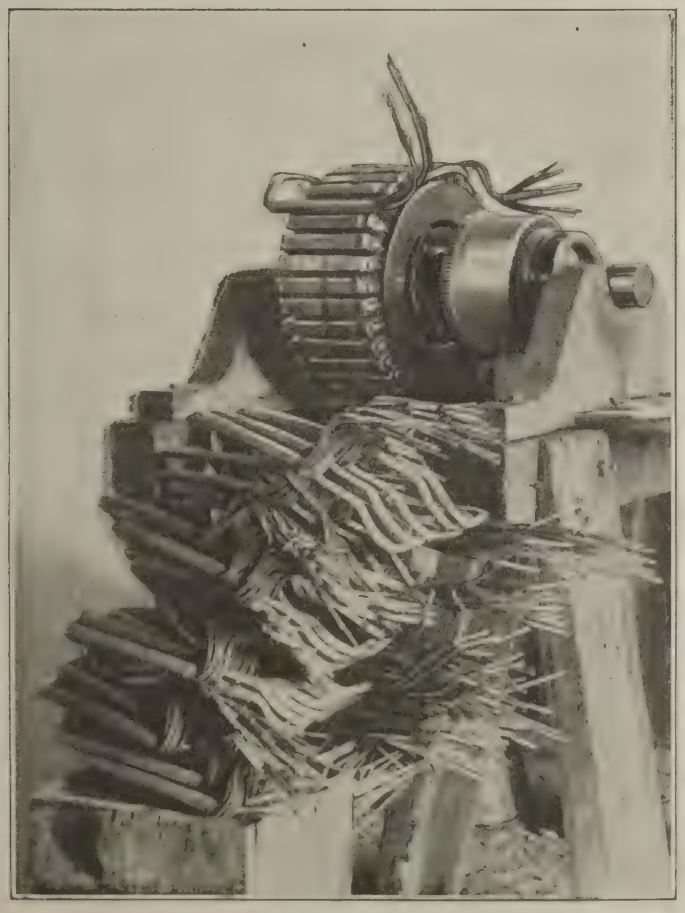


FIG. 1. LOCOMOTIVE ARMATURE READY FOR REWINDING

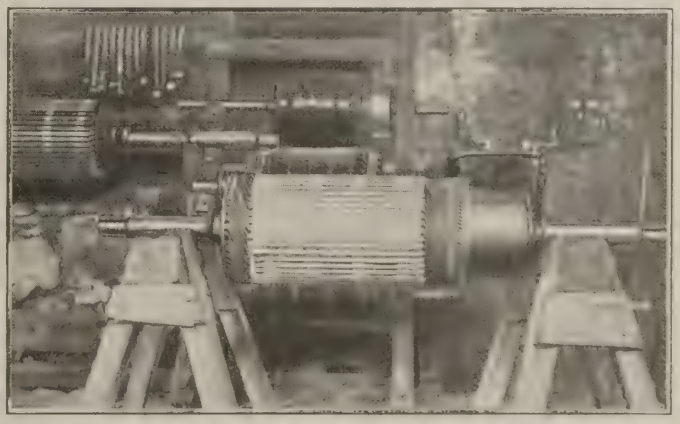


FIG. 3. OLD LOCOMOTIVE ARMATURE PARTLY REWOUND

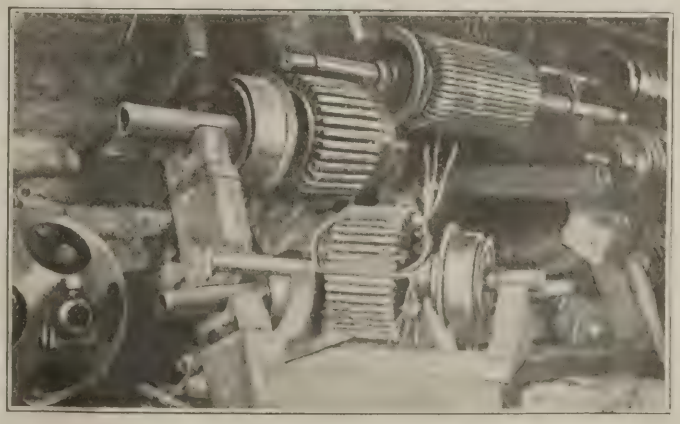


FIG. 4. PUMP AND LOCOMOTIVE ARMATURES

mechanical advantages over the other types, and the open slot has come into common use.

The form of coil generally employed is the diamond coil. This is frequently made in one of the shapes shown in Figs. 7, 8 and 9. In the one-piece series diamond coil, Fig. 7, the leads at the end of the straight parts are either strap- or wire-wound. Fig. 8 shows a

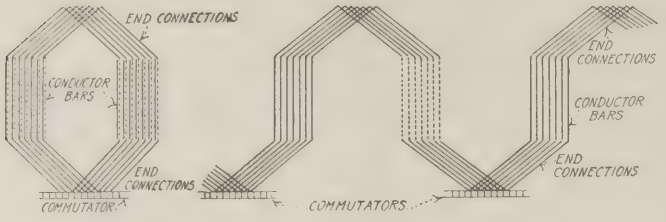


FIG. 5 FIG. 6

FIGS. 5 AND 6. CHARACTERISTIC SHAPE OF LAP AND WAVE-WOUND COILS

one-piece series diamond coil with leads at the ends of the straight parts. Fig. 9 shows a two-piece series diamond coil, Fig. 10 a one-piece multiple diamond coil with leads at the point of the diamond, and Fig. 11 a two-piece multiple diamond coil.

The diamond coils, when completely insulated before they are inserted in the armature, can be used in open slots only. Their great advantage is the easy and simple manner in which they can be manufactured, especially in large quantities, which makes them well adapted for standard machines.

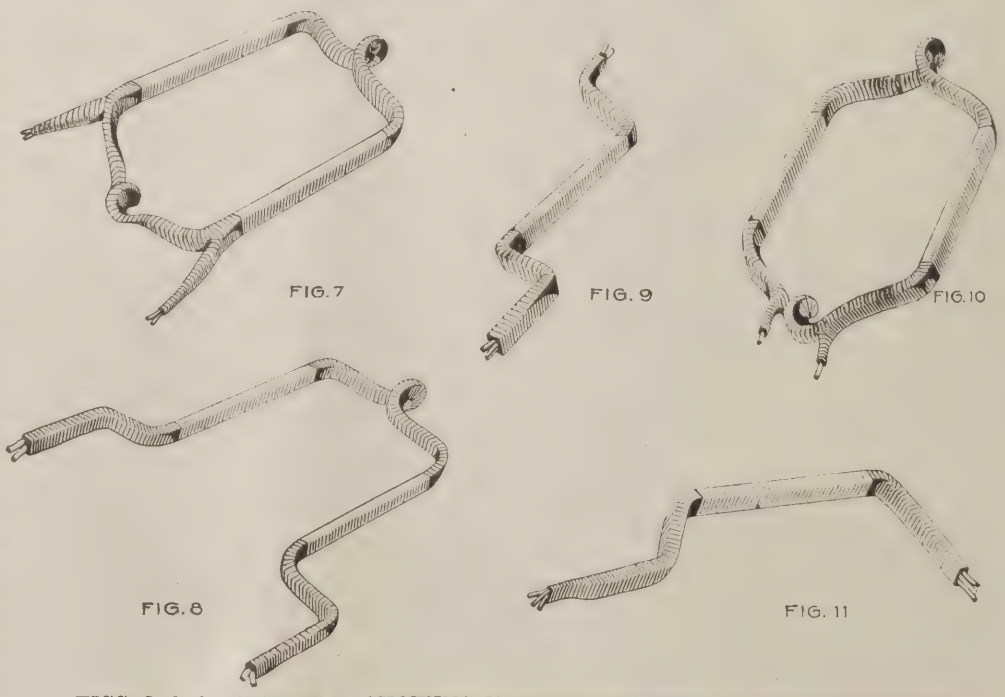
Since all the coils used on the one type of machine are of the same size and shape, only one winding mold over which to form them is necessary. Moreover, the number of spare parts which must be kept on hand for repairs is reduced, and repairs can be made easily and in a minimum of time.

From the electrical point of view, the diamond type of winding possesses the advantage of being absolutely symmetrical. Hence there is no tendency for the unbalancing of voltages due to the differences of self-induction, and in closed windings there is no tendency to produce internal circulating currents. Pitch, or spread of coils, is illustrated in Fig. 12, which shows a single drum-wound coil in a multipolar field. The sides of the coil A and B should be separated by about the same angle C as the angle D between adjacent poles. The angle C is often referred to as the pitch or spread of the coils, or winding pitch. The angle D is called the angular pitch of the poles. The spread of the coils may differ a little from the angular pole pitch without affecting the action of the machine, but if the difference is large there is liable to be sparking at the brushes. The single-series winding is the principal type in use. In the series type of winding, sometimes called wave winding, the coils are connected to segments removed from one another by approximately the angle of two poles. On a single-series armature the number of coils and commutator bars must always be such that a series of $\frac{P}{2}$ coils connected to bars equidistant from each other will encircle the armature and terminate in a bar adjacent to the one from which the series started. That is, $N = \frac{P}{2} \times Y \pm 1$, in which N is the number of commutator bars or coils, P is the number of poles and Y is a number called the pitch of the connections, or the connecting pitch, it being the number of bars passed over between the terminals of a coil.

In most cases the connecting pitch of an armature is + (plus) 1, commonly called "one over." The advantage of connecting one over is that sometimes in repairing an armature all of the leads are removed from the commutator and it happens that several are broken off close to the commutator. The leads can be reconnected — (minus) 1, or "one under." By this method the broken leads that would have been too short to connect to the commutator one over, will probably reach when connecting one under. The only difference that the change in reconnecting from the one over to the one under will make in any armature is the direction of rotation. That is, changing the armature connections from one over to one under, also changes the direction of rotation in that armature; but as this is a simple matter to adjust at the motor or controller, it will not make any difference.

On four-pole motors the pitch of the coils, or the winding pitch, is usually a little less than one-fourth the number of slots. The throw of the leads must be such that the brushes will rest on bars connected to face conductors in the neutral region.

In the rewinding of any armature the only practical and safe method is the following: The core is cleaned, all slots are filed out, and all sharp corners and edges are removed. The commutator is cleaned and all slots for the leads are cleaned out and tinned. The mica



FIGS. 7, 8, 9, 10 AND 11. SHOWING VARIOUS SHAPES OF ARMATURE COILS

rings on both back and front of the commutator are cleaned and given a coat of shellac varnish, after which a cord band is wound on them. This band is then given a couple of coats of shellac varnish. The commutator is given a thorough test for grounded and shorted bars, with a lamp and test terminals in series. After all the "bugs" are removed from the commutator, all parts of the core that need it should be insulated and painted.

Next find the proper pitch of the coils and the connecting pitch of the leads. For example, assume a four-pole machine, with 35 armature slots and 105 commutator bars, $N = \frac{P}{2} \times Y \pm 1$. In this instance $\frac{4 \times 105}{2} = 52\frac{1}{2}$, called in this case 53, $53 + 1 = 54$, which gives the connecting pitch of 1 and 54; that is, one lead of the coil connects to bar 1 and the other end of this coil connects to bar 54. The next coil leads connect into bar 54, then connect to bar 107, recounting the bars 1 and 2, see Fig. 13. This is called

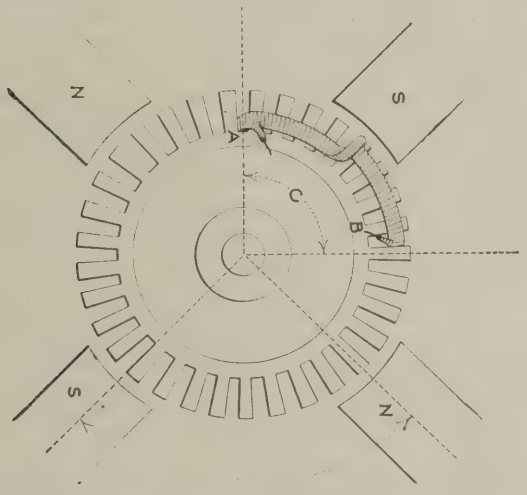


FIG. 12. ONE COIL IN A MULTIPOLAR FIELD

one over, or plus. The connections can also be made as shown in Fig. 14. This is called one under, or minus.

After determining upon the proper slot pitch of the coils and the connecting pitch proceed to put in all of the coils, using the proper amount of insulation in the slots and between the parts of the coils, etc., and keeping them shaped properly. As each coil is placed in the slots the bottom leads are connected to the commutator. The proper slot pitch for the armature in the example chosen—that is, with 35 armature slots—will be 9. This means that the top part of the coil will go into slot 1, while the bottom part will go into slot 9.

After all the coils are in place, and all of the bottom leads are in the commutator slots, tie a wire around the commutator so as to short-circuit, or connect all the commutator bars together, and then make a test for grounds. Remove this short-circuiting wire and cut off all surplus from the leads that are connected to the commutator; separate all of the top leads, and make a test for rotation as follows: Place one terminal of the lamp-test set on a commutator bar, marking this bar, then with the other test terminal touch the top leads until the proper coil is found—that is, until a coil lead is found that the lamp will light up on. Still leaving the test terminal on the same bar, touch the leads on each side of the one where the lamp lights up. Getting no light from these leads indicates that the lead that the lamp lights up on is O. K.

If the lamp lights up on more than the one lead at a time, it indicates that the leads are either crossed or shorted together, or else the commutator bars are shorted together. Make this test all the way around

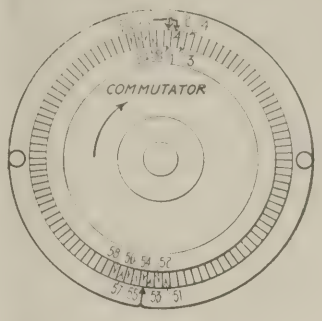


FIG. 13

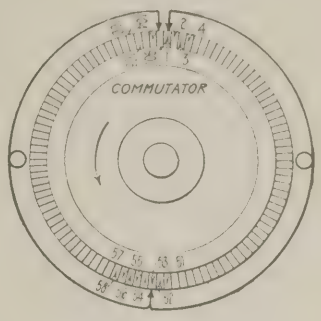


FIG. 14

FIGS. 13 AND 14. ONE OVER AND ONE UNDER WINDINGS

the commutator by moving the test terminal one commutator bar at a time, and then touching the top leads with the other test terminal until the lamp lights up. The top leads should test out in rotation. As the leads are tested separate them and lay them out in rotation as they are to go in the commutator.

Next insulate the bottom leads and find the proper connection for the top leads. Then proceed to put in the top leads all the way around the commutator. When all the leads are in place make another test for grounds. In making this second test for grounding it is not necessary to tie a wire around the commutator as the coils are all interconnected now. Finding the armature clear of grounds, make a test for circuit by touching the test terminals of the lamp test set, on the commutator. The lamp should light up no matter to what parts of the commutator the test terminals are touched. Finding everything all right, the next step is to solder all leads in the commutator and shape all coils to place, then give a coat of thin shellac varnish or other insulating paint. Next insulate and put the band wires on, taking care that the tension on the band wire is steady and fairly tight. The proper tension to use in

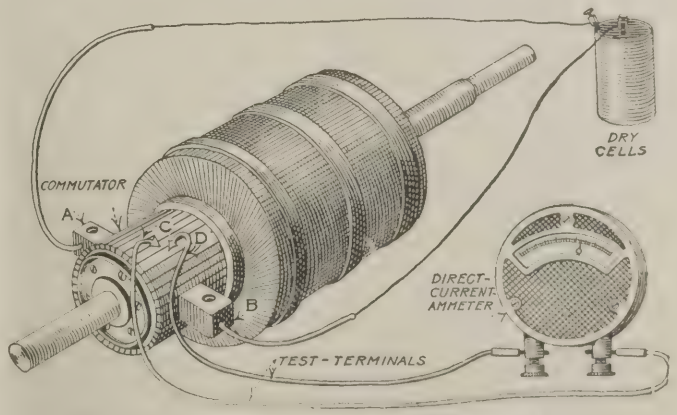


FIG. 15. HOMEMADE TEST SET IN OPERATION

banding an armature is a matter of judgment on the part of the winder, since this depends on the size of the armature and size and kind of band wire, also the speed and the service at which the motor is to be used. Solder the bands and give the clips a little extra solder;

then true up the commutator by putting the armature in a lathe and taking a cut or two off the commutator. Next proceed to make the following tests: Test for ground, then successively make a bar-to-bar test for open circuits, short circuits, poor connections and reversed leads.

A reliable and satisfactory test set that can be made at any mine and used in making the bar-to-bar test is shown in Fig. 15. It is constructed as follows: Take a common switchboard or portable ammeter, direct-current type, and leave out the shunt. Connect two test terminals as shown at *C* and *D;* connect about four dry cells in series to the points *A* and *B*. On the commutator of some armatures it is necessary to move these points closer together than is shown in the diagram, in order to get a reading on the ammeter. This can be found only by test. Take the two test terminals *C* and *D*, and touch adjacent commutator bars. If the

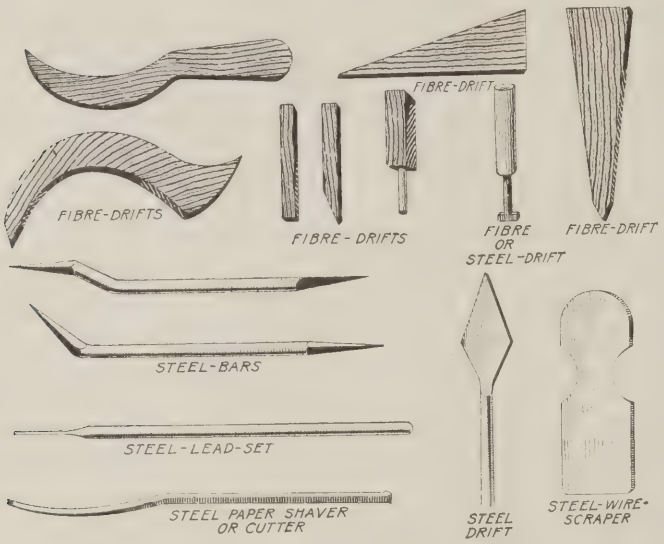


FIG. 16. A FEW ARMATURE REWINDING TOOLS

coils are all right the ammeter will read approximately the same on every two bars between *A* and *B*. After testing all bars between the points *A* and *B* move the points *A* and *B* around a little and test again until all of the commutator bars have been tested in this manner.

If a coil or a commutator bar is shorted the reading on the ammeter will be practically zero. If the coil is open-circuited there will be no reading on the ammeter until the open is bridged by the test terminals, when there will be a very high reading, throwing the ammeter needle violently across the dial. If the coil is reversed—that is, if the leads are crossed—the reading on the ammeter will be reversed. If the coil is poorly soldered or connected to the commutator bars the reading on the ammeter will be high. A little practice will enable anyone to make rapid and thorough tests with a test set like the one just described.

In the rewinding of any armature the success of the winder depends greatly upon the methods employed. In rewinding an armature it is advisable to be careful, neat and particular from the start to the finish. Never get in a rush and start to slap the coils or connections in any old way, as this does not pay. Do not strike a coil with a hammer; always use a piece of fiber between the coil and the hammer. A rawhide hammer is useful in rewinding, as the blows from such a hammer will not damage the coils. In tapping the coils into place and into the slots always use a fiber drift of the proper size and shape. In Fig. 16 are shown a few of the common armature-rewinding drifts and tools.

All armatures after rewinding should be tested for balance. The armature is mounted on two exactly horizontal knife-edges. If it shows a tendency to rotate, it is out of balance. Weights are applied wherever needed to correct unbalancing.

Legal Department

FORFEITURE OF LEASES FOR NONPAYMENTS.—Before a court will decree forfeiture of a mining lease because of failure of the lessee to make stipulated payments, it must appear that the lessor, not only has an equitable right to forfeiture, but also that he cannot obtain adequate redress by means of suit to recover the payments due. (Indiana Appellate Court, Rembarger vs. Losch, 118 Northeastern Reporter, 831.)

NEGLIGENCE AS TO UNEXPLODED CHARGES.—If an unexploded charge of dynamite was negligently left in a mine entry wall, and the operator's foreman negligently permitted plaintiff, a miner, to work at the place, drilling a hole nearby, and injury resulted to plaintiff, the assignment of plaintiff to work at that point constituted actionable negligence, entitling him to recover. (Oklahoma Supreme Court, Corrigan vs. Oklahoma Coal Co., 171 Pacific Reporter, 47.)

INJURY TO UNINVITED PERSONS.—The fact that defendant company gratuitously furnished one of its engines and flat cars, used exclusively in coal-mining operations, to convey the remains of two of its miners, who had been killed at work, and their friends and relatives to the cemetery where interment was made, did not render the company liable for accidental injury to plaintiff, who boarded the car without invitation and rode on the return trip and who fell to the ground while one of defendant's representatives was assisting the persons on the car to alight by means of a plank placed from the ground to the car; there being no proof of any wanton or positive negligence on the part of the company or its employees. (Kentucky Court of Appeals, Laxton vs. Wisconsin Steel Co., 201 Southwestern Reporter, 15.)

WHEN AN OPERATOR MUST AFFIRMATIVELY DISPROVE NEGLIGENCE.—The general rule of law that when an employee sues to recover damages the burden rests on him to affirmatively establish negligence for which defendant employer was legally responsible is modified in Iowa by the drastic provision of the Workmen's Compensation Act: "In actions by an employee against an employer for personal injury sustained, arising out of and in the course of the employment, where the employer has selected to reject the provisions of this act, it shall be presumed that the injury to the employee was the direct result and growing out of the negligence of the employer; and that such negligence was the proximate cause of the injury; and in such cases the burden of proof shall rest upon the employer to rebut the presumption of negligence." Applying this provision in the case of Mitchell vs. Phillips Mining Co., 165 Northwestern Reporter, 108, the Iowa Supreme Court holds that plaintiff having proved that a miner sustained fatal injury through a fall of slate from defendant's mine roof, while the miner was performing duties of his employment, and that defendant had rejected the provisions of the Workmen's Compensation Act, the proof was sufficient to sustain recovery against defendant, in the absence of affirmative proof by defendant of its freedom from negligence.

A Uniform Cost Sheet

SYNOPSIS—*Each operator presumably has filled out Federal Trade Commission blanks, reporting on the monthly coal cost, income and coal tonnage for the current year. He is supposed to be familiar with the details of this task. Nevertheless, there has been some uncertainty as to just what is required in this report. The Winding Gulf Operators' Association considered it worth while to have a committee, made up of members from its organization, thoroughly investigate the whole matter. The report of the committee on the uniform cost sheet, with instructions as to its use, is most timely and the suggestions made should be of interest to operators generally. A full discussion of this matter might influence new rulings which are expected to be made for the year 1919.*

"COAL is costing too much. I noticed by our cost sheet this morning that it was 11c. higher last month than the preceding month, and we will have to locate the items which caused this and do better." This statement was made by the general manager of a large coal company to his superintendents of mining and preparation. It suggests one successful method of management. When the total cost seems excessive, a careful analysis of all the items entering into the mining and preparation of coal would often enable a manager to put his finger on the trouble at once without going out of his office.

Another equally successful manager might get at the matter in an entirely different way. If the cost of placing coal on cars was too high, he would depend on locating the trouble out on the ground. It is difficult to find this manager in his office. He spends his time out around the breaker or tipple, down in the mines and at every point about his plant where men are at work, where supplies are being used, noting the efficiency or failure of methods. Both men emphasize the importance of attention to details. One man reads his cost sheet, the other depends more on personal observation.

Question of Costs Now Receiving Attention

Today most of the large coal companies and the more progressive operations have more or less elaborate cost sheets in which all the items entering into expense and receipts accounts are carefully distributed. During the last year or so great attention has been given to costs all over the United States. This is due in many cases to the impetus given the matter by the Washington authorities. In this connection a report of a committee of the Winding Gulf Coal Operators' Association of West Virginia is most interesting. The members of this association are operating in the southern part of Raleigh County, West Virginia, on lines of the Virginian and the Chesapeake & Ohio railroads. The committee in question, after a thorough investigation reported on the uniform cost sheet of the Federal Trade Commission with instructions as to its use; a local interpretation is given to some features of the standard cost sheet for the guidance of the association's members in filling out the required monthly report. However, the operators in the field in question are progressive and their opinions should be of interest to coal men not only in other sections but also in other states.

This report notes that the United States Fuel Administrator has stated officially that the question of the selling price of coal is one that is open to constant review; that cost engineers are continually examining the cost sheets in all the coal districts in the country. The Winding Gulf committee finds that one of the most important questions in the coal-mining business today is to see that the proper charges are made against the cost of coal. It is of special importance that each individual operator returns as fair and accurate a cost report as practicable, in view of possible future adjustment of the selling price of coal.

Note is made that the basis upon which the selling price is fixed is entirely upon cost. Since this report was published the Fuel Administration has ruled that a bonus of 20c. a ton may be added to the Government price in the case of operators who use special means for eliminating inpurities. Later a further effort to insure the loading of clean coal was made in an order enforcing operators who failed to comply in this respect to either clean the coal or accept 50c. a ton less than the Government price. The committee earnestly recommended that a uniform system of coal cost accounting be seriously considered by each individual operator with a view of standardizing all accounts. It would greatly facilitate the work of the Federal Trade Commission and the Fuel Administration if all operators acted on this suggestion.

Scope of the Standard Cost Sheet

The 1918 standard cost sheet seeks first of all to arrive at the total mining cost, which is divided into labor and supplies. Labor is subdivided as follows: (a) Mining; (b) yardage; (c) haulage; (d) tipple; (e) removing stripped coal; (f) power; (g) washery; (h) other operating labor; (i) maintenance and repairs—(1) structures, (2) equipment; (j) superintendence and engineering. In its report the Winding Gulf committee disregards the items (e) removing stripped coal and (g) washery, as these accounts do not enter into the costs of the Winding Gulf operations.

Each of the subdivisions has a further subdivision. Supplies are subdivided as follows: (a) Mine timbers; (b) feed and other stable supplies; (c) power house fuel; (d) power purchased; (e) water purchased; (f) washery supplies, including water; (g) other operating supplies; (h) maintenance and repairs—(1) structures, (2) equipment. The items (e) water purchased and (f) washery supplies are disregarded in the Winding Gulf report and an additional account, "explosives used," is specified. In connection with the item (b) feed and other stable supplies, note is made that operators should inventory their stable account at the end of each month and close the account for the month. The labor at the stable should be charged under the head of "haulage." The feed used should be charged to "feed and other stable supplies." A stable account should be opened at

the beginning of each month, charging it with the inventory of the previous month.

The Winding Gulf report states that the gross cost of labor and supplies is now complete. To obtain the total operating cost several other items should receive consideration. Among these items is the profit or loss on the powder house; to obtain this the inventory of the magazine should be taken at the end of each month. The magazine account should be opened on the first of each month, charging it with the stock on hand. The gross returns from smithing should go into this operating account as well as the gross returns from the power house and the substation. The net debit or credit balance for mine checks, unclaimed wages and any other accounts in the mining business should be considered, and the total debit or credit either added or deducted to obtain the total operating cost.

Under fixed charges and general expense are included (a) royalty, (b) depletion and (c) depreciation. Royalty is arrived at on leased lands according to the terms of the leases. As to depletion, the Winding Gulf committee states that some confusion exists as to the correct interpretation of the matter. The committee advises those who purchased property prior to Mar. 1, 1913, to deplete on the value en bloc as of Mar. 1, 1913. If purchased after that time deplete on the original cost, on the assumption that this position will be sustained by the courts.

In regard to depreciation the committee states that the question of depreciation on mining property is one about which no two people hold the same view. This is a most interesting and important matter; after diligent research and much investigation the following was recommended by the committee: All structures which are directly engaged in the mining of coal should be listed at their original cost under this head; all equipment used directly in the mining of coal should be listed at original cost and be placed under this head; all development of mines in question, including the sinking of shafts and slopes, the driving of tunnels through faults over 50 ft. in length (other development work of like character should be included) should be listed and be placed under the head of development. These three items together with a fourth—(d) miscellaneous income—are all taken into account in the cost of coal. Under this last item are included outside investments not included in the first three classes.

After the structures account has been opened up the following depreciation is recommended:

	Per Cent.		Per Cent.
Wooden tipples, complete	8	Churches and schools	4
Steel tipples, complete	5	Squire's office and jail	4
Wooden power house (building)	7	Sand houses	4
Stone or brick power house	5	Postoffice building	4
Machine shop—wood	8	Substation—wood	7
Machine shop—stone or brick	5	Substation—stone or brick	5
Supply house—wood	8	Humidifier building—wood	7
Supply house — stone or brick	5	Humidifier building—stone or brick	5
Blacksmith shop—wood	8	Powder house — concrete, stone or brick	10
Blacksmith shop—stone or brick	5	Wash house—wood	10
Stable building—wood	8	Wash house—stone or brick	5
Stable building — stone or brick	5	Fireproof vaults	4
		Freight stations	10
		All other small buildings	10

After the mine development account is opened up, depreciate as follows:

	Per Cent.		Per Cent.
Clearing property	5	Diamond drill holes	5
Creek changes	5	Tram roads	20
Wagon roads	5	Mine development	10
Slopes and shafts	5		

After the equipment account is opened up depreciate as follows:

	Per Cent.		Per Cent.
Dynamos and engines	8	Mine wagons (cars)—steel	17
Boilers	11	Mine locomotives	10
Pumps, heaters and other power house equipment	8	Mining machinery	20
Header lines	8	Electric drills	20
Fans	5	Stable equipment	25
Water tanks	7	Patent mine doors	20
Railway sidings and approaches	7	Copper wire	7
Humidifiers	12½	Supply house fixtures	10
Telephone lines	10	Post office equipment and fixtures	7
Saw mills	10	Fire equipment	20
Hoists	7	Air compressors	8
Incline drums and larries	10	Good roads machinery	10
Incline ropes	33⅓	Shop fixtures and machinery	7
Cage ropes	50	Stationary motors	7
Hoist engines	7	Watchmen's clocks	10
Mine telephones	20	Pipe lines in mines	33⅓
Mine pumps	20	Barber shop fixtures and barber shop	10
Steel rail	10		
Mine wagons (cars)—wood	20		

In connection with the miscellaneous building and fixtures account, depreciate as follows:

	Per Cent.		Per Cent.
Theater building	6	Store and office buildings —stone or brick	5
Theater building fixtures and poolroom	20	Furniture and fixtures in same	10
Store and office buildings —wood	6	Tenement houses	6
		Club house furniture	15

It is assumed in charging up the various depreciation items against coal that the revenue derived from this source will constitute a working capital and not be distributed as dividends. It is further assumed that the depreciation percentages given are for one year and that this fact is taken into account in making out monthly reports.

Before arriving at the total mining cost of coal, there are a number of other charges which should receive consideration. Among these are deferred charges, incuding unrecoverable royalty, which will have to be figured out in individual cases. Further, the executive committee of the National Coal Association advises that an account be opened up under the head of special maintenance, to which should be charged coal at the rate of 5c. per ton to take care of the abnormal cost in the present mine equipment. In other words, to charge to this account those parts of the cost of material and equipment which are above normal prices and which are used in capital accounts only. Then gradually work off, through this 5c. per ton per month, the abnormal cost of material and supplies going into capital accounts.

The Winding Gulf committee also would open up a contingent account to take care of explosives and other damages beyond human control. After due investigation and advice the committee feels that special maintenance and contingent accounts should be included, notwithstanding the fact that they have not been allowed by the Federal Trade Commission.

It is advised that all state excise and corporation taxes, county taxes, United States Government stock taxes, and, in fact, all taxes except United States income and excess profit taxes should be charged and prorated to the different departments to which they belong. The suggestion is made that the previous year's taxes along these lines be taken and then apportioned one-twelfth of that amount each month and charge it up to the proper departments. Set this amount off as a reserve for these taxes and the last month in the year reconcile this account with the amount actually paid.

Similarly with insurance. The premiums on all fire insurance that properly belong to the mining property directly engaged in the mining of coal should be charged

to the cost of coal. Thus the insurance on the store building and stocks should be charged against the rent account; fire insurance on other subsidiary lines of business, not directly engaged in the mining of coal, should be charged to the proper account. It is further advised that the entire amount of premium paid for explosion and use and occupancy insurance be charged against coal under the head of general insurance. It is suggested that the total cost of all this be figured out from the policies for one year and then one-twelfth of the total amount be charged each month.

All officers' salaries and office expenses, with some possible exceptions (in West Virginia—the scrip clerk), should be charged against coal. If there is a shipping clerk or clerks of any kind who spend their time at the mines, their time should be included in the two items, officers' salaries and office expenses. All legal expenses except those expenses incurred for personal injury accounts or legal expenses incurred in acquiring new property should be charged against coal under the item legal expenses. The total operating cost and the total fixed charges and general expenses are now available; adding these costs, charges and expenses together gives the total mining cost of coal.

The committee now turns to coal tonnage. This should include the tonnage furnished employees, or sold at the mines, power house, and shipments—rail or otherwise. This tonnage is to be taken from the returns from sales agents for the coal shipped and the accounting of the company's force at the mine for coal used and coal delivered at the tipple. Following the tonnage, as to quantity, is a space for recording the cash returns for coal sales. This account is made up from the returns from sales agents together with the accounts kept at the mines for coal used and coal furnished.

Under coal inventories are spaces for an inventory at the first of the month, at the end of the month, and increase or decrease, as the case may be. Under production tonnage are included total sales derived from detailed tonnage accounts. If coal has been purchased it should be deducted from total sales. The inventory should be added in event of increase or deducted in case of decrease. The final result is the production tonnage for the month and represents the coal dumped over the tipple. It is the divisor to be used to divide the total mining cost previously obtained.

As to selling cost—this includes (a) commissions, (b) advertising, (c) salesmen's salaries and expenses, (d) officers' salaries and expenses, (e) clerical salaries and office expenses, (f) uncollectible accounts and (g) miscellaneous. There are two columns under selling cost—amount for the current month and the amount Jan. 1 to and including the current month. The committee did not instruct definitely under this head, as many of the operators have contracts with selling agents who remit net at the mines so much per ton. To such operators this fact should be thus stated on the return. Many operators sell their own coal, have pooled their interests with others, or have special arrangements with selling agents. Those operators who make a return on selling cost should include the tonnage returns by the sales agents and the coal sold at the tipple. Coal used in a power house should not be considered, as it carries no cost for selling.

Under income statement, the Federal Trade Commission endeavors to arrive at the real money a company has received. Little comment seems to be necessary up to the point where the profit from coal is noted. Under miscellaneous income the Winding Gulf committee states that the operators should show the profit or loss each month from their dwellings. Dwellings should be credited for rent collected and charged with ordinary repairs, with their proportion of the insurance, taxes and depreciation. Also the stores and any other part of an operator's business indirectly engaged in the mining of coal should be so handled. As the Winding Gulf fields at this time have no private transportation lines or coke ovens, these features are not touched upon. However, net receipts from any other profits, as well as proper depreciation charges, should be included in miscellaneous income. Under deductions from income are noted (a) taxes (income and excess profits) and (b) interest. The committee considers that these items are more or less in the nature of an estimate; a reserve should be set aside each month on a company's books. When the annual income and excess profit tax is paid, the amount should be charged to the tax account and the cash account be credited. Similarly with the interest.

In connection with charges to fixed assets, the committee reports that if a company has spent any money on its property in the way of betterments that these amounts should be included.

Under general information the comment is made that the Federal Trade Commission has advised that the word "semi-bituminous" be used in answer to the kind of coal. Further, that for the field in question that "New River" be used in the column marked field; and that "Beckley" be used for number or name of seam—or "Sewell" or "Pocahontas," as the case may be.

The Winding Gulf committee concludes with the statement that it "has labored patiently with reference to this whole question and respectfully submits this report with the understanding that, in its opinion, it is the best advice and information that can be furnished at present on this matter. The whole question of coal cost accounting, as laid down by the Federal Trade Commission, as outlined in the foregoing, is good only for the year 1918. No doubt as we progress further along in this matter, new ideas and rulings will be made for the year 1919."

The report is submitted to E. E. White, president of the Winding Gulf Operators' Association, and is signed by E. B. Wray, D. C. Wade, F. K. Bowles, C. R. Stahl, R. F. Roth and George Wolfe, chairman. W. G. Caperton is the treasurer and J. H. Hatcher secretary of this association.

The conversion of the volatile matter of bituminous coal into liquid fuel seems to be even more promising than its conversion into gas. By the application of proper processes it seems possible to reduce a large part of the volatile matter of liquid, of which an appreciable percentage can be obtained in the form of light oils suitable for motor fuel. Benzol has been obtained at byproduct plants for many years without any special effort to produce it. There is no doubt that with well-developed methods the yield of benzol and similar oils could be greatly increased.—*Bureau of Mines Bulletin No. 135.*

Determination of the Proper Size of Storage-Battery Locomotive

By DEVER C. ASHMEAD
Tarrytown, N. Y.

SYNOPSIS — *Two important considerations govern the selection of a storage-battery locomotive—drawbar pull and battery capacity. The maximum drawbar pull is easily determined. The battery capacity depends upon the amount of actual work to be performed between chargings and necessarily involves considerable calculation of loads, grades, speeds, etc. These calculations are here explained.*

ALTHOUGH storage-battery locomotives have been used in a few mines for as long as eight or nine years, only within the last two or three years have they come into general use. Many operators do not yet understand them sufficiently to be able to decide on the proper size, and therefore have to rely entirely on the advice of the salesman who is selling these machines.

This is satisfactory in most cases, since the salesman is usually well versed in his own business. He is likely to make mistakes, however, which may be costly. A few instances have occurred (when competition has been severe) where a salesman has cut down the size of the battery in order to reduce the price so that he might get the order. Fortunately this rarely happens, as it is unusual for a salesman to sacrifice quality in order to make a sale.

The prospective purchaser of a locomotive should at all times be in a position to check the statements of a salesman or manufacturer and satisfy himself that the locomotive in question will do the work required of it. This knowledge I have endeavored to embody in this article, which is based on an experience gained in the installation and observation of more than 50 storage-battery locomotives.

Proper Size Is Important

After the operator has decided on the use of storage-battery locomotives, and has come to the conclusion that they can be used successfully in his mine, the next thing to determine is the proper size necessary to do the work. A locomotive that is not large enough will not do the required work, while one that is too large means a waste of power and money.

The first fact to know about a locomotive is the relation of its weight to its drawbar pull. This varies in the different types of locomotives; in other words, all locomotives will not have the same maximum drawbar pull for the same weight, but all such machines of the same weight, type and construction will have the same drawbar pull. At the present time there are seven different types of locomotives on the market. Table I enumerates the various varieties, with the relation between the drawbar pull and weight of the machine expressed in percentage of the weight of the locomotive. This relation is shown for both starting and running and is based on dry, clean sanded rails.

TABLE I. RELATION OF DRAWBAR PULL TO WEIGHT OF LOCOMOTIVE

Type	Total No. of Wheels	No. of Motors	No. of Driving Wheels	No. of Trucks	No. of Drivers on Each Truck	Type of Wheel	Percentage of Drawbar Pull to Weight: Running	Percentage of Drawbar Pull to Weight: Starting
1.....	4	1	4	1	4	C.C.I.	20	25
2.....	4	2	4	1	4	C.C.I.	20	25
3.....	4	2	4	1	4	S.	25	33⅓
4.....	8	2	4	2	2	C.C.I.	17½	20
5.....	8	2	4	2	2	S.	20	25
6.....	8	2	8	2	4	C.C.I.	25	30
7.....	8	2	8	2	4	S.	30	35

C.C.I. = Chilled cast iron. S = Steel.

Knowing the different types of locomotives, and the one that is preferred, it is easy to determine the percentage of the drawbar pull to the weight of the locomotive from Table I.

In order to ascertain the proper size of driving motor it is necessary to know the grades on which the locomotive will operate and what load it will have to handle over them. The grades can be determined from track levels, or if the locomotive is to be used in a part of the mine in which there has been no work done, it may be advisable to take part of the mine where the conditions are about what are expected and assume that these grades will be actually encountered.

The maximum load is easily determined. This depends on how many cars will be handled per trip on a heading and what each holds.

Friction May Vary Considerably

The next point to consider is the amount of friction that the locomotive will have to overcome in order to move the train. This friction may vary from 10 to 40 lb. per ton of train weight. The friction depends entirely on the track conditions and the type and condition of the rolling stock. If the rail is heavy, the track well ballasted and in good alignment, the curves elevated and not too sharp, and the cars have well oiled roller bearings, the friction may be as low as 20 lb. per ton or even less for the train, and the locomotive may have a friction as low as 10 lb. per ton. If the rail is light, track poorly ballasted and crooked, curves flat and sharp and the cars have plain bearings, the friction may be as high as 40 lb. per ton of train weight. The prospective purchaser of a storage-battery locomotive must determine what condition his track is in and about what friction the locomotive will have to overcome. This friction can only be estimated.

The maximum load in tons that locomotives of various sizes can handle on various grades with different amounts of friction is shown in Table II. Knowing the maximum load that will have to be handled over the worst grade, and having estimated the amount of rolling friction per ton, the proper size of locomotive can be determined readily. The table is self-explanatory.

Having fixed on the size of the locomotive, the next step, which is probably the most important, is to determine the size of the battery to supply sufficient power to do the required work. Fig. 1 gives the drawbar pull necessary to move any load up to 220,000 lb. up any grade not exceeding 12 per cent., and with different amounts of rolling friction. Knowing the different grades that the locomotive will operate on and the load that it will have to handle up these grades, the drawbar pull necessary to move this load can be obtained for each and every grade.

Fig. 2 gives the watt-hours that will have to be drawn from the battery in order to furnish sufficient power to produce any necessary drawbar pull up to 7000 lb., and for any distance up to 5000 feet.

Therefore, knowing the drawbar pull from Fig. 1, and the length of the grade that this pull will be used on, from Fig. 2, the watt-hour consumption can be found. It will be noticed that there is no allowance made for negative grades or those in favor of the load, as with few exceptions there will be practically no drawbar pull required here. When a small drawbar pull is necessary the minus grade can be assumed to be level and the drawbar pull assumed as that for level track.

The next quantity to be determined is the time that the motor will require to make a round trip. It is necessary to have this information in order to determine the number of trips per day, so that the number of times the locomotive passes over a certain grade will be known.

Knowing the times the lomocotive will pass over the various grades, the next step is to multiply the watt-hours for each grade by the number of times the locomotive traverses it. The total will represent the number of watt-hours that the battery will have to produce in order to do the work required.

Having determined the watt-hour capacity of the battery, the next step is to decide on the type of accumulator and the size of the individual cell. In this, much will depend on the preferences of the individual oper-

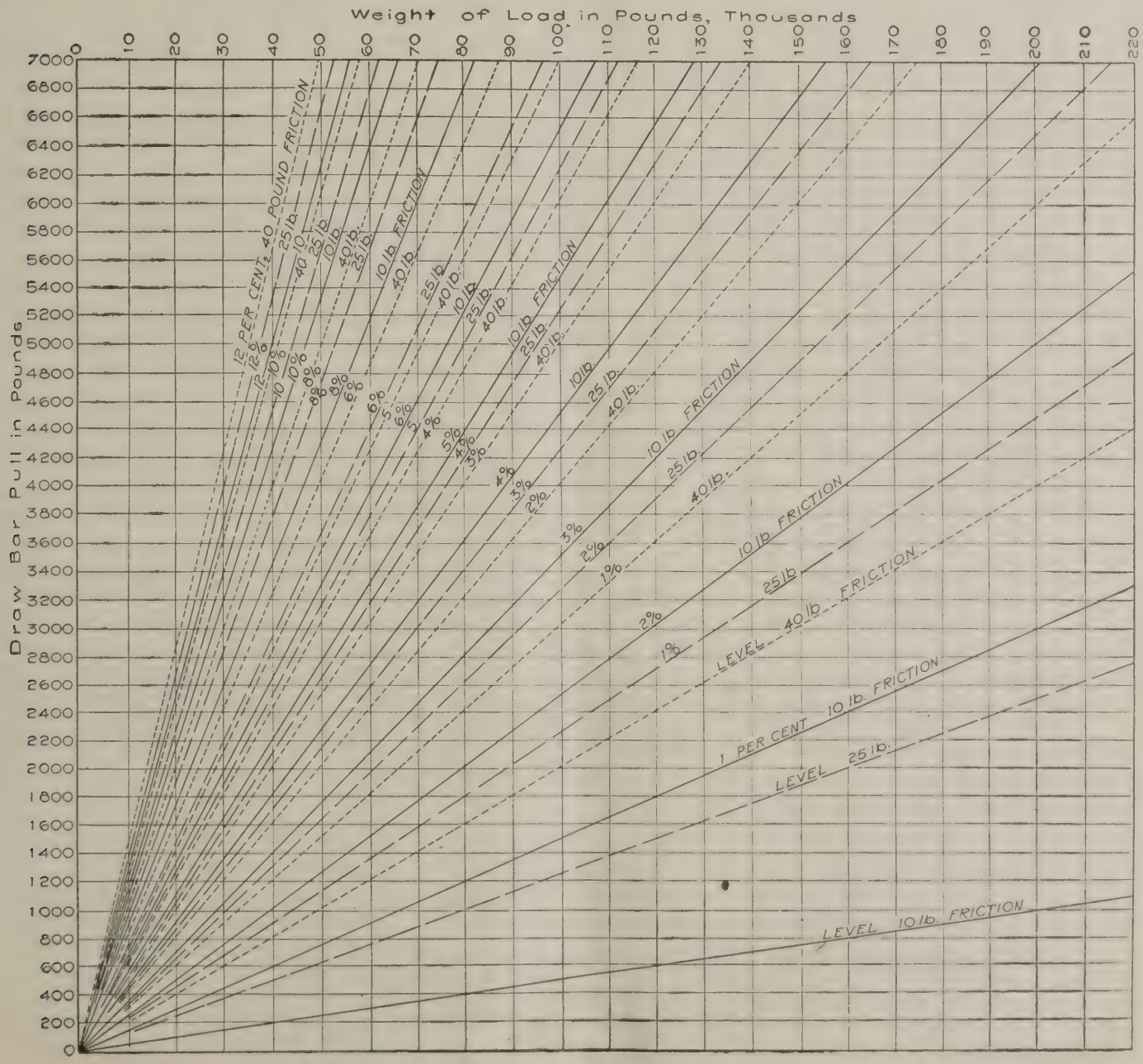


FIG. 1. DRAWBAR PULL FOR VARIOUS LOADS, GRADES AND COEFFICIENTS OF FRICTION

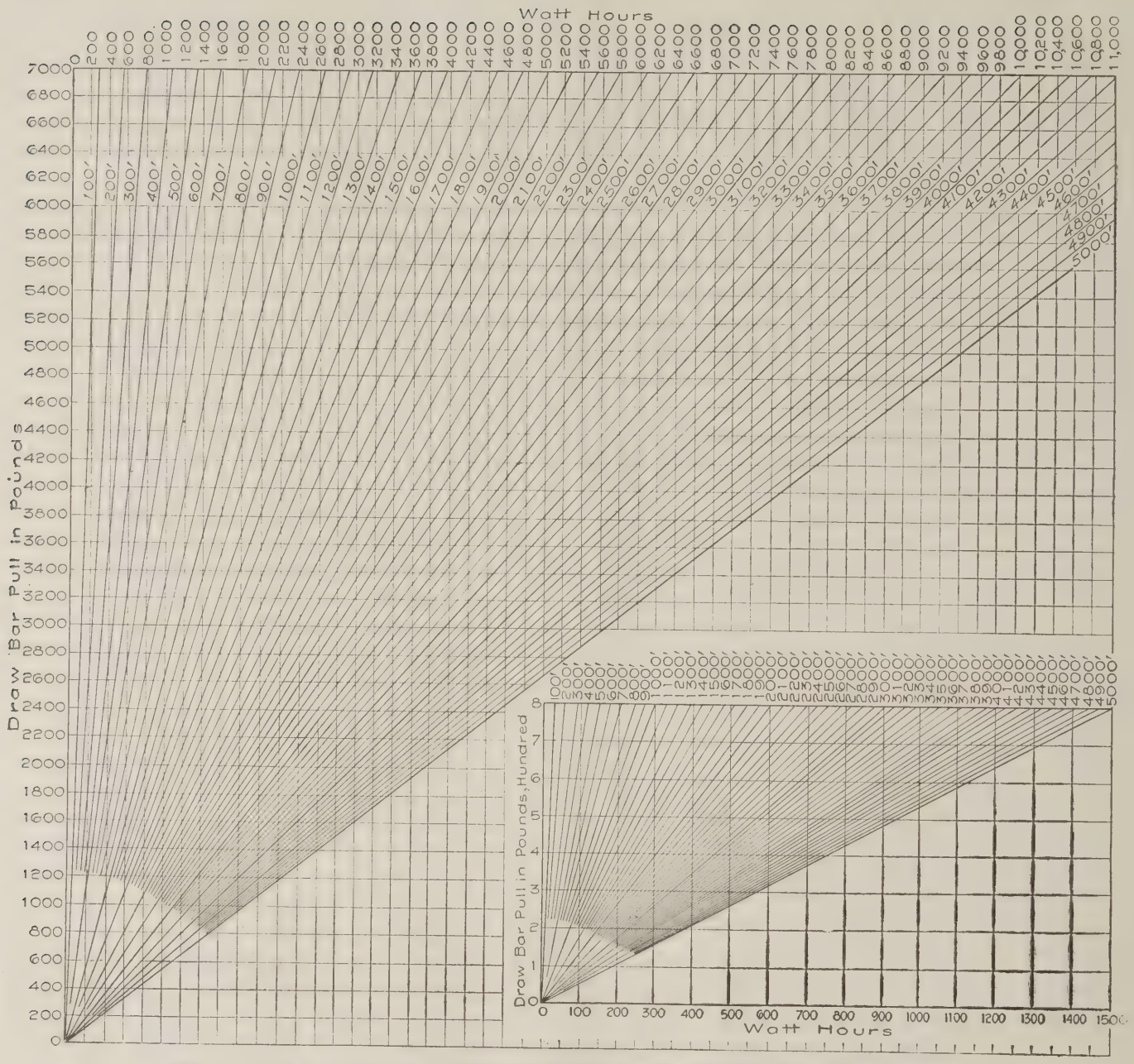


FIG. 2. THE WATT-HOUR CONSUMPTION FOR DRAWBAR PULLS AND DISTANCES

ator and on the information given him by the manufacturer. After the type of the cell has been determined, the only step necessary to settle the number of cells is to divide the total watt-hour capacity by the amperage of one cell and this quotient by the voltage of one cell. The result will be the number of cells required.

It will be noticed that no allowance has been made for any loss of power in the motor itself. The motors used in storage-battery locomotives of course are not 100 per cent. efficient, and there is also a loss between the battery and the motor and some loss within the battery itself. It is not necessary to consider these losses for two reasons. In the first place in the charging of the battery the ammeter is so arranged that a 20 per cent. overcharge is put into the battery, thus taking care of the battery loss. Secondly, the manufacturers always underrate their batteries about 25 per cent. Thus if the manufacturer's rating is used when calculating the size of the battery, this 25 per cent. will compensate any further losses. The friction losses in the locomotive are taken care of in the calculation for the drawbar pull.

The following is a calculation of the size of a locomotive and its battery, to operate over certain grades and do a certain amount of work. Let it be assumed that the locomotive will be used for gathering, and that the total distance from the sidetrack to the last room is 2500 ft. The mine cars weigh empty 2000 lb. and hold a load of 3 tons.

The track from stations 0 to 100 on the cross-entry is level, from stations 100 to 400 it has a 2 per cent. grade against the loads; from stations 400 to 600 it has a grade of 1½ per cent. in favor of the loads; from stations 600 to 1000 it has a grade of 2½ per cent. against the loads. On the butt entry from stations 0 to 300 the track has a grade of 4 per cent. in favor of the loads; from stations 300 to 500 it has a grade of 2 per cent. against the loads; from stations 500 to 700 the grade is 5 per cent. in favor of the loads; from stations 700 to 1050 the grade is 6 per cent. against the loads, and

TABLE II. MAXIMUM LOAD IN TONS LOCOMOTIVES CAN HANDLE ON VARIOUS GRADES

Weight of Locomotive	Per Cent. Drawbar Pull to Weight of Locomotive	Level Rolling Friction in 1 Ton			1 Per Cent. Rolling Friction in 1 Ton			2 Per Cent Rolling Friction in 1 Ton			3 Per Cent. Rolling Friction in 1 Ton		
		10	25	40	10	25	40	10	25	40	10	25	40
4	17½	136	54	34	43	28	21	24	18	15	16	13	11
	20	156	63	39	49	33	28	28	22	18	19	16	13
	25	196	78	49	63	42	31	36	28	23	25	20	17
	30	236	94	59	76	51	38	44	34	27	30	25	21
	33⅓	263	105	66	86	57	43	50	38	31	35	28	24
	35	276	111	69	89	59	45	52	40	33	36	30	25
6	17½	204	82	51	64	43	32	36	28	23	24	20	17
	20	234	94	59	74	49	37	42	32	26	28	23	20
	25	294	118	74	94	63	47	54	42	44	39	31	26
	30	354	142	88	114	76	57	76	51	41	45	37	32
	33⅓	394	158	99	127	85	64	74	57	46	52	42	36
	35	414	165	104	134	89	67	78	60	48	54	44	38
8	17½	272	109	68	85	57	43	48	37	30	32	26	22
	20	312	125	78	99	66	49	56	43	35	38	30	26
	25	392	157	98	125	83	62	72	55	45	49	40	34
	30	472	189	118	152	100	76	88	68	55	62	50	42
	33⅓	525	209	131	172	112	85	90	75	62	68	56	48
	35	552	221	138	178	119	89	104	80	65	72	59	50
10	17½	340	126	85	106	71	53	60	46	38	40	33	28
	20	390	156	98	123	82	61	70	54	44	47	39	33
	25	490	196	122	157	105	78	90	69	56	61	51	43
	30	590	236	148	190	127	95	110	85	69	76	62	53
	33⅓	660	264	165	213	142	106	124	95	78	86	71	60
	35	690	286	172	223	149	112	130	100	82	90	74	63

Weight of Locomotive	Per Cent. Drawbar Pull to Weight of Locomotive	4 Per Cent. Rolling Friction in 1 Ton			5 Per Cent. Rolling Friction in 1 Ton			6 Per Cent. Rolling Friction in 1 Ton			8 Per Cent. Rolling Friction in 1 Ton		
		10	25	40	10	25	40	10	25	40	10	25	40
4	17½	12	9.5	8	9	7.7	7	7	6.1	5	4.2	3.9	3.6
	20	14	11.8	10	10.5	9.3	8.3	8.3	5.0	6.7	5.4	7.5	4.6
	25	18	15.6	14	14.0	12.5	11.0	11.4	7.1	9.2	7.8	10.2	6.6
	30	23	19.4	17	18.0	15.7	14.0	14.0	9.3	11.8	10.1	12.9	8.6
	33⅓	26	22.0	19.5	21.0	17.8	16.0	17.0	10.7	14.0	11.8	14.7	10.1
	35	27	23.2	20.0	22.0	18.9	17.0	18.0	11.5	14.0	12.4	15.7	10.6
6	17½	17	15.2	13.0	13.0	11.8	10.0	10.0	9.4	8.3	6.4	6.1	5.4
	20	21	17.5	15.0	16.0	13.9	12.0	12.5	18.8	10.0	8.1	7.5	6.9
	25	27	23.4	20.0	21.0	18.7	17.0	17.0	15.3	14.0	11.6	10.7	9.9
	30	34	29.2	25.0	27.0	23.5	21.0	22.0	19.4	18.0	15.2	13.9	12.9
	33⅓	38	33.0	29.0	30.0	26.7	24.0	25.0	22.4	20.0	17.5	16.1	14.9
	35	42	34.9	31.0	32.0	28.3	25.0	26.0	23.6	21.0	18.8	17.2	15.8
8	17½	23	19.8	17.0	17.4	15.4	13.7	13.5	12.2	11.0	8.5	7.8	7.2
	20	27	23.6	21.0	21.0	18.5	17.0	16.6	14.9	13.5	10.8	10.0	9.2
	25	36	31.2	27.0	28.0	25.0	22.0	28.8	20.4	18.5	15.5	14.3	13.2
	30	45	38.6	34.0	36.0	31.4	28.0	29.9	25.9	24.0	20.0	18.6	17.0
	33⅓	52	43.8	38.0	41.0	35.4	32.0	33.0	29.4	27.0	23.0	21.3	20.0
	35	54	46.5	41.0	43.0	37.8	34.0	35.0	31.5	28.0	25.0	22.9	21.0
10	17½	29	24.8	23.0	22.0	20.0	17.0	17.0	15.2	14.0	10.5	9.7	9.0
	20	34	29.5	26.0	26.0	23.2	21.0	21.0	18.6	17.0	13.5	12.5	11.5
	25	45	39.0	34.0	35.0	31.2	28.0	28.0	25.5	23.0	19.0	17.8	16.0
	30	57	48.5	43.0	45.0	39.2	35.0	36.0	32.4	29.0	25.0	23.2	21.5
	33⅓	63	55.2	48.0	51.0	44.8	40.0	42.0	37.2	34.0	29.0	27.0	25.0
	35	68	59.0	51.0	54.0	47.2	42.0	44.0	39.3	36.0	31.0	28.6	26.0

Weight of Locomotive	Per Cent. Drawbar Pull to Weight of Locomotive	10 Per Cent. Rolling Friction in 1 Ton			12 Per Cent. Rolling Friction in 1 Ton		
		10	25	40	10	25	40
4	17½	2.7	2.5	2.4			
	20	3.7	3.4	3.3	2.5	2.3	2.2
	25	5.6	5.2	4.9	4.1	3.8	3.6
	30	7.5	7.0	6.6	5.7	5.3	5.1
	33⅓	8.9	8.1	7.9	6.9	6.3	6.2
	35	9.4	8.7	8.3	7.2	6.8	6.5
6	17½	4.0	3.9	3.5	2.4	2.4	2.1
	20	5.4	5.1	4.8	3.6	3.4	3.2
	25	8.3	7.7	7.3	6.0	5.7	5.4
	30	11.2	10.4	9.8	8.4	7.9	7.5
	33⅓	13.0	12.2	11.4	10.0	9.4	8.9
	35	14.0	13.0	12.2	10.8	10.2	9.6
8	17½	5.3	5.0	4.7	3.2	3.0	2.9
	20	7.2	6.8	6.3	4.8	4.5	4.3
	25	11.1	10.3	9.7	8.0	7.5	7.2
	30	14.8	13.9	13.0	11.2	10.5	10.0
	33⅓	17.4	16.1	15.3	13.4	12.5	11.9
	35	18.7	17.4	16.3	14.4	13.6	12.8
10	17½	6.7	6.2	5.8	4.0	3.8	3.6
	20	9.1	8.4	7.9	6.0	5.7	5.3
	25	13.8	12.9	12.0	10.0	9.4	8.9
	30	18.5	17.3	16.2	14.0	13.2	12.5
	33⅓	22.0	20.4	19.0	16.8	15.7	15.0
	35	23.0	21.8	20.0	18.0	17.0	16.0

between stations 1050 and 1500 the grade is 4 per cent. against the loads.

The rooms are 300 ft. long and are driven 1 per cent. in favor of the loads. Twenty-four men are working in a butt entry, 12 on each side, and each two men have three rooms.

The first step to determine is how long it will take the locomotive to make a round trip and how many trips it can make in a day of 9 hours under the maximum haulage conditions, which are encountered when rooms at the head of the entry are driven up 150 ft. and when the first rooms that the men are working in are practically finished. Therefore the average length of the rooms that the locomotive will have to traverse is about 225 ft. As 12 men will be working in pairs on each side of the butt entry, the locomotive will take six

TABLE III. CALCULATION OF TIME REQUIRED TO MAKE ROUND TRIP

	Minutes	Seconds
Couple motor to trip of 6 empties	1	30
Running time, sta. 0 to 100 at 4 miles per hour		17
Running time, sta. 100 to 400 at 8 miles per hour		26
Running time, sta. 400 to 600 at 8 miles per hour		17
Running time, sta. 600 to 1,000 at 8 miles per hour		34
Throw heading switch		5
Running time, sta. 0 to 300 at 6 miles per hour		35
Running time, sta. 300 to 500 at 8 miles per hour		17
Running time, sta. 500 to 735 at 8 miles per hour		20
Running time, sta. 735 to 870 at 4 miles per hour		22
Running time, sta. 870 to 1,470 at 5 miles per hour	1	16
Running time, sta. 1,470 to 800 at 4 miles per hour	2	20
Running time, sta. 800 to 500 at 8 miles per hour		26
Running time, sta. 500 to 300 at 7 miles per hour		20
Running time, sta. 300 to 0 at 8 miles per hour		26
Throwing heading switch		5
Running time, sta. 1,000 to 600 at 6 miles per hour		47
Running time, sta. 600 to 400 at 8 miles per hour		17
Running time, sta. 400 to 0 at 6 miles per hour		47

Running Time in Rooms:				
Uncoupling car	5 sec.			
Throwing room switch	5 sec.			
Run to face of room, 225 ft., 4 miles per hour	40 sec.			
Uncouple car	5 sec.			
Run back to switch, 225 ft., 5 miles per hour	31 sec.			
Throw switch	5 sec.			
Couple to trip	10 sec.			
Total time in room	101	x	12	20 12
Total running time				31 min. 39 sec.

cars to a trip. Table III shows how to calculate the time required by the locomotive to make the round trip.

The track condition will be considered to be medium and the rolling friction to be 30 lb. per ton of train weight. It will be noticed that on a part of the 6 per cent. grade the heaviest load will be hauled—that is, six loaded cars weighing 48,000 lb. It will be assumed that the purchaser will prefer a locomotive of the two-motor, double-truck type with the drive on all four wheels of each truck, and that it will have steel wheels. By referring to Table I it will be found that this type of machine has a ratio of 30 per cent. between the drawbar pull and the weight.

Referring to Table II, under the column for a 6 per cent. grade and 30 lb. of friction per ton, the nearest figure to the maximum of 24-ton load is found to show an 8-ton locomotive with a tractive effort equal to 30 per cent. of its weight. Such a locomotive, therefore, will handle the load over the given grade and is of the proper type.

Having determined the weight of locomotive necessary, the next step is to find the size of the battery required to furnish the power. First the amount of power required on each grade will have to be determined. In order to learn this the drawbar pull on each grade has to be found. Then knowing the length of the grade, the watt-hour consumption can be obtained from Fig. 2. The best way is to tabulate the figures obtained as shown in Table IV.

The total number of watts required to make a round trip is thus equal to the sum of the watt-hours thus shown, or 1929.

TABLE IV. METHOD OF TABULATING DATA

Station	Distance Ft.	Load, Lb.	Grade, Per Cent.	Drawbar Pull, Lb.		Watt-hours
1470–1335	135	L 16,000 / T 8,000	4	720 / 440	1,160	58
1335–2200	135	L 16,000 / T 16,000	4	720 / 880	1,600	80
1200–1065	135	L 16,000 / T 24,000	4	720 / 1,320	2,040	100
1065–1050	15	L 16,000 / T 32,000	4	720 / 1,760	2,480	14
1050–930	120	L 16,000 / T 32,000	6	1,040 / 2,240	3,280	148
9930–795	135	L 16,000 / T 40,000	6	1,040 / 3,000	4,040	210
795–700	95	L 16,000 / T 48,000	6	1,040 / 3,600	4,640	170
700–500	200	L 16,000 / T 48,000	5			
500–300	200	L 16,000 / T 48,000	2	400 / 1,680	2,080	158
300–000	300	L 16,000 / T 48,000	4			
1000–600	400	L 16,000 / T 48,000	2½	480 / 2,000	2,480	376
600–400	200	L 16,000 / T 48,000	1½			
400–100	300	L 16,000 / T 48,000	2	400 / 1,680	2,080	237
100–000	100	L 16,000 / T 48,000	Level	80 / 720	800	30
000–100	100	L 16,000 / T 12,000	Level	80 / 180	260	11
100–400	300	L 16,000 / T 12,000				
400–600	200	L 16,000 / T 12,000	1½	320 / 420	740	53
600–1000	40	L 16,000 / T 12,000	2½			
000–300	300	L 16,000 / T 12,000	4	720 / 660	1,380	156
300–500	200	L 16,000 / T 48,000	2			
500–700	200	L 16,000 / T 12,000	5	880 / 780	1,660	128

The remainder of the grades for the empty cars are in their favor.

As the motor has to go in the rooms 12 times to make up a trip and distribute the empties, we get:

Distance, Ft.	Grade, Per Cent	Load, Lb.	Drawbar Pull, Lb.		Watt-hours
225	1	L 16,000 / T 2,000	240 / 50	290	23
225	Level	L 16,000 / T 8,000	80 / 120	220	19
					42×12

Equals 504 total watt-hours

This gives a grand total of 2433 watt-hours for a complete round trip, and as the locomotive will make 17 round trips in 9 hr., the battery will have to furnish 41,361 watt-hours. It may be safely assumed that the cells will be of 500 ampere-hour and the voltage of the battery will be 82. Allowing 2.2 volts per cell, the total number of cells required will be 38. As this number is not convenient for the locomotive manufacturers, they will probably use either 42 or 44 cells. This number will obviously give a capacity and voltage slightly above bare requirements, which is not objectionable.

Minecdotes

On Center and Backfired

The new motorman was expressing his opinion of his locomotive. He said it reminded him of both a steam engine and a flivver.

"How do you figure that out?" asked "Curly," our oldest motorman.

"Well," said the new man, "the darn thing got on center this morning, and when I went to push it off it backfired and knocked me down. Now, then, if that is not like a steam engine and a flivver, what is?"

"On center and backfired? What you trying to give us"?

"I'm not trying to give you anything. I mean just what I said. It happened over at the South, where those boards are alongside the rails. I was coming out of there real slow, with no cars on, and the fire was flashing something fierce from the wheels and the rails. The locomotive acted just like the spark was missing in some of the cylinders. We were coming along in jerks, and then it stopped dead. I tried to start it several times, but nothing doing. I concluded the darn thing was on center. I put the controller lever on the first point, got off, and started to shove on the thing so as to move it off center. The blame thing must have backfired, for it knocked me a winding. It sure hit me a good one, and I saw all kinds of fireworks. It certainly hit me some wallop."

"Oh, so that is what you call on center," said the others after they had had a good laugh. "Why Simple Simon had nothing on you. What your trouble was, was that the locomotive wheels had so much dirt and sand between them and the rails that they were practically insulated from the return. When you put the controller on the first point you simply charged the whole works, the same as the trolley line. Then you got off to push on the machine and probably put your foot against the rail and your hands on the locomotive. Sure thing you saw fireworks and thought a mule had kicked you! Better be more careful next time, as you are liable to get on center and the backfire will knock you out for keeps. We have all had the same experience at one time or another, and experience is a wonderful teacher. Even if it is at times a little rough on a fellow, it generally leaves an impression that is not soon forgotten."



More Profitable for Whom?

Steel Cantilevers Support Headframe

SUPPORTING the headframe over a mine shaft by cantilever trusses was the expedient resorted to at the "A" shaft of the Pioneer mine of the Oliver Iron Mining Co. at Ely, Minn., because of unstable ground.

This shaft was sunk in the early '90s, and was then equipped with a timber-frame shafthouse. It had been impossible to explore the ground in advance to such an extent as to determine thoroughly the nature of the underlying rock, but no change of alignment was experienced until 1900, when a slip in the formation was noticed about 135 ft. below the collar of the shaft. The depth at that time was 1110 ft. The alignment was maintained without difficulty, however, by trimming the timbers and occasionally replacing a shaft set.

A steel headframe was built in 1909, up to which time the settlement at the surface had not been serious. In this structure the rear columns were placed 70 ft. from the shaft and were supported on independent concrete piers founded in good solid ground. The front columns and ore-pocket columns were supported on a concrete base, 50 x 65 ft. and 3 ft. thick, reinforced at top and bottom with steel rods, so that when settlement occurred the entire front portion would move uniformly, thus causing no undue stress in the steel members.

The bases of the rear columns were provided with a hinged joint. The bases of the front columns and ore-pocket columns were fitted with brackets so that jack-screws could be placed under these to raise the columns and thus take up any settlement of the ground. From 1909 to 1912 the settlement due to the slip in the shaft amounted to 9 in., which was taken up by jacking the front columns of the shaft at different times and putting blocking under the bases.

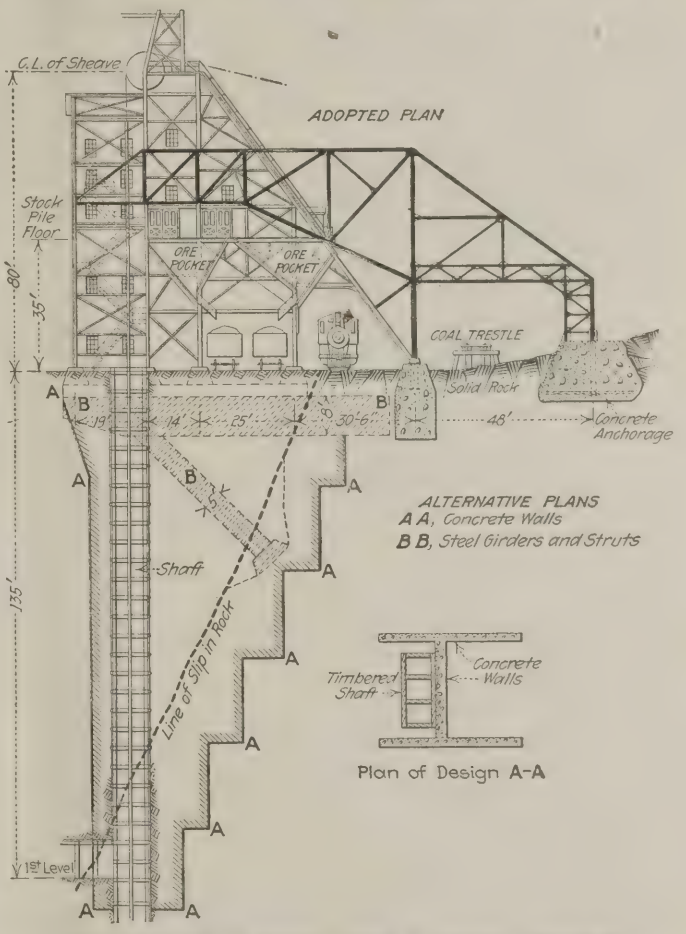
Movement of the ground became much more serious in 1912, and it was apparently unsafe to continue mining operations near the shaft without making provision to support the shafthouse. Consideration was given to three different methods for supporting the shafthouse and pockets.

The first plan was to excavate the entire portion between the line of slip and the shaft and construct a vertical concrete wall with two wings, all founded on solid rock. This would extend from the first level in the shaft, 135 ft. below the collar, to the under side of the reinforced-concrete base supporting the front portion of the shafthouse, as shown by dotted lines *A*—*A* in the drawing. The wall would carry the entire load of the foundations, tracks, cars, front portion of shafthouse and ore in shipping pockets, and would support the rear portion of the mine shaft from first level to surface.

The second plan was to excavate beneath the reinforced-concrete base and place two horizontal steel girders under it, as shown by dotted lines *B*—*B*. The rear ends of the girders would be anchored on good ground back of the slip, and the ends over the shaft would be supported by structural steel struts or columns placed at an angle of 45 deg. and seated on solid rock.

The third plan, which was adopted, was to construct a steel cantilever support, having its footings on permanent ground back of the slip. This carries the portion of the shafthouse above the stockpile trestle, which consists of skip dumps and headsheaves. All main columns of the shafthouse were disconnected at splices at the stockpile floor elevation, except the rear batter-brace columns, which have a firm footing. The cantilever support thus maintains the headsheaves and skip dumps in permanent position, and the front part of the shafthouse, including the stockpile floor and shipping pockets, now cut loose from the upper portion, will be kept in position by jacking up and blocking the column bases as may be required by ground settlement.

Adoption of this plan was based upon the fact that its first cost was the lowest, and that this structure was above ground, where it could be erected readily and inspected easily. As the rear columns of the cantilever support are on solid rock and have an uplift, the pier excavation was made in the shape of a prismoid and the concrete was poured without the use of forms. The concrete pier was made large enough for its weight to balance the uplift due to the weight of the shafthouse portion; the bond of the prismoid in the solid rock is an additional safety factor.



HEADFRAME IS HUNG FROM A GIANT BRACKET

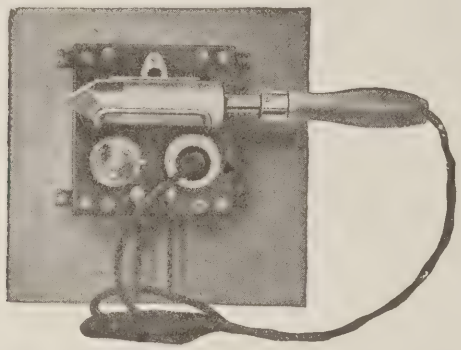
As the mine shaft is constructed of timber sets and is considerably larger than the skips and cages, there is sufficient room for lining the timber guides without retimbering or enlarging the shaft. The cantilever support has now been in service for practically five years, and has kept the upper part of the shafthouse in accurate alignment. The lower portion has settled two feet, which has been taken care of by jacking up and blocking the front column.—*Engineering News-Record.*

NEW APPARATUS AND EQUIPMENT

Automatic Rack for Electric Soldering Irons

Electric soldering irons that are allowed to lie on a bench or other convenient place when temporarily not in use gather dirt and become a hazard. Often the tip will be overheated, necessitating refiling; the heating unit may burn out; the hot iron may set fire to the bench or other material. If the current is turned "off," the iron cools down to such a degree that considerable delay is caused when the tool is again wanted.

To overcome these objectionable features the Cutler-Hammer Manufacturing Co., of Milwaukee and New



PANEL FOR MOUNTING ON WALL, SHOWING METHOD OF SUPPORTING SOLDERING IRON

York, has recently developed an automatic soldering-iron rack and control panel which decreases the amount of current taken by the iron when it is placed on the rack. This keeps the iron from overheating, prevents burnouts and saves current. Furthermore, it encourages orderliness by providing a convenient connection point and support for the iron.

The rack consists of a small slate panel arranged for wall mounting and carrying a support for the iron which acts on the principle of the telephone receiver hook. When the iron rests on the support, or hook, it bears it down and resistance, which is mounted on the back of the panel, is inserted in circuit with the iron. The current is reduced and the temperature held at a safe value, but ready for service and full current as soon as the iron is lifted from the hook.

Taking the weight from the hook disconnects the resistance from the soldering-iron circuit and allows full current to flow. Below the hook, on the same panel, a push-button snap switch is mounted together with a "standard" receptacle, to which the plug of the soldering-iron cord is connected. This little panel, therefore, is a complete switchboard which may be mounted on the wall or machine within reach of the workman. When not in use, and at night, the switch is snapped "off," which completely opens the circuit to the iron.

These automatic racks are designed for use with Cutler-Hammer soldering irons, but they are so constructed that they may be used just as well with other similar types of soldering irons.

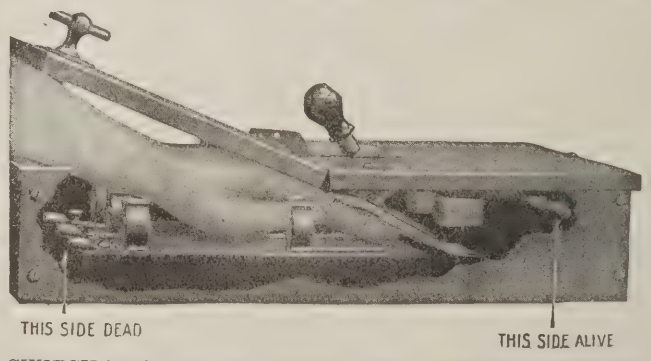
Auto-Lock Safety Switch

In many mines, steel mills, factories and similar industries where most of the workmen have little knowledge of electricity it is desirable to use switches having no live parts exposed or accessible in the ordinary operation of the switches or when replacing fuses.

This is fully accomplished in the Krantz auto-lock switch, marketed by the Westinghouse Electric and Manufacturing Co., which is intended for use on main circuits or wherever an ordinary knife-switch is applied. The switching parts and fuses are inclosed in a steel box, the cover of which is in two parts, one being screwed on to form a permanent covering for that end of the box containing the switch, and the other part being hinged so as to swing back and permit the renewal of fuses, which are located in this portion of the box.

An ingenious latching mechanism makes it impossible to open the cover without first throwing the switch to the "off" position and rendering all fuses and other accessible parts dead. Thus fuses may be replaced at any time with absolute safety. As long as the door of the case is open, the switch contacts cannot be closed.

By using a padlock, the switch handle can be locked in the "off" position, making it impossible for any-



SWITCH MUST BE PLACED IN "OFF" POSITION BEFORE COVER CAN BE OPENED

one to close the switch, except the person holding the key to the padlock. By using another padlock, the cover may be locked shut, so that the fuses cannot be tampered with. Either of these padlocks can be used independently of the other, so that the switch cover can be locked shut with the switch either "on" or "off," or the switch can be locked in the "off" position with the cover either locked or open.

Electrical contact is made by means of a laminated-spring copper brush, double-ended with auxiliary arcing contacts at each end. The outer leaves of the brush are bronze to provide additional spring pressure.

The stationary contacts are of hard-drawn copper and are mounted on slate bases, one of which in the fused end carries one of the fuse clips while the other

forms the terminal block for the incoming line and is mounted under the stationary portion of the cover.

The operating mechanism, of the toggle type, is galvanized steel and is attached to the under side of the stationary end of the cover. This mechanism can easily be removed for inspection by taking out several screws.

In closing, the pressure between the contacts causes the laminations of the brush to spread apart, giving it a wiping or self-cleaning action. The double-ended brushes provide a double break, dividing the arc between the two ends, each of which is provided with a separate arcing tip.

In the closed position the switch is held in positive contact by throwing a toggle over the center point. A spring provides a quick-break for opening, the mechanism being independent of the operating handle.

These switches are supplied for 250-, 500- and 600-volt circuits, for either alternating- or direct-current service, and in capacities up to 2000 amperes.

The safety features of this switch have been recognized by the American Museum of Safety, which has awarded it a gold medal and special mention.

Service-Restoring Relay System

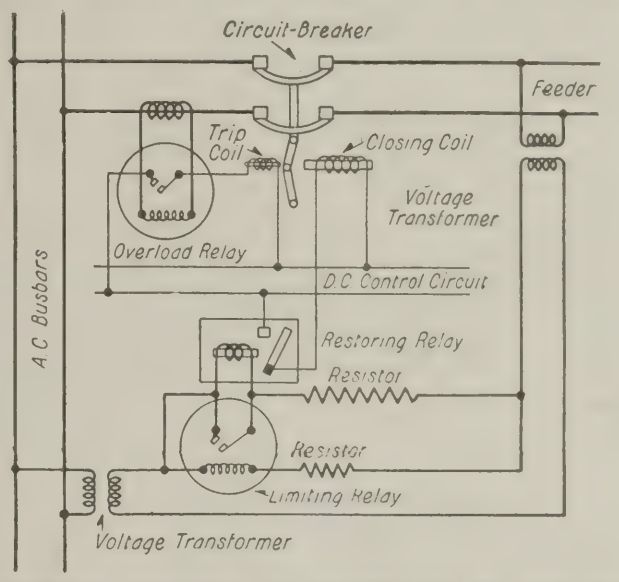
A new service-restoring relay system has been tried out for a number of months on the lines of several central station companies of considerable size, and the reports received have been satisfactory. The system minimizes interruptions caused by transient short circuits, which clear themselves as soon as the circuit breaker has been opened, thus permitting the feeders to be immediately put back into service. If the circuit breaker is reclosed automatically within a second after the transient trouble has occurred, the service will be restored in time to prevent induction motors from stalling.

The Westinghouse service-restoring relay system has been developed to perform this operation within the shortest possible time and thus reduce all disturbances to a minimum. This greatly improves the lighting service. Should a permanent defect occur, the system will allow the breaker to remain open until the defect is cleared.

A schematic diagram of connections is shown in the accompanying illustration. Any type of overload relay may be employed to trip the circuit breaker. A voltage transformer on the feeder line outside the circuit breaker is connected so that its potential opposes that of another voltage transformer connected to the busbars. The restoring relay, which is similar to a magnet switch, is connected in series with these two voltage transformers. Before a short circuit occurs, both voltage transformers are subjected to the same condition so that no current will flow through the restoring relay; but when a short circuit develops and the circuit breaker has been opened by the overload relay, current will be forced by the busbar transformer into the feeder transformer through the restoring relay. The restoring relay will then close its contacts, which in turn will close the circuit breaker.

In case of a permanent defect on the feeder line, the restoring relay would continue to open and close the circuit breaker indefinitely. To prevent this, a limiting relay, similar to the Westinghouse type CV overvoltage relay, but equipped with weaker spring and heavier damping magnets so that its action is sluggish, is connected in such a manner that while the circuit breaker is open it is subjected to the same difference of potential that is operating the restoring relay. Every time the circuit breaker opens, the limiting-relay contacts begin to close and, due to the heavy damping, they do not return to the starting point immediately after the circuit breaker is closed. After the circuit breaker has opened and closed a predetermined number of times, this relay closes its contacts, thus short-circuiting the restoring relay and preventing further operation.

When this system is installed at substations having no attendant, it is often found advisable to have an indicating device that will show when the service has been



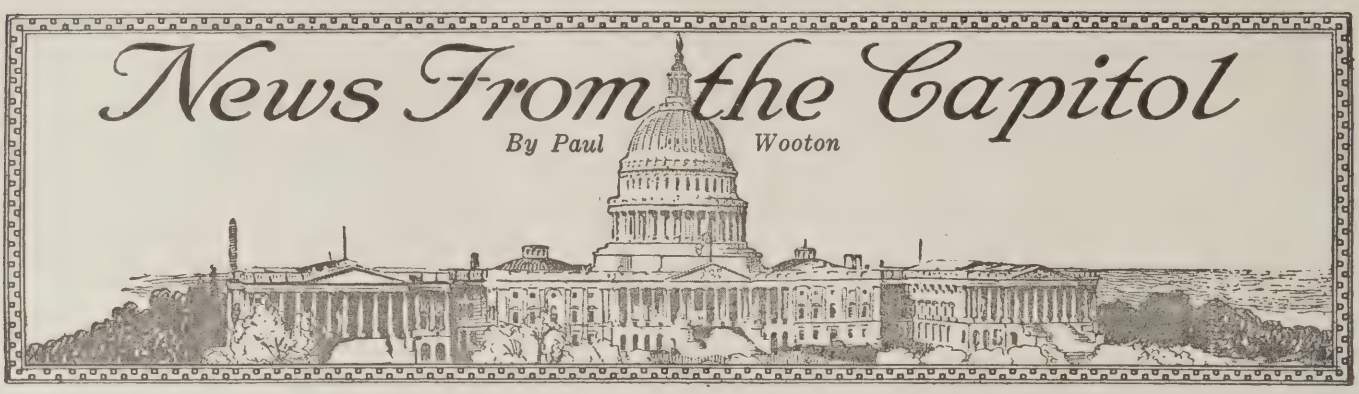
SCHEMATIC DIAGRAM OF CONNECTIONS OF SERVICE-RESTORING RELAY SYSTEM

momentarily interrupted. For this purpose, a graphic ammeter is placed in the direct-current control circuit of the circuit breaker. This will indicate whenever the breaker has been closed by automatic means.

A special control switch is used, which contains one dragging contact so arranged that when the circuit breaker is tripped manually the switch automatically opens the circuit between the two voltage transformers.

The service-restoring relay outfit is a valuable addition to the protective equipment of all central stations, and should be especially useful now. This relay decreases power interruptions and thus economizes the time of switchboard and other station attendants, or in some cases releases some of them for other duties.

Hydrocarbons are decomposed or cracked by heat. Carbon and hydrogen are the ultimate products when cracking is carried to the end. The decomposition is a complicated process, the exact mechanism of which is not known, but it is governed by the laws of physical chemistry. Equilibrium conditions determine the extent to which cracking occurs, and the values of the equilibrium constant depend, among other factors, upon the temperature and pressure. High temperature favors cracking because most of the reactions take place with absorption of heat.—*Bureau of Mines Bulletin No. 135.*



Operators Contradict McAdoo

Issue has been taken with Director General McAdoo as a result of some of his statements on the supply of cars for coal mines, made in his report to the President. Among those challenging the purport of his report is the National Coal Association. Mr. McAdoo's entire statement as to the coal movement reads as follows:

Just at present strenuous efforts are being made to speed up the movement of coal so as to preclude the recurrence of the distressing experience of last year. In both the production and transportation of coal 1917 was a record year. Including bituminous, lignite and anthracite the production was 650,000,000 tons. Of this some 11,563,056 cars, containing about 558,000,000 tons, were transported by the railways. The balance was either consumed or converted into coke at the mines or near by. During the bad weather in January, 1918, when the railroads were practically at a standstill, there was a reduction of 79,131 in the number of cars of coal loaded and moved as compared with the year 1917. Notwithstanding the continued bad weather in February, 1918, the railroads got on their feet and increased over February, 1918, 31,250 carloads of coal. In March the increase was 46,613; in April, 73,408; in May, 84,998; in June, 88,840; and for the first four weeks of July, 113,198 cars. It will be seen, therefore, that for the last six months the increase in coal carried by the railways has been 437,976 cars of coal—equal to about 21,998,800 tons.

One of the great advantages of governmental control is that the transportation facilities of the country can be concentrated upon the quick performance of an urgent duty. The energies of the Railroad Administration are now being largely devoted to moving the coal mined as rapidly as the Fuel Administration can deliver it.

Of late cars have frequently been supplied to the coal mines more rapidly than they have been able to load them and it is probable that adequate transportation for the fuel requirements of the Nation will be available provided the coal production during the warm weather can be maintained at a point that will fully employ the cars requisitioned. The country has been led to believe that coal production is limited entirely by transportation and that any shortage is due to the railroads. This is erroneous. The maintenance of an adequate coal supply depends in the first instance upon production which in turn is restricted by shortages of labor and other causes aside from transportation.

The situation, as viewed by the National Coal Association, is very different. Its statement is as follows:

So far as the car supply for bituminous caol loading is concerned, Mr. McAdoo apparently has not been informed fully as to all the facts in the case. It is true that in certain sections of the country the supply of empty cars furnished bituminous coal mines has shown marked improvement during the summer months; and the industry as a whole also has enjoyed an increased car supply. This supply, however, is by no means adequate when the whole industry is considered, as the government's own figures show.

These figures, made public by the United States Geological Survey, which keeps a careful record of coal production and the causes curtailing such production, show that during the latest week covered by returns from producing fields, that of Aug. 24, car shortage cut production no less than 1,530,000 tons of bituminous coal. In four fields alone—Southern Ohio; Somerset County, Pennsylvania; Fairmont, W. Va., and the high volatile fields of southern West Virginia—the bituminous coal mines lost 750,000 tons during the week because the railroads failed to furnish cars to load this tonnage. Director General McAdoo certainly did not have these fields in mind when he reported that "cars have frequently been supplied to the mines more rapidly than they have been able to load them."

One coal-producing company in West Virginia, whose output of byproduct coal is made into coke and in that form is used in the production of steel, lost 100,000 tons during the month of August because cars were not furnished to load and haul this tonnage. This loss was directly reflected in the curtailment of steel intended for ships at a time when the output of steel plants was being reduced because of their inability to obtain sufficient fuel. Another company in the gas coal fields of western Pennsylvania ran part time and lost 170,000 tons production of coal because of the inadequate car supply.

Shortage of railroad cars at the bituminous coal mines of the country has curtailed production not less than 82,000,000 tons since Jan. 1 last, and stands as the dominating factor of all causes of curtailment. Much of this huge production lost to the country because the railroads did not furnish the coal mines sufficient cars occurred during the months of January, February and March, when the railroads were recovering from the worst congestion in their history and from the effects of unprecedented storms, but not all.

Car shortage cut bituminous coal production 1,934,000 tons during the week ending Aug. 17; 1,559,000 tons during the week ending Aug. 10; and 1,145,000 tons during the week ending Aug. 3. These figures do not support a claim that the coal mines are receiving more cars than they can load, even recently.

The production of bitumnious coal from Jan. 1 to Aug. 24 inclusive, totaled 384,000,000 tons. The mines that produced this coal were capable of producing 522,000,000 tons under full time output. The total production lost from all causes was therefore 138,000,000 tons—far more than enough to afford a guarantee against a fuel shortage. Here are the reasons why this 138,000,000 tons were lost:

Because of car shortage, 82,000,000 tons; because of labor shortage and strikes, 22,750,000 tons; because of mechanical disabilities and unavoidable shutdowns at the mines, 19,750,000 tons; because of no market (chiefly in southwestern states) 4,000,000 tons; all other causes, 9,500,000 tons.

It will thus be seen that car shortage, the dominant factor curtailing bituminous coal production during the year, was responsible for approximately 60 per cent. of the total production lost from all causes.

These figures are not guesswork. They are the government's own figures, as published by the Geological Survey. They show conclusively just what did limit coal production.

Operators Advised to Obtain Deferred Classification for Employees

The War Department has provided the necessary machinery for the protection of essential industries such as mining from the indiscriminate operation of the draft, and depends upon the companies and individuals to protect their industries by taking special care to see that skilled labor which cannot be replaced receives the proper industrial deferred classification. Mining organizations producing necessary war minerals should consider it a patriotic duty to attend actively to this matter at once and to take up with their local boards the classification in the draft which their keymen should receive, Van H. Manning, director of the Bureau of Mines, declares.

The Army desires to have every man who can be replaced put into a classification where he will be ready to carry a gun as soon as called for, but does not wish to take men who would be more useful for war purposes where they are. Should those engaged in the conduct of essential war mines not carry out this duty promptly, the War Department may naturally hesitate to furlough back men from the army in cases where the companies have neglected to ask for the proper deferred classification for their men as provided for under the selective draft regulations.

Machinery has also been created whereby in some instances the keymen in essential industries who have failed for any reason to receive industrial deferred classification may still be returned to their work by the Adjutant General of the Army after their arrival at camp. Under this arrangement, the different departments and bureaus representing certain industries may designate a certifying officer, who may recommend to the Adjutant General that the soldier in question be granted an indefinite furlough without pay and ordered to report to the industry where his services are needed.

Chief Coke Inspector Appointed

R. C. Glazier, of Johnstown, Penn., has been appointed chief coke inspector for the Fuel Administration. It is the intention to centralize the work being done for the improvement in the quality of coke. Mr. Glazier will also concern himself with the matter of conservation of fuel and increase of production.

Coke Company To Make Large Refund

The Fuel Administration's statement concerning the $80,000 refund which it has required the Consolidated Coke Co., of Pittsburgh, Penn., to make, is as follows:

A refund of a sum approximating $80,000 was arranged Sept. 7 by the United States Fuel Administration between the Consolidated Coke Co., of Pittsburgh, as party of the first part, and the Steel Company of Canada, of Hamilton, Ontario, and the Thomas Iron Co., of Hokendauqua, Penn., as parties of the second part. The refund came as the outcome of the delivery of inferior coke to the two companies of the second part.

The Consolidated Coke Co. had contracts providing for the delivery of coke made from washed coal to the blast furnaces of the other two companies. Last November the Consolidated Coke Co. washery broke down and shortly thereafter burned, rendering the producers unable to ship coke of the quality contracted. Also, in order to secure maximum output, the coke company had installed coke-drawing machines which enabled them to maintain the regular output of coke, but, as appeared, reacted unfavorably on the quality of coke produced.

It was clearly evident to the Fuel Administration that both the iron companies had been seriously damaged, not only by increased fuel consumption but also had been unable to meet the requirements for metal of their respective governments.

The Consolidated Coke Co. agreed to pay to each of the other companies a sum amounting to $1 per ton for each ton of coke shipped to them from June 1 to Aug. 15. Also it agreed to rebuild its washery at the earliest possible date.

The sum involved, while large, in no way represents the loss sustained by the furnace companies and, of course, the national loss due to the curtailed tonnage of iron and steel cannot be calculated in dollars and cents. It is the belief of the Administration that the exercise of its power to maintain the standard of quality of coke, by control of prices, will result in more vigorous efforts on the part of all coke producers to use their properties to the utmost extent to aid in the effective prosecution of the war.

Work-or-Fight Order Has No Application in Coal Mining Industry

The "work-or-fight" order does not apply to any employee of a coal-mining company, General Crowder, the Provost Marshal General, has informed the National Coal Association. Where local boards notify clerks or any other employee of a coal-producing company that they must seek other work, the fact is to be communicated at once to the Provost Marshal General.

Criticized for Attitude on New Mines

Considerable criticism is being aimed at J. G. Jones, of the Fuel Administration, and his committee charged with the licensing of new mines. It is contended by some that the few permits which are being granted are threatening the future coal supply. Mr. Jones admits that a change of policy may be necessary if the war should be greatly prolonged, but for the present he is fully determined to allow no new mines to open which will influence production in mines that are already producing.

With the steel situation in its present shape, Mr. Jones declares that no machinery can be spared for mines not in a position to use the equipment for immediate production. There are, of course, some permits being granted where exceptional conditions make large production possible in the near future.

In those sections of the country where the railroads are not congested, and where idle machinery, in many cases, can be rigged up to do the work, the same stringency is not being exercised as is the case in the coal fields of the East and of the Middle West.

The cost of handling cars of coal diverted from their original destinations to relieve an emergency may be added to the regular freight charges, the Fuel Administration has ruled.

A service flag containing 50 stars was hoisted over the Fuel Administration building at noon Sept. 6. Dr. Garfield, who has two sons in the service, delivered a brief address to nearly 1000 of the employees of the administration.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

We reproduce in the panel on this page the remarks of P. B. Noyes, director of the Bureau of Conservation, of the United States Fuel Administration. Against it and almost around it we write the answer of the anthracite mine workers. Apparently they are willing to accept the awful sacrifice of life and limb of which Mr. Noyes speaks. We shall face the foe partly armed, partly munitioned, and merely because a wage readjustment is sought by the anthracite mine workers, an adjustment that is in violation of their pledge given only at the close of last year. Though they had a contract at that time a readjustment was made in their wages, yet now they are striking again, despite the fact that their arguments are being considered by the Department of Labor and the Fuel Administration.

WE CANNOT fill Pershing's orders in full because the United States cannot make sufficient steel this winter. A shortage in steel results almost entirely from lack of coal. Keep this in mind and then look forward to the events of the coming spring. We shall have the drive. We shall succeed in it, but some time in February or March, or whenever the time has come, General Pershing will sit down with a pencil in hand and will figure up the exact deficit in the filling of his orders for munitions. With military formulas now well recognized, he will figure in place of those munitions how many extra men must be put into the battle to be killed. This is no fanciful statement. It is now possible to treat, in any aggressive movement, the question of munitions or of casualties as interchangeable quantities. So many thousand American youths must be thrown into the hopper for every thousand tons of munitions which are short.—P. B. Noyes, Conservation Division, United States Fuel Administration, addressing engineers at Cincinnati, Ohio.

Are the mine workers of the anthracite region willing to take on themselves the blood of the slain by striking at this time in violation of their pledge? It seems as if they are. On Sept. 8 four collieries of the Delaware & Hudson Co. in the Wyoming valley were closed down by a strike of motor runners, drivers and doortenders, and at two others the same classes of men were, at that date, threatening to go on strike. The four mines when operating employ 1500 men, the other two employ 1000 more, so 2500 men will be involved if the strike spreads.

The motor runners want an advance of 15c. per hour; they now receive 35c. The drivers get 24c. and want 35c., while the doortenders, who are paid 12c., are now asking 24c.

The miners at one of the Panther Valley operations have gone on strike for an increase while the men in the Hazleton region are pressing for extra pay for overtime and have inserted paid advertisements in the local papers telling the men at certain mines to be careful not to do Sunday work. The union is counseling patience and the fulfilling of contracts, but the men are wrath with the union, and condemn it more heartily than they do their employers.

The strike for free transportation at the Sandy Run colliery of M. S. Kemmerco and Co. still continues. When the men struck the company announced a shutdown for repairs. This is probably not altogether a move of strategy. It may merely show that the company, anxious to make repairs, thinks the present time favorable. The mine has had some severe squeezes in recent years, and repairs are possibly quite necessary. The men, though dispossessed, are not idle. The labor scouts of the companies operating in the neighborhood quickly lighted on these men and they are busily mining coal in nearby workings.

The northern Pennsylvania coal fields in the neighborhood of Blossburg, Tioga County, are still busily at work though few, if any, sections of Pennsylvania have mined bituminous coal longer than Blossburg and the vicinity. The Blossburg employees of the Morris Run Coal Mining Co. and O'Donnell Brothers Co. have asked that a work train be run from Blossburg to the plants of these companies.

The mountaineers of West Virginia and Kentucky are justifying the motto of the first state—"Montani semper liberi" (the hill country people are always free), by strenuous efforts to aid America in her struggle for liberty and justice. They have the most intense kind of patriotism. E. E. White, president of the E. E. White Coal Co., which operates in the hill country surrounding the Virginian Ry., pays a high compliment to the miners of his district and to the patriotic attitude of the people in general. He has been appointed production manager in the New River and Winding Gulf fields and seems to find great pleasure in the work, owing to the support given the movement by the workmen everywhere. White is not the kind of man to go round with a grievance. He sees the big things, publishes them, and big things spring up by the spreading of the seed.

Some people plant blame and discouragement and wonder that their row grows such spindling corn. After Mr. White had visited the many mines in his care he described his impressions thus: "In traveling through my district I saw miners wearied by a long day's work going back into the mine to produce more coal on the night shift. A desire to do their bit has caused the farmers to go into the mine at night and load coal. As one farmer expressed it, 'I raise wheat during the day and load coal at night to aid our boys in France.' A preacher and his congregation volunteered one night last week to load 100 tons. A worn-out miner has written saying, 'I have finished my mining days, but I'm going to pay some one to do a day's work for me.'" Mr. White concludes by asking, "In such an atmosphere as this do you think there is any room for a slacker to exist?" There's good blood in the "sagers" and good blood is bound to tell.

But the mountaineers look askance at your strolling players and mountebanks. A carnival company operating near one of the big coal mines in southeastern Kentucky interfered with production. It was summoned before the Harlan County Council of Defense, with Judge Onthank presiding. When it was testified that the production of the district had fallen by reason of the operations of the carnival company, the "attraction" was ordered to move into another district. It was found that there were two draft evaders in the troupe, one a British subject and the other a man from Missouri. Both were held. Triflers are not wanted where men are mining coal for the soldiers at the front.

At Jackson, Breathitt County, Kentucky, R. T. Gunn, the vice president of the Riverside Coal Co., has put the matter to the men in this way: "During July the Riverside Coal Co. has killed more Huns than in any months in its existence, and in August it will kill more than in July." Mr. Gunn declares that he's surely fully justified in his

statement, for all his coal goes for war work. For several months practically the entire output of the mine was shipped to Wright Brothers' aëroplane works. The output now largely goes to a plant making aëroplane parts and to a utilities company.

A Kentuckian Advocates Bonuses

Writing, as he says, "with some misgivings," a Kentucky general manager unburdens himself on the subject of bonuses as follows: "Bonuses are a great stimulus to production, and I cannot understand the attitude toward them taken by the United Mine Workers of America, much less can I fathom the reasons which have caused the Federal Fuel Administration to give support to the hue and cry against the bonus. I would like to see a discussion of the subject in your journal.

"I can readily see how the miners' union may object to a low and inadequate wage being supplemented by a bonus when it might be more reasonably corrected by a revising of the scale. But the objections are not equally strong when the wage paid is adequate and when the supplementary payment is not made to remove what is in the nature of an injustice. The wage advance that was recently granted satisfied the mine workers, and they were willing to mine coal under it. The bonuses were added not to satisfy the mine workers and not to bring their compensation up to a level of adequacy, but to induce them to produce more coal than in the past.

"I can not see any harm in a bonus such as granted, still I am willing to concede that a flat bonus paid on each and every ton mined, whether few or many, would cause a chaotic condition, because it would mean that every operator, by adjusting the bonus, could pay any rate he desired. This practice would completely disrupt the labor market in our industry. A bonus on coal mined in excess of a normal tonnage is vastly different. It means that more coal will be mined with a given supply of labor and that the miners will earn higher wages. If it is to be said in reply that by excessive work some of the men will do themselves an injury, the answer is that the eight-hour day and the limitations of the car turn prevent that probability.

"Let me illustrate my remarks by citing a specific case. In a certain mine with which I am familiar, it was found that the men were producing 5 tons a day, or 30 tons a week. In order to encourage them to work more regularly and energetically, thus increasing production, the owner notified the men that he would pay a bonus of 10c. per ton for all coal mined in excess of the average of 30 tons per man per week. The result was most gratifying. The average production was raised 20 per cent. In certain individual instances the increase was much greater. Some skilled miners increased their weekly production 100 per cent. This mine had never been able to operate on Saturdays because it could not induce its employees to enter the mine on the concluding day of the week, yet after the bonus payment was introduced 80 per cent. of a normal run was obtained on that much abused day. Bonuses have recently been discontinued because of the attitude of the Fuel Administration.

"Of course, we should look at the matter from all sides, that of the individual miner, the operator and the public. The first delivers more than an average tonnage and he is entitled to an exceptional price for the coal he mines in excess of the general average. It seems to me that the extra income gives him hope for better things, permits his indulging in comforts otherwise beyond the compass of his purse, opens up to him opportunities for investment and encourages him in the purchase of Liberty Bonds and War Savings Stamps. The bonus stimulates the exercise of those virtues that bring success. It is quite sound in principle and the end which it seeks is in line with the Government requirements for fuel.

"I have heard it contended that if the companies can pay bonuses they can pay higher wages. This argument is plainly unsound, for bonuses are paid out of the lower overhead costs resulting from increased production. This is especially true in this war period. Mines designed for large tonnages have overhead expenses in proportion to the output for which preparation has been made. If the output falls or fails to reach that level, the overhead expense per ton mounts to an alarming figure.

"Am I justified in believing that the miners' union desires to discourage individual effort and for this reason opposes itself to the bonus system? Is it not the purpose of the union to put all men into a straight-jacket, restricting their production to a certain figure? America should mean to the miner 'equality of opportunity and a chance to rise in the world by personal effort.' No miner should feel his wage so regulated to the average wage as to leave him no hope beyond and above his working place. Where men are disposed to earn and save capital they should be given an opportunity, and such opportunity is afforded by bonuses for increased production. Every man who is disposed to replace hand labor by brain labor should be allowed to avail himself of all the chances offering themselves to him.

"Bonuses reward the miner for the additional effort which he makes to increase the coal tonnage and help obliterate the gap in the ranks of the miners caused by the draft. The stopping of bonuses is sure to retard the production of coal at a time when the maximum supply of fuel is absolutely necessary to the success of the war."

Local Would Single Shift Gassy Mines

Claiming that the mines of the Crowsnest Field are too dangerous for continuous day and night operation, members of the Gladstone local, No. 2314, United Mine Workers of America, have petitioned the Minister of Mines of British Columbia to make the single-shift system compulsory in all the coal mines of the district. In support of their demand the local quotes the report of George S. Rice, of the United States Bureau of Mines, who made a special investigation on the Crowsnest coal area on behalf of the Provincial Government. The petition draws especial attention to his observations respecting the gas flow at mines in certain parts of the field. The coal operations of the Crowsnest region are located in what is termed, under the classification of the United Mine Workers of America, District No. 18. This district covers the mines of Eastern British Columbia and Alberta. The direct control of the Dominion Government, which is represented by Commissioner W. H. Armstrong, extends all over this district. Consequently it is probable that the request of the mine workers of the Gladstone local will go before the latter official for decision.

The document setting out the case of the mine workers begins with the assertion that the movement for single-shift operation was inaugurated solely because of the desire to secure greater safety in the mines at Coal Creek. It adds that conditions in the mines were so abnormal and so baffling to the engineering talent of the province that the Government felt compelled to obtain outside advice in order to prevent any further continuance of the appalling loss of life. George S. Rice is quoted as follows:

"On page 340 [of the Rice report] a statement is made that the gas flow from No. 1 East when the mine was idle was found to reach the astounding amount of 1,795,680 cu.ft. per day. When the mine was working 4,184,600 cu.ft. were given off, there being approximately three times as much gas flow when working as there was when the mine was idle."

Against these figures is held up, for purposes of comparison, the amount of gas used per day by the 11,000 citizens of the city of Medicine Hat, Alta., which amounts to 3,000,000 cu.ft. The document further maintains that gas-flows, blow-outs and bumps in the Crowsnest coal field "have invariably happened on the afternoon shift." This, it is contended, bears out Mr. Rice in his statement that the mines are being developed "too continuously or rapidly." The conclusions finally reached are that "such ground be only advanced at a moderate rate—say one shift in 24 hours." The mine workers say that while they cannot determine the terms of their employment, they can point out to the Government that it has a share in the responsibility for their safety and that they will be compelled to place

the onus on the Government in case a fatal accident arises out of the conditions stated.

While no exception is taken to the men's statements insofar as they have quoted Mr. Rice, it is maintained officially that, great as the gas flow is in the Crowsnest coal field and exceptional as are the conditions, the story has lost nothing in the telling. It is pointed out that conditions have materially changed since the expert from the United States made his investigation. The gas flow per 24 hours now, for instance, is 2,397,600 cu.ft. instead of the 4,187,600 cu.ft. given and it is declared that, "astounding" as these figures may appear at first blush, the conditions at No. 1 East Mine now are not nearly as dangerous as the petitioners would represent.

The safety of a mine is measured, according to the respondents, not by the gas flow so much as by the percentage of gas in the air currents. The mine officials say that looking at the situation from this viewpoint conditions will not appear so bad for while there is a gas flow in No. 1 East Mine of 1665 cu.ft. per minute there is a flow of 143,640 cu.ft. of air per minute in the main return airway. As a result, according to reliable statistics, the actual gas content of the air current is 1.16 per cent. Further it is pointed out that, among other steps taken by the Government to protect the men, is the regulation that immediately tests disclose the presence of gas measuring 2.5 per cent. or more the men in the working places affected must be withdrawn from the area so charged.

Mine Popular Despite Allegations as to Safety

There are six other mines controlled by the Crowsnest Pass Coal Co., namely, No. 1 South, No. 1 North, No. 2, No. 3, "B" North, and No. 9. With the exception of No. 1 South, which is about as gassy as No. 1 East, the gas content of the air of these mines runs between 0.04 and 1 per cent., but the coal is harder. All of these mines are now operated by single shift, or, to speak more correctly, there was but one shift in these mines in 24 hours at the time of writing and even under these conditions there were a few weeks ago, and presumably still are, idle working places. This is due, of course, to lack of labor and this shortage is considered especially serious because the colliery is understood to have orders for 8000 tons of coal a day and is able to produce approximately only 2000 tons. But it is also thought to be somewhat remarkable that No. 1 East Mine, with which the petition deals specifically, is the only mine which it is possible to work on double shift; in other words, that it is the most popular mine of the Crowsnest district, despite the allegations made as to its safety. The question has been asked: Is its popularity due to its soft, easily-mined coal? Of course the easier the coal is to work the more can be mined and the higher the wages. The question is finally put thus: If the men are so eager to work in this mine that they fill up both shifts and will not fill a single shift at the other mines, would they be willing to be deprived of the opportunity of working at this mine if the Government should accept the union's suggestion? Obviously many men will have to be displaced if No. 1 East is to be run single shift as suggested.

Watkins' Letter to His Mine Foremen

From T. H. Watkins, the president of the Pennsylvania Coal and Coke Corporation, the mine foremen of that company have received a letter, urging them to do their part in the production of tonnage and promising them plenty of assistance in performing their duties. This letter runs as follows:

"You have no doubt read the proclamation of the President to all engaged in coal mining. Nevertheless, even though you have read it before, please read it again carefully.

"The President is our commander in chief; therefore, upon him is the responsibility, and we must assume that he is thoroughly familiar with all conditions, particularly those surrounding the supply of coal and its importance not only in assisting to win the war, but in aiding us to win it as speedily as possible, thereby lessening the loss of life.

"In this emergency there are probably no officials on our staff who are more important than the mine foremen, for they are directly in charge of the mines. Upon the mine foreman depends almost entirely the success of the company in securing the coöperation of all of the employees. He must possess courage; he must possess brains and the will to use them, and, of course, a familiarity with the best methods of mining. I want to speak frankly to the mine foreman and to say that I can readily see that at times in a large organization he may not feel that his work is properly appreciated, either by a recognition of the value of his ideas, or by a proper compensation for the work that he is called upon to perform. For that reason he may not work at times with quite the spirit and will that he would exhibit if entirely contented. I recognize that in some cases miners are making more money than the mine foreman over them. We have always considered that the mine foreman who was efficient and attended to his duties had a permanent position and was not subject to such fluctuations in earnings as is the miner. I am giving special attention to the subject of proper compensation for our mine foremen. In the meantime, I ask each of them to remember in what an important way his job promotes the interests of the Nation, and I trust that as far as compensation is concerned the matter will be worked out satisfactorily.

"With the scarcity of labor from which we are now suffering, and which will be accentuated by the draft, the necessity for handling labor to the best advantage is, in our experience, greater than ever and, in my judgment, the mine foreman should keep the following points in mind: 1. To get and keep in personal touch with every one of the men under him. 2. To see that all working places are kept in proper condition. 3. To give special attention to the subject of ventilation, as men cannot work with full efficiency in poor air. 4. To see that all supplies needed by the miner are promptly furnished and placed where they are easily accessible to him. 5. To see that all mining machinery is kept in the most efficient condition and used to the best advantage. 6. To see that all locomotives and cars are kept in the best possible condition, repairs promptly made and cars properly lubricated. 7. To see that all mine tracks, and their electric bonds, are kept in perfect condition.

Mine Foremen Should Welcome Assistance of Others

"In order to give himself full opportunity to use his brain to the best advantage, the mine foreman should ask for such assistance as is necessary for the satisfactory operation of the mine. We have recently placed section foremen under the mine foreman's charge, it being our intention that one section foreman shall not have charge of more than 25 men, each section foreman, of course, reporting to the mine foreman. These foremen should be of great assistance to the mine foreman in making out his reports, from which he can study his plans for efficiency and operation.

"At many of our mines men are laying off for various reasons, some of which are inexcusable. The mine foreman should study with the mine committees, now being appointed, the best way of correcting the habit of delinquency and how to secure the coöperation of the men in the effort to mine more and cleaner coal. When punishment is administered for delinquencies of any character, it should be done with great care and judgment and only after the mine foreman is satisfied that such punishment is well deserved.

"I think the miners as a whole now fully appreciate how important is clean coal for the efficient service of the Nation. The mine committees, I believe, will readily recognize how important it is. All the officers of the miners' organizations have said that a man who at this time loads dirty coal is a traitor to the Nation. However, where it is impossible for men to load clean coal and get out a quantity sufficient for them to earn fair wages, an investigation should be made, and the question taken up with the division superintendent as to whether the men so situated should not have an allowance made while those conditions prevail.

EDITORIALS

A Kentuckian Advocates Bonuses

A STRIKING feature in the Labor Department of this issue is a letter from a general manager who is in charge of big mines in Kentucky. The communication presents arguments in favor of the much-abused bonus, though we do not believe the writer need have any misgivings about the propriety of making public his defense of a proper bonus system. We do think, however, that he is a little unfair to the union, for since the war commenced the United Mine Workers of America, as a body, has been a frank supporter of increased production.

Opposition to bonuses arises from two sources. The operators oppose such bonuses as are planned for the purpose of inducing men to change their places of work. Bonuses introduce competition for labor and increase the labor turnover. Also, they reduce the margin of profit to too low a figure. Mr. Garfield rests his objection on the same basis. In his fulmination against these provisions on Aug. 5 he said: "Information is reaching me that coal operators are bidding against each other for labor by means of bonuses. This evidently causes unrest, and it shifts, but does not increase the total production of coal."

The union objects to bonuses because it claims the bonus is recognized only as a temporary concession, and one to be revoked at pleasure. It is regarded as a free gift of the operator, and the union does not approve of such gifts. The union's slogan, if we may make a guess at it, runs thus: "No good gifts are obtainable without the good offices of the union." The operator who pays a bonus is like the stranger who gives the youngster a dime and thereby convinces him that his father is parsimonious should he refuse to do the same. The union does not approve of free-will offerings of any kind. When these are being distributed the union is liable to be confronted at any time with the criticism, "There is a dollar that you overlooked."

Discontent between those earning bonuses and those not earning them, and not located at mines where they can earn them, adds to the embarrassment. We really believe that if the union could, by actual contract, force the operator to pay a bonus for all tonnage mined above a certain amount, and so could obtain credit for the change and at the same time could make the modification general, it would be disposed to stand sponsor for it. It could not then be charged with laxity, and there could be no heartburnings between the members of the union because some received it and some did not; being general, the bonus would not increase labor turnover.

As is pointed out in the letter referred to, the bonus is, in many cases, really earned. The operator who gets the larger tonnage is helped to lower his operating costs. When a man works until quitting time the flow of coal is rendered more equal through the full eight hours, and conditions are favorable for a maximum use of the mine force. Nothing is more wasteful than the drag in operation after the noon hour. Men scurry everywhere trying to find enough coal for a trip. As soon as work begins to lag and the roadway is full of the lights of departing men, the trips are but half as large as in the morning rush hours. Usually the mine is shut down before the full day has run its course, but when men are scarce the day force is kept on so as not to discourage the men; and when coal is at a premium the day men are sent around hunting cars because the steady miner must be rewarded and every ton available secured.

We have said that the bonus is, "in many cases," really earned. In some mines, however (at least after the war is over), the operator will find himself less able to profit by a large tonnage from each man, for he will have men enough to keep the flow of coal going at full force without any such large unit production. A bonus, then, may make it essential for his financial stability to keep unit production below the level at which the bonus begins and make him as anxious to restrict tonnage as he is now to encourage it.

That is looking far ahead, and some will contend that so long as the bonus is kept around 10c. per ton and is arranged to start at a reasonable figure really representing average production it will almost always be amply earned whenever and wherever it is awarded. How many general managers in Kentucky and elsewhere have longed for a full eight-hour day, with full trips and a sure flow of coal? And in the stub end of the working day how much coal might we not haul with the force of labor on hand if only the miners observed the appointed hours as well as their fellow mine workers?

When the Goddess of Liberty Speaks

IN THIS ISSUE appears a colored insert to call the attention of our readers to the coming sale of Liberty Bonds. The war has put our artists as well as our mechanics to the test. Uncle Sam is no longer the beaming, genial, if somewhat bizarre, gentleman he formerly was: Columbia has surrendered some of her grace while gaining force of character, and here is the Goddess of Liberty full of cares and trouble, though strong in purpose and in courage.

The countenance of the nation is changed, as have been also the faces of its great symbolic figures. The great mission with which we, with our Allies, are charged—no less a task than to give the world a new birth in freedom—has added a new seriousness to our outlook, and has given us an idealism to which, at one time, we believed ourselves to be strangers.

After all there is something larger than money in this world. There are purposes which far transcend personal advantage and private gratification. The war has

shown us that our money and our labors have value only as they promote worthy ends. They are the instruments of service and not merely the playthings of pleasure.

We are asked to invest our money in liberty, freedom of trade, freedom of travel, democracy and honor. And we will invest it freely, for, if we win this war, the world makes a step forward on the road of human brotherhood. Law is henceforth to be founded on the consent of the governed, and is the strong man which, entering the household of this world, will despoil war of its ill-gotten goods.

The appeal to invest is not made on the basis of the interest paid or on the ground of the security offered, though both are ample. National loans are not being floated on these narrow grounds. People said when the war first started, back in 1914, that a loan of a billion dollars would bankrupt the strongest of nations. They reckoned ill who cast up their column without adding in the forces of patriotism. Those ideals never proved stronger than they have done of late in the sale of Liberty Bonds. Each issue has been a revelation of the national solidarity. It has convinced us that there is between man and man a cement of mutual interest and esteem that will stand almost any strain.

We shall put aside the pleasures our wealth can buy that we may see the wonders our wealth can perform and the good our wealth can effect. We will deny our bodies that we may feed our spirits with a new vision of noble achievement. We will be narrow in detail that we may achieve a stupendous result. Every little economy, every little denial will be devoted to filling the golden stream of effort that is setting full from our Atlantic coasts toward the battle line—victory line—in France.

This Is the Day of the Spoken Word

A TIME of increased democratization is at hand. Unless the mine official is prepared to do his duty as a molder of public opinion the floodgates of order and fair play are apt to be swept away. More and more we shall find that it will be necessary for the managers of our mines and factories to be leaders of men, able from the platform to place the right cause in the right way before their men.

Someone complained to Sankey that his songs were set to the Devil's music, and he responded that he did not propose to leave all the best tunes to the Devil. Similarly oratory has been used by men of Bolshevik tendencies, but it is a weapon that can be drawn in a good cause as well as in a bad. When labor feels its power and uses it the only weapons of defense will be the oratory of those whose outlook is broader, painful experience and general reading. Perhaps the most potent of all these forces and the least harmful in operation will be the oratory of the natural leaders of men. Happy will be the time when we can argue our difficulties to a conclusion rather than force a result by strikes, lockouts, discharges and wars.

In the matter of oratory the welfare and safety men are showing the way. They will not absorb the whole stage, however. After a while the operating officials will realize that the platform calls as insistently on them as on any one else.

Electrification Not a War Necessity

MANY ARE THE problems in electrification from coal-mining centers which we will have to work out carefully in times of peace. There is no doubt that, when that time comes, they will be solved quite successfully. The extremists are already quite sure of their ground, but until more work has been done and until the end of the war makes experiments safe the public will prefer to do nothing revolutionary. The electrification of railroads is one of these problems.

The Norfolk & Western Ry. electrification has reduced the cost of freight movement per ton 26 per cent. and increased the volume of traffic 50 per cent.—a noteworthy result. This does not agree with the views of the ardent propagandist. He would suggest that a gain of two-thirds is possible. What gain has been made has arisen largely from the fact that the capacity of the railroad in question had reached its limit under steam operation. By replacing steam by electricity as the motive power a larger tonnage has been attained with consequent saving. It is thought that, had the railroad been electrified in 1905, the change might not have paid; that had it been electrified in 1910 there would have been no marked saving. It is because the business done since 1915 has been large that electrification has so clearly justified itself.

Before the tonnage handled was held down to a certain maximum by the difficulties in operating the Elkhorn tunnel, and it will probably in the future be strictly limited by the restrictive capacity of that critical point.

In order to make the electrification economically feasible it has been necessary to take special precautions to prevent too high a load factor. Portable telephones have been installed permitting the conductor or the engineer of the leading locomotive to notify the power director that the train is made up and ready to start. However, the train dispatchers are not advised by the power director unless the train is to be held more than about ten minutes.

By such careful adaptation of means to ends the installation has been so successful that the Norfolk & Western is extending it twelve miles from Vivian past Welch to Farm, and also five miles from Welch to Wilcoe. The electrified road will then be 41 miles long. But with all its experience the railway is not electrifying the stretches between Williamson and Farm—70 miles—and between Bluefield and Roanoke—106 miles. The complete work will come in time doubtless, and it will then be justified in the results attained; but for the present the installation of another 17 miles of electrification is satisfying the management or is being imposed upon it. The railroad may well desire to spread reconstruction over a term of years, but our legislators as ever will rush boldly in where railroad men still fear to tread.

In the five-year period ending Dec. 31, 1917, there was a total casualty list on American railroads of 980,565. Of this number 48,801 were deaths and 931,764 were injuries. During this period, 1391 passengers and persons carried under contract were killed and 55,887 injured; 14,652 employees were killed and 815,897 injured; 32,879 other persons were killed and 60,080 injured.

Who Says the Miner Can't Ring the Bell?



UNCLE SAM:-"THE STEEL MEN, THE SHIP BUILDERS, THE ARMY, THE NAVY, THE AVIATORS ARE GOOD HARD HITTERS, BUT THE MINER HAS THE BUSTER WALLOP OF THEM ALL. SO PLANT THE MALLET SQUARE ON THE BLOCK AND UP SHE GOES"!

COAL AGE

DISCUSSION BY READERS

Man Power and Longwall Mining

Letter No. 1—It was with pleasure that I read the excellent article of F. A. Pocock, *Coal Age*, Aug. 22, p. 350, bearing on the peculiar advantage of longwall mining as a means of utilizing the present limited man power to the best advantage to insure the production of the largest possible output of coal.

At the outset, Mr. Pocock announces that his remarks do not apply to the anthracite region but are particularly applicable to the entire bituminous field of Pennsylvania. He asks two pertinent questions: "Is there no way of increasing the tonnage per worker? Can the thinker not make the worker more productive?" Let me answer both of these questions in the affirmative, basing my conclusion on the conviction that the adoption of the longwall method of mining where the conditions will permit is the solution to this problem.

In the present crisis, the country must have coal and it must have soldiers, which makes it necessary that the tonnage per man be increased. With Mr. Pocock, I believe that the key to this situation is the longwall method of mining. As proof of the correctness of this conclusion, let me cite an instance of its practical application, recently, in my own experience.

The Virgin Run mine of the Coke City Coal Co. is situated on the Pittsburgh & Lake Erie R.R., about 4 miles

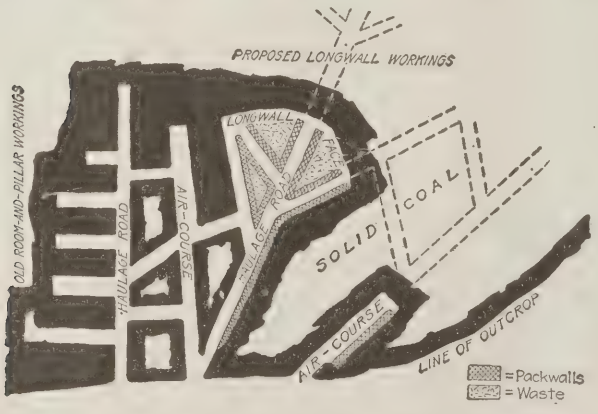


FIG. 1. ROOM-AND-PILLAR WORKINGS ABANDONED FOR LONGWALL

below Dawson, Penn. As shown in the accompanying illustration, Fig. 1, this mine was originally worked on the room-and-pillar system, there being five rooms driven off a single pair of entries. The average thickness of the coal was 44 in., which was improving slightly as the entries advanced under the hill. These entries and rooms had been driven about 10 years ago. On taking possession of the mine, recently, the new company cleaned up the falls and laid tracks to the faces of the entries and rooms, which work was completed May 20, 1918, when the company was ready to ship coal.

The mine proved a tough proposition, operated on this plan. Four or five miners were employed in the rooms and they worked hard, almost burning out the coal with the excessive charges of powder they were compelled to use in blasting. In the start of the work, I saw clearly the impossibility of the undertaking and proposed to the management to put the mine on a paying basis if permitted to open out on the longwall system of mining.

For some time the company refused to consider my proposition, but it finally gave reluctant consent to my trying what seemed to the officials to be a doubtful method. The attempt was permitted to be made in a corner of the hill, to the right of the present opening.

Starting the Longwall Work

As shown in Fig. 1, I at once started a 14-ft. entry at the mouth of the old air-course, driving it on an angle of about 30 deg. to the right of the latter. As luck would have it, the conditions here were particularly favorable to my plan. The pitch of the seam was such that the gateways turned to the left of the new entry afforded an easy grade for handling the loaded cars using a mule to haul the cars.

Desiring to make all speed possible, when the new entry was driven about 40 yd. I opened up a longwall face in the usual manner. Two men were put on night shift and kept busy taking down rock and building packwalls on the gateroads.

My longwall experience, in Derbyshire, Nottingham and Yorkshire, England, convinced me that *coal digging* was not *coal getting*. Someone had taught the miners how to *get* coal by longwall, in the mines of those counties, and I reasoned that it was possible to teach men to do the same here. My first efforts were to bring the miner to understand that the overburden of the seam is utilized to break the coal in longwall, instead of using powder, as in room-and-pillar work.

Overcoming the Prejudice of the Miners

A few minutes' talk with a good miner convinced him of the comparative ease promised by the new method. I explained how it was necessary to cut two tight ends when driving a room or entry, and the man was quick to see that in longwall work, the coal was slabbed and that, when mined, no powder was needed but the roof pressure broke down the coal ready for loading. After that the miners were not slow to see that things were coming their way, and it was difficult to keep them on the old work where a miner would average about three cars a day as compared with eight and twelve cars a day in the longwall section.

About this time, however, I experienced my first difficulty in the longwall proposition. As the men were transferred from the old to the new work, trouble arose from attempting to put the one Slav to work with an Italian miner. I was forced to tell the Slav that he must bring a buddy the next day or work with Tony for whom he had no liking. The big wages the Slav was

making however, made it easy for him to secure a buddy whom he liked.

The rapid progress of the work, under the new plan, soon showed that the equipment of mules and cars was not sufficient. It was impossible to satisfy the men, as I could not give them the cars they could load. The longwall face had been extended so that there was now room to work eight men, and more animals were needed to haul the coal. Trouble again arose when Tony had to work with three Slavs on the same face. The result was that the first day Tony had one of the Slavs by the neck, disputing his right to one empty car, while on that face 20 carloads of coal were down and ready to load.

Taking out all the coal as the face advanced suggested to some the possibility of a general cave, but most of the men had full confidence in the new plan.

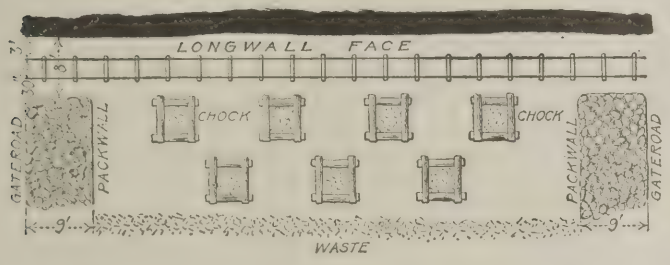


FIG. 2. TIMBERING A LONGWALL FACE WITH CHOCKS

As quickly as the face advanced, as shown in Fig. 2, chocks were built for the support of the roof over the face track, which was moved forward from time to time. On the gateroads 2½ ft. of rock was taken down for building the packwalls shown in the figure. This gave good headroom on the road and it was no longer necessary to take rock to the surface. The packwalls were 8 or 9 ft. in thickness and well built.

Owing to the longer working face, it is clear that there were less roads to keep up, while the extra expense of building the packs never approached the expenditure for timbering and trackwork, in the old system. It will generally be found a good plan to build a chock filled with rock every 40 or 50 ft. in the roadpacks. This will provide for a more permanent roadway when the roof has finally settled on the pack.

In closing, let me say that the success of this operation shows that it is possible to make good longwall miners of men who have been trained for room-and-pillar work. It will pay operators who are skeptical, in regard to the adaptation of the longwall method of mining to their conditions, to investigate this system and, if necessary, make a trip to those sections of England where the method is largely used.

Connellsville, Penn. JOSEPH A. GREAVES.

Ventilating a Gassy Slope Mine

Letter No. 4—Referring to the request of "Mine Foreman," *Coal Age*, July 25, p. 191, asking for information in regard to the best method of ventilating a slope mine, when the seam has a dip of 6 per cent. and generates much gas, let me say, sufficient data are not given to enable one to handle this subject except in a general way. To be able to discuss this matter intelligently it would be necessary to know the size and shape of the field and extent of the mine to be ventilated. also the source of the gas, whether in the roof or the coal; also the capacity of the mine or the expected daily tonnage.

However, assuming that the field is large and of a shape that would permit, I would drive not less than four main slopes abreast, or five if the field was large enough to make that number necessary to comply with the law. These must be driven on the full dip of the seam. If only three slopes are driven, as suggested, and two of these are used as returns there will be no travelingway, unless the men traveled to and from their work on the haulage road or the return air-course, neither of which would be advisable.

MAKING AMPLE PROVISION FOR VENTILATION

A single main intake would not give enough air to ventilate such a mine, especially when you consider that the inlet would be blocked by trips a part of the time. Furthermore, if the mine became very extensive it would be impossible to circulate the required amount of air, under 1 to 2 in. of water gage, and using a single intake.

The fan should be large enough to furnish the required circulation of air, under a water gage not greater than 2 in. and, to accomplish this, it will be necessary to make the conditions in the mine conform to that requirement. It must be remembered that it is practically impossible to make a given fan give the same air with a less gage, or more air with the same gage, as the resistance of the mine determines the water gage for a given volume of air.

In planning a mine of a certain tonnage capacity, the necessary circulation must be estimated to comply with the law regarding the number of men employed and the gaseous condition of the seam. The volume of air so determined should be circulated under a water gage of, say 2 in., which fixes the size and power of fan required The circulation in the mine must then be arranged, by splitting the current, so as to pass the required air under this gage.

INSTALL DUPLICATE EXHAUST FANS

This mine should be ventilated on the exhaust system and all haulage roads and travelingways arranged on the intake air-courses. The fan should be so constructed that it can be operated by either one of duplicate engines, in case of needed repairs or in an emergency The fans should be of sufficient size to yield a fifty per cent. increase, if necessary.

If four main slopes are driven, the two center entries should be used as intakes, haulage roads and travelingways, and the two side entries as return air-courses. Levels or flat headings should be turned to the right and left of the main slopes, and driven three abreast, the two upper levels to be intakes and the lower one the return. Butt- or room-headings should be turned off the flat entries and rooms opened off these butts.

The air should be split at the bottom of each pair of butt-headings and, after ventilating these entries and rooms, it should be carried down the parallel entry and across two overcasts into the return. This system will require a split for each pair of room-headings and no doors will be necessary. If the mine is not making too

much gas it may be possible to ventilate two or more sets of room-headings with one split of air and, in that case, air-lock doors should be used at the mouth of each pair of entries, except the one where the air was first split, after which it could be carried by the overcasts into the return.

The question may be asked, why not make the two lower entries intakes and the upper entry the return, if each pair of entries is made a split, as that would save building the extra overcast at the bottom of each pair of room-headings. This is done so that when they start to draw ribs and stumps in the cross headings they can cut through into the return air-course, on the flat above, and drain the gas from the gobs directly into the return, forming what is known as drains or "bleeders."

Advantage of Driving Levels Four Abreast

If the cost of driving entries is not too great, four flat headings can be driven, the two center ones to be used as intakes and the two outside entries as returns. This would only require one overcast for each pair of cross-headings. Using the two center slopes as intakes permits the laying of tracks in the extra entry, for use as sidetracks or "run-arounds" and make a good haulage system and needs no doors. Where the air is split on the main slope overcasts will be required to carry the return from the lower sections of the mine across the roads going into the flats.

This mine should be worked with approved safety lamps or electric cap lamps, in conjunction with safety lamps. Permissible powder should be used and competent shotfirers employed to charge and fire all holes.

Some attention should be given to the grades at which the headings are driven. The main slopes can be driven on the full dip of the seam. The levels or flat headings should be driven with about a 2 per cent. grade in favor of the loads. The room-headings are driven on an upgrade of about 3 per cent. in favor of the loads. Rooms turned off the room-headings are driven about on the same grade as the flats.

Richard Maize, Mine Inspector,
Uniontown, Penn. Fifth Bituminous District.

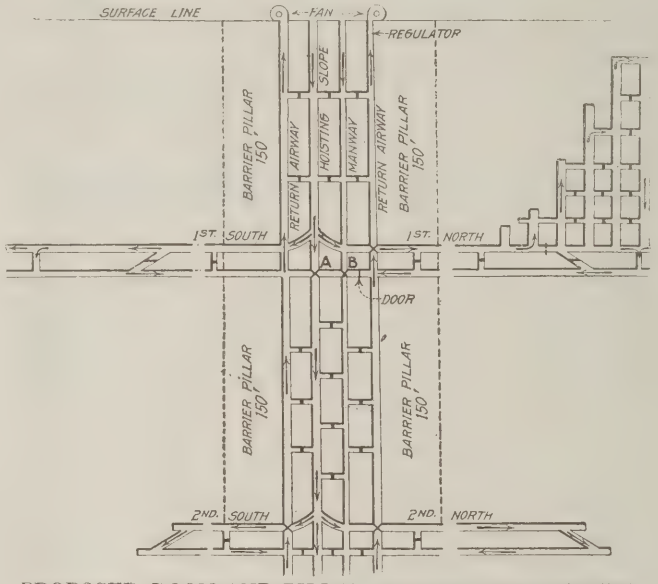
Letter No. 5—I have followed the discussion in regard to the best method of ventilating a slope mine generating large quantities of explosive gas, with much interest, and desire to submit the following, which appeals to me as being best adapted to the conditions outlined in the inquiry that appeared in *Coal Age*, July 25, p. 191:

As the efficiency of any ventilating system depends, to a great extent, upon the method adopted in the development of the mine, I have prepared the plan shown in the accompanying figure. My opinion is that a slope mine, opened in a seam generating large quantities of gas, should not have less than four parallel slopes sunk on the full dip of the seam.

As indicated in the figure, the exhaust system of ventilation should be adopted. In this arrangement, the main hoisting slope and the manway, being the two central slopes, are intake airways, while the two side slopes are the return airways for their respective sides of the mine. Since the men are warm when coming out of the mine, the air in passing down that slope must be controlled by a regulator so as to reduce the draft to which they are exposed.

The hoisting slope is 7½ x 14 ft. in the clear and the manway 7 x 7 ft. in the clear, while the two air-courses should each have a sectional area not less than 64 sq.ft. If desired, steps can be provided in the manway by running poles 6 in. in diameter across the slope and hitching them into the rib or supporting them behind the legs of the timber sets. On this inclination, however, that may not be thought to be necessary.

Two fans are shown in the figure, one located at the mouth of each return airway. These should be reversible so that the air current can be reversed, if that is



PROPOSED ROOM-AND-PILLAR RETREATING SYSTEM

necessary. I would install one fan only the first year, and let the other wait until the development of the workings required an independent circulation for each side of the mine. I consider this a very necessary precaution to take in a mine subject to large inflows of explosive gas.

Each fan should have a capacity sufficient for the ventilation of the entire mine. In order to accomplish this, however, overcasts must be built at *A* and *B*, while the door shown in the crosscut divides the circulation and when closed makes each fan independent of the other. As a further precautionary measure, these fans should be provided with two independent sources of power, steam and electricity, so as to guarantee their continuous operation.

Further explanation of the plan shown in the figure is unnecessary, except to say that if the requirements of the company will permit, I would adopt the room-and-pillar retreating system, driving the levels to the boundary before turning any rooms. This plan will greatly simplify the ventilation by allowing large quantities of gas to be drained off before attempting any extraction of coal in the rooms.

It should be observed that the crosscuts are shown on this plan as far apart as possible, which will give stronger pillars on both the slopes and the entries, besides decreasing the number of stopings required, which are always a source of leakage of air. By employing a booster fan and using flexoid tubing 16 in. in diameter where the room will permit, the distance in crosscut yardage will soon pay for this equipment.

Cassidy, B. C., Canada. J. W. Powell.

Loading Coal at the Face

Letter No. 4—I read with much interest the letter of Thomas Hogarth, *Coal Age*, Aug. 8, p. 282, referring to the record made in the loading of coal by Ed. Blagg at No. 1 mine of the Buckeye Coal and Railway Co., San Toy, Ohio. As stated by Mr. Hogarth, Mr. Blagg is reported to have loaded 508 tons of coal in 22 working days of 8 hr. each, in the month of May.

Like many others, I was tempted to doubt the report. Having worked at the same mine, in the year 1906, I know what a person has to contend with in that mine, in loading such a tonnage as that stated. The seam of coal averages about 3 ft. 8 in. in thickness and is overlaid with from 6 to 8 in. of bone coal.

In entry work the bone coal is taken down with every cut taken out, and it requires one large car to remove that bone from the entry. Judging from my own experience, Brother Blagg would have to load two cars of bone to every 20 cars of coal, making a total of 22 cars loaded each day he worked at the face. As just stated, I had a suspicion that something was wrong and wrote Brother Blagg for first-hand information, and Sam Walters, to whom Brother Blagg referred my letter, sent me the following official statement, which he vouches is correct:

AUTHORIZED STATEMENT OF TIME WORKED AND TONNAGE OF COAL LOADED BY EDWARD BLAGG, DURING THE MONTH OF MAY, 1918

Date	Hours Worked	Tonnage	Date	Hours Worked	Tonnage
1	8	20	16	7	17
2	8	18	17	8	23
3	8	22	18	6	14
4	8	25	20	8	20
6	8	27	21	8	27
7	8	21	22	8	16
8	8	23	23	8	21
9	5	10	24	8	26
10	8	31	25	4	3
11	4	7	27	8	22
13	8	23	28	8	24
14	8	12	29	8	19
15	8	19	31	8	18

This coal was loaded on bank time only. The 7 tons loaded May 11, and the 3 tons, May 25, was all the coal down those days.

The statement shows the number of hours worked each day and the tons of coal mined. It shows that, instead of this output (508 tons) being the work of 22 days, as reported, the exact time worked was 24 days and 2 hours, mine time.

Notwithstanding the error of 2 days, and 2 hours made in the first report, we must admit, as mining men, that Brother Blagg accomplished a great feat, considering the disadvantages existing in that seam in getting the coal ready to load. To my knowledge no person in this part of the country has ever before made such a record, and I want to say that if we had an army of coal loaders such as Ed. Blagg, we would not suffer for a lack of fuel next winter. JAMES H. TAYLOR.

Poston, Ohio.

Travel of Electric Current

Letter No. 5—In reading the discussion of this subject, in *Coal Age*, I could not fail to observe the different aspects in which the several writers viewed the situation presented in the flow of electricity in a conductor. In this, as in most other controversies, it is probable that both sides are partially correct in their contention. What we are pleased to call the "electric current" may be the actual flow of something in a conductor, while, at the same time there is something going on outside of or surrounding the body of the conductor and which is incidental to the current.

The flow in the conductor, when the current is direct or continuous, is probably uniformly distributed throughout its entire cross-section. In other words, when such a current is flowing extremely minute particles of negative electricity called "electrons" move along longitudinal lines through every section of the conductor. On this assumption, an electric current has been defined as "a flow or movement of electrons."

Now, consider what happens at the same time outside the conductor. When the so-called current is flowing through a conductor, a magnetic field is established about the latter. Seemingly, then, the whole discussion hinges on our definition of an *electric current*. Do we understand this term to refer primarily to the flow that takes place within the conductor, or to the external magnetic field incident to and associated with the former?

Reference to electrical authorities reveals no general agreement as to the meaning of the term. Until this morning, I have never had occasion to compare the different definitions given by many books on the subject. I find that no two of them appear to be the same, which, to say the least, is confusing to one in search of exact information.

Personally, I prefer to define an electric current as the flow of electricity through or within the conductor, meaning by that the movement of electrons within the body of the same. I like to regard the effect outside of the conductor as a distinct phenomenon and incident to the current in the wire.

The Electron Theory Helpful

Probably, the actual situation can be most readily understood by adopting the electron theory. In my book, "Practical Electricity," I have endeavored to set forth this viewpoint in an elementary way. My belief is that when one adopts the electron theory and becomes familiar with its essential elements, which practical men may grasp with little effort, many things concerning electricity that were previously regarded in a vague and hazy manner become clear.

Allow me to urge that every electrical man, the practical man in particular, familiarize himself with the fundamental conception of the electron theory. From experience, I know that this will be of great value to his understanding of the subject.

Following are some of the definitions that I found in my search for the true meaning of the word "electric current":

CURRENT, ELECTRIC—A continuous flow of electricity along a conductor; also the rate of flow of the electric fluid through a conductor, representing the ratio between the electromotive force and the resistance.

CURRENT, ELECTRIC — A continuous flow of electricity a conductor, from the higher to the lower of two points having different potentials.

An electric current is defined as the rate of flow of electricity, or the quantity of electricity which flows through a cross-section of the circuit, per unit of time.

The quantity of electricity, per second, which passes through any conductor or circuit when the flow is uniform

It is my hope that the American Institute of Electrical Engineers, or some other qualified authority, will soon define for us the meaning of this term in a manner that will give to it a definite significance.

St. Louis, Mo. TERRELL CROFT.

INQUIRIES OF GENERAL INTEREST

Blackdamp on Pitches

Working at the face of a 35-deg. pitch, in a mine operated in the Buck-Mountain seam, I have experienced some difficulty in the ventilation of my place. What I have taken to be blackdamp appears to hang at the face of this pitch. The gas dims the light and, in other respects, suggests that it is blackdamp.

As is well known, however, the ordinary blackdamp is much heavier than air and accumulates at the face of dip workings and other low places in a mine. It is not natural to find it at the face of a pitch, and I want to ask, Is it possible for blackdamp to hang at the face of a chute pitching 35 deg.? MINER.

Shamokin, Penn.

Before answering these questions, it will be well to understand what is meant by the term "blackdamp," which miners generally think is carbon dioxide (CO_2).

Originally, the term "damp" was used to describe mine gas, as distinguished from pure air. The meaning of the term was a vapor or fume. Later, as miners came to distinguish between gases having different properties, they applied the terms "firedamp," "blackdamp" or "chokedamp," "whitedamp," "afterdamp," "stinkdamp," etc., according to the particular characteristic or nature of the gas observed.

Thus, the true significance of the term "blackdamp" is a gas or mixture of gases that dims or extinguishes the miner's light, leaving him in the dark. The term does not apply to carbon dioxide any more than to nitrogen, but describes an atmosphere deficient in oxygen, which is required for the support of life and combustion.

In a chart issued a short time ago by the Federal Bureau of Mines, the average composition of blackdamp is given as 11 per cent. carbon dioxide and 89 per cent. nitrogen. In the opinion of *Coal Age*, however, it is not possible to give an invariable or absolute composition of blackdamp. It is, on the contrary, a *variable* mixture of extinctive gases, in this respect resembling afterdamp. The term cannot be applied to carbon dioxide unmixed with air or other gases. That is to say, blackdamp and carbon dioxide are not synonymous terms. Likewise, the term "firedamp" cannot be applied to methane or marsh gas unmixed with air. It is a question, also, whether the term "whitedamp" is synonymous with carbon monoxide, as that gas does not represent the mixture the term described in its original meaning.

Returning now to the question asked by our correspondent: What he has very properly called "blackdamp," owing to the extinctive quality of the observed gaseous mixture encountered at the face of the pitch, is not carbon dioxide as he may wrongly assume. It is a true blackdamp mixture, having a specific gravity but slightly greater than that of air. Because of its temperature being somewhat higher than that of the air on the gangway, such a mixture will tend to hang at the face of the pitch.

Taking for example, the average composition of blackdamp as given by the Bureau of Mines, in the chart just mentioned, namely, 11 per cent. carbon dioxide and 89 per cent. nitrogen, since the specific gravity of these gases is, carbon dioxide 1.529 and nitrogen 0.9713, the specific gravity of the assumed mixture would be

Carbon dioxide,	$11 \times 1.529 =$	16.819
Nitrogen,	$89 \times 0.9713 =$	86.446
	100	103.265

The specific gravity of this mixture is, therefore, $103.265 \div 100 = 1.032$, showing that the assumed mixture is slightly heavier than the same volume of air, at the same temperature.

It should be mentioned, here, that such an atmosphere as the one just described cannot be assumed to exist in a mine. It is probable that the air at the head of the pitch referred to by the correspondent approaches a *residual* atmosphere, in which a portion of the oxygen has been consumed by the breathing of the men and the burning of the lamps, and there has been produced, besides, a certain amount of carbon dioxide.

Under these conditions, a residual atmosphere becomes extinctive of a lamp flame when it contains about 3 per cent. of carbon dioxide. The composition of the air, at that stage, is as follows: Oxygen, 16.6 per cent.; nitrogen, 80.4 per cent.; carbon dioxide, 3 per cent. The specific gravity of these gases being: Oxygen, 1.1056; nitrogen, 0.9713; carbon dioxide, 1.529; the specific gravity of the mixture forming a residual atmosphere is calculated as follows:

Oxygen,	$16.6 \times 1.1056 =$	18.353
Nitrogen,	$80.4 \times 0.9713 =$	78.092
Carbon dioxide,	$3.00 \times 1.529 =$	4.587
	100.0	101.032

The specific gravity of this mixture is, therefore, $101.032 \div 100 = 1.01$, which shows that such an atmosphere is slightly heavier than the same volume of air, at the same temperature. To make the density of this mixture equal to that of air, assuming the temperature of the air on the gangway is 60 deg. F., would require a rise of only 5 deg., which probably represents more or less closely the actual condition in this case. Assuming a somewhat slack ventilation of the place, this difference in temperature would easily be attained, owing to the burning of the lamps and breathing of the men working in the place, together with the heat radiated from their bodies.

It is possible, also, that there is an inflow of carbon dioxide into the chamber, either from the coal or from adjoining workings further up the pitch, or from an overlying seam, in which case, the conditions at the head of the pitch would be aggravated. We shall be glad to have this question further discussed by readers.

EXAMINATION QUESTIONS

Kansas Firebosses' Examination Pittsburg, May 15, 1918

(*Selected Questions*)

Ques.—What are the lawful duties of a fireboss?

Ans.—The rules governing the operation of coal mines in the State of Kansas, as they relate to the duties of the fireboss, require him, before going into the mine to first clean and examine his safety lamp and then examine the fan and fanhouse to see that no unusual conditions exist. He must never take an open light into the mine, but must be provided with an electric light when the light given by his safety lamp is insufficient.

He must observe and see that the air is traveling uniformly in its usual course; examine all doors and curtains to make sure that they are in good condition and not leaking, which would allow gas to accumulate in the workings. Where gas in dangerous quantity is found, the fireboss must place a danger signal and permit no one to enter or work in such places, until they are cleared of gas and safe for work. He must permit no one to work on the return air where he has discovered a gas feeder.

Ques.—If, upon making an examination of a mine, you discovered explosive gas in the intake air current of one of the splits in which 45 persons are employed, how would you proceed to protect the workmen?

Ans.—Notify the men at once to extinguish their lamps, proceeding in order from place to place and instructing everyone to withdraw as quickly and as quietly as possible from the mine. This is assuming that the test mentioned showed a dangerous percentage of gas present in the air current.

The percentage of gas that can be considered dangerous will depend very largely on the conditions existing in the mine, in respect to the inflammability of the coal and the amount of dust suspended in the air. If the condition is such as not to be considered dangerous for work, the men should be instructed to use extra precaution in their places; and, at the same time, every effort should be made to increase the circulation of air in that split, so as to reduce the explosive condition of the current. A careful watch must then be kept and frequent tests made to ascertain what changes are taking place and to enable due warning to be given the men in case of danger.

Ques.—After making your examination of the mine, what evidence would there be to show that you had examined all the working places? When and where would you make your reports and what information would the reports give?

Ans.—The fireboss is required to mark the date on the face of every working place examined and found to be safe for work. Where gas is discovered in a place, he is required to fence off all the entrances to the place, placing at each entrance a suitable danger signal, which is warning to all men to keep out. The fireboss' report, when properly made out, is also evidence of what places he has examined.

Immediately on completing the examination of the section of mine in his charge, a fireboss must proceed to the shaft or slope bottom or the mouth of the mine and make out and sign a written report, in a book kept for that purpose. This may be done in the fireboss' shanty near the entrance of the mine or in the office outside. The report must show the time of beginning and completing the examination, and the places examined, giving in detail any dangers that may have been found, stating their nature and where they exist.

Ques.—How would you proceed, with safety, to enter a mine, after an explosion that has destroyed the doors, brattices and overcasts?

Ans.—An examination must first be made to ascertain the condition of the ventilating apparatus and to observe the upcast current discharged from the mine. Everything will depend on the results of that examination, as no attempt must be made to enter the mine except on the intake air. Having organized a rescue party composed of experienced miners, under a competent leader, and equipped with safety lamps and breathing apparatus, which should always be available at every mine, and having gotten together the necessary supplies of tools and material required to rebuild brattices and restore the circulation in the passageways, entrance must be made by following the intake air. No advance must be made ahead of the air, which must be carried forward by constructing temporary brattices. It is necessary to proceed with caution, making frequent tests of the air with the safety lamp and by observing the caged birds or mice that must always be carried by rescuers to insure their safety.

Ques.—How would you proceed to extinguish a mine fire at different stages of the fire?

Ans.—A gob fire, caused by spontaneous combustion occurring in the waste, can generally be loaded out of the mine if taken in time. When a feeder has been ignited and is burning back under the gob the flame can sometimes be extinguished by exploding a small stick of dynamite near the place. It is not well to treat a gob fire with water ordinarily, as the moisture tends to increase the heating of the gob and extend the trouble.

A fire that has gained considerable headway by the ignition of a door, brattice, timber frame or a gas feeder in the coal must be extinguished with water or by the use of fire extinguishing apparatus. When this cannot be done, the place must be sealed off so as to prevent air reaching the fire, which should then die out for lack of oxygen to support the combustion.

When every other means has failed recourse must be had to drowning out the fire, by flooding the place where it is located. For this purpose, it is sometimes possible to build a substantial dam in the opening leading to that section and thus avoid flooding the entire mine.

COAL AND COKE NEWS

What Happened in August

[The bracketed figures in the text refer to pages in the present volume and should the reader desire further information he can obtain it by reference to the pages indicated.]

Aug. 1—Canadian railroads file new rates approximately 20 per cent. higher than those in force—Mines of the Lehigh Valley Coal Co. at Beaver Meadow are flooded by the rising of Sulphur Creek and the bursting of the Beaver Meadow silt dam [289]—Lehigh Valley Coal Co. redistricts its operations [289]—An Austrian, Alexander Frank, by name, is accused of attempting to blow up Wilson Creek mine near Carbondale, Penn. [366]—Increase in wage granted in Alberta coal mines to balance increase in cost of living [407, 457].

Aug. 2—Order establishing production committees at all local mines—Fuel Administration provides price for "sized screenings" to take the place of anthracite and to be used in magazine or base-burner stoves—Order No. 670 issued by Fuel Administration restricting the movement of anthracite coal from any of the coal docks in the States of Minnesota, Wisconsin and Illinois, and in the upper peninsula of Michigan—Conference of mine operators at Washington, D. C., relative to increased production.

Aug. 3—Price is set for the "modified mine-run" product of mines in Barton and Vernon Counties, Missouri, and in Cherokee and Crawford Counties, Kansas—Announcement is made that retail coal dealers in Minnesota and South Dakota have refunded $16,000 to their local customers, or where these could not be located to the Red Cross—During the week just ended anthracite production rose to a record figure, 1,750,490 tons.

Aug. 5—United States Fuel Administrator condemns the coal operators for "bidding against each other by payment of bonuses," threatens where bonuses are paid to assume that the coal price allowed is too high and declares that he will order a lower price in such cases—Weekly reports are required to be made to the Fuel Administration relative to domestic coke production and distribution—Delegates from 52 unions in northern anthracite field meet and demand a 25 per cent. increase in wages, time and a half for overtime and double time for Sundays without increase in selling price of coal [322].

Aug. 8—Fuel Administration orders that cement plants shall consume in the calendar year 1918 only 75 per cent. of the average annual fuel consumption between Jan. 1, 1915, and Dec. 31, 1917—Two plants may combine and pool the coal allowed and larger allowances may be given if market conditions render it necessary—Wood and peat may be used ad libitum if not brought in by railroad.

Aug. 9—President Wilson addresses a proclamation to all those engaged in coal mining, urging steady work and the duty of miners to claim and accept exemption under the selective service draft [319]—All bars are withdrawn restricting the importation of Mexicans for work at coal mines [378].

Aug. 12—New railroad rates become effective in Canada.

Aug. 15—James B. Neale announces that 28 production managers have been appointed [363].

Aug. 16—President Hayes, of the United Mine Workers of America, states that "the only logical solution (of labor conditions in the mining industry) is a substantial flat wage increase to be applied to all classifications of labor [365]—Fuel Administration orders that bona-fide contracts relative to charcoal made prior to order of July 8, 1918, shall stand. This order was privately promulgated Aug. 13—Dominion Coal Co. announces bonus to shippers and loaders [456].

Aug. 17—Fuel Administration makes order adjusting charges for handling and forwarding lake cargo coal and fuel for lake vessels [364]—Fuel Administration provides that the price of coal delivered into the tenders of engines may be 5c. per ton more than that charged for coal loaded in cars for shipment [364].

Aug. 21—Yorkshire (England) mine workers, threatening to strike against Judge Benson's award, receive letter from Marshal Foch—"Coal is the key to victory. The miners of Great Britain must help me."—United States Fuel Administration limits the amount of coal that may be stored by industrial plants [405].

Aug. 22—Yorkshire coal strike begins and comes to an end, the employees receiving concessions [420]—Meeting of district presidents of United Mine Workers to discuss wage increase urged by President Hayes Aug. 16 [365]—Interstate Commerce Commission decides that no additional charge shall be made for freight carried in privately owned cars except where the ordinary rate is based on the cost of transportation of like freight in a type of car that is more readily and cheaply handled. Increase does not apply to stock, coal, coke, rack, flat, box or pocket cars, the additional rate on which remains 3c. a mile.

Aug. 23—Cardinal Gibbons writes a letter to Dr. H. A. Garfield urging greater coal production and stating that the clergy can and will render great assistance by urging the duty of steady work upon their parishioners [541]—An order is promulgated by the Fuel Administration removing, except as to breweries, till Sept. 8 the restrictions on the purchase and use of slack and screenings west of the Mississippi River—[319, 363]. Fuel Administration promulgates a new classification of Alabama coals and specifies new prices for same [406]—Fuel Administration creates a new district in Ohio, No. 9, a subdivision of District No. 5. It includes the Cambridge and Hocking fields. The Fuel Administrator also reduces the prices of all Ohio coals except District No. 8, where adjustment has already been made.

Aug. 24—Fuel Administration announces the beginning of the erection of a "Carbocoal plant near the junction of the Carolina, Clinchfield & Ohio and the Norfolk & Western railways.

Aug. 25—Strike of men of Nova Scotia Steel and Coal Co. to compel four men to retain union membership on their advancement to official position [456, 457].

Aug. 29—Fuel Administration announces that the lamp manufacturers have agreed to eliminate the carbon filament lamp in favor of the tungsten lamp though battleships and industrial establishments where vibration is excessive will probably continue to use them. It is hoped that a million tons of coal will be saved by the use of the more economical lamp.

Aug. 31—Fuel Administration announces that by Sept. 15 it hopes to be able to put in operation a skip-stop provision for street cars which will save 1,500,000 tons of coal a year—War Industries Board orders West Penn Power Co. in Pittsburgh district, to give coal mines a full supply of power discriminating in favor of coal companies as against all other industries [453].

Harrisburg, Penn.

At a meeting of the executive committee of the Pittsburgh Coal Producers' Association on Sept. 4, plans were completed for a vigorous fourth Liberty Loan campaign among the miners of the Pittsburgh district. Philip Murray, president of District No. 5 of the United Mine Workers of America, attended the meeting by request, and will take a prominent part in the campaign.

A meeting of the miners and operators was also held, at which a committee to have charge of the campaign was appointed. This committee consists of three operators and three miners, and will have power to appoint sub-committees of three miners each, which will be stationed at all of the 300 mines in the district, to be known as the Liberty Loan committees, whose duties will be to take subscriptions for the loan. These committees will be entirely independent of the production committee appointed to speed up coal production at the mines.

Richard W. Gardiner, manager and distributor of coal production in the Pittsburgh district, stated on Sept. 6 that complaints have been received by him that certain industrial plants of the district are making a practice of distributing part of the coal assigned to them among their employees. Mr. Gardiner, in a statement issued, says that this is contrary to the orders of the Federal Fuel Administration and that he will unhesitatingly shut off the supply of any plant practicing such distribution of its coal, no matter how small the distribution may be.

Connellsville district, America's premier coke region, smashed all its coal production records for the week ending Sept. 7, according to a report made from Uniontown by W. L. Byers, production manager, to James B. Neale, Director of Production of the Federal Administration. Tonnage for the week was 718,221, an increase of 2424 tons over the preceding week and 1267 tons more than the previous high week of the current coal year.

This record is not only remarkable in itself, but is doubly so when it is considered that it is for the six-day period which included Labor Day. As it stands, it is regarded as a practical demonstration of patriotism on the part of all men engaged in the coal industry of that district. Since Connellsville coal is a great source of coke supply, the record-breaking output is a direct contribution to the nation's blast furnaces which are supplying the metal going into the guns and shells which America is shipping abroad.

Uniontown, Penn.

That a coal company is liable under the compensation law for death or injury received by policemen in its employ is the import of an award made by the State Compensation Board, allowing Mrs. Louis Vecchio compensation in the sum of $7000 for herself and nine children. Vecchio was employed as watchman for the Hustead Semans Coal and Coke Co., and was killed by Andy Medavich, another watchman, in a quarrel over their authority. Medavich is now serving a term in prison for second degree murder.

Monthly shipments of coal and coke down the Monongahela River to Pittsburgh continue to break all records. The aggregate shipments during the month of August passing through Lock No. 4 at Charleroi was 29,282,350 bushels, of which 28,563,000 bushels was coal and 719,350 bushels coke. The increase over the July shipments was 1,530,800 bushels. A decrease in coke shipments was brought about by an increased coal traffic to the Clairton by-product plants. Because of the necessity of keeping that plant supplied with coal it was necessary to shift several steamers from the coke to the coal trade.

West Virginia

The last few weeks have witnessed a marked change in production conditions throughout West Virginia, due solely to an improvement in the car supply. During the second week in September most of the districts in the state were receiving a 100 per cent. supply. Relief was not only afforded by the railroads and a pronounced increase in production shown, but at the same time apprehension lest the mining industry be badly crippled by further draft inroads was dispelled when the district draft board for the southern district of the state issued a statement that the board proposed a more liberal construction in its classification as to "skilled" laborers. At the same time production committees were beginning to secure results from an active and well organized production campaign. Circumstances, according to operators, seem favorable to an increased production during the month of September, if the record established during the last week of August is to be accepted as an indication of what it may be possible to establish. Even the Labor Day loss of production was to some extent offset by working at night during

the days immediately preceding and immediately following that holiday.

Production of coal in the New River field has within the last few weeks been increased an average of 30,000 tons a week over the normal production during August. This increase represents a gain of 7 per cent. in the field proper and 8 per cent. in the Winding Gulf district, the last named division now producing about 105,000 tons per week. The production committees for the New River and Winding Gulf fields have been busily engaged in organizing both the fields mentioned right down to each mine and each man, with substantial results to show for such work. Car supply in both the New River and Winding Gulf Districts since the first of the month has been practically 100 per cent., or equal to all requirements of the mines, the districts in question being supplied by both the Chesapeake & Ohio and the Virginian Railways.

There has also been a most perceptible improvement in the Kanawha region insofar as transportation facilities are concerned, although the betterment of conditions in that region was not apparent until last week, when the holiday cut into production. Under favorable conditions the mines in the Kanawha district are capable of producing in the neighborhood of 220,000 tons a week as against the 168,000 tons produced according to the latest figures available.

Coal has been produced in much larger quantities during the last few weeks in the Fairmont field than was the case during August, an increased car supply making this possible. While late placing of cars has to some extent curtailed production in the Fairmont field, even when an ample number of cars are on hand, this is being overcome to a large extent and operators in the district are extremely hopeful of being able to establish a new high-water mark during the current month, though this will be dependent almost entirely upon transportation facilities afforded.

With more cars available in the Tug River and Pocahontas districts and with a more liberal construction of the selective service regulations as applied to those actually engaged in mining, the industry in the southwestern part of the state is beginning to hit its stride once again, after a period of curtailed production due to a shortage of man power. While a shortage of cars has not affected production to as great an extent in the districts referred to as it has elsewhere, nevertheless it has even been felt in those districts, but in the last few days an improvement is even observable in the Pocahontas and Tug River districts.

Reverting to conditions in the Fairmont district, the operators in that region, while making no complaint as to the Monday supply of cars in that district, are not satisfied as to the supply which has been vouchsafed them and which is now being given them during the remainder of the week, and while the supply as already indicated is not as bad as it has been within the past month the number of cars furnished is far from adequate.

On the other hand, mines reached by the Western Maryland Ry. have fared exceedingly well during the last few weeks in point of cars supplied them. Such mines are located in Randolph and adjacent counties.

Elkins, W. Va.

A mass meeting of coal operators from Randolph, Barbour, Upshur and surrounding counties was held at the Y. M. C. A. Auditorium at Elkins, Tuesday afternoon, Sept. 12. The meeting was called by C. H. Jenkins, president of the Northern West Virginia Coal Operators' Association, while the directors of the state association were meeting last week at Huntington. The chief feature was an address by Mr. Fleming, who was recently named production manager for the Fairmont district. Mr. Barrett, of the Department of Labor, made a few remarks to operators outlining the work planned by that department.

Mr. Bradley told how the state coal association could be of value both to the country generally in war times and to operators as individuals. He dwelt particularly on the importance of physicians remaining at the mines and not heeding the call for service overseas, pointing out that miners would not remain at the mines if there were no physicians and that such action would mean a serious loss of production.

Mr. Fleming emphasized the necessity of increased production, and urged the operators to name production committees at their mines if that had not already been done. He discussed the necessity of putting it before the mine workers squarely that they were essential to to production of coal and therefore more needed at their present posts than in the trenches. He told of finding draft boards ready to grant exemption to mine workers really essential to production and pointed out that men taken heretofore might possibly be furloughed and brough back to the mines if still in this country. He emphasized the necessity of following out prescribed regulations where mine workers were willing to accept deferred classifications. Pressure must be brought on the mine worker to make such an affidavit, the foreman or superintendent must back this up with an affidavit that he is essential, and the operator must file still another affidavit.

Birmingham, Ala.

Coal production in Alabama during the week ended Aug. 31, totaled only 390,413 tons, as compared with 430,311 tons produced during the preceding week. The slump in production is attributed chiefly to the effects of payday, though there is some complaint also of car shortage. Col. H. E. Hutchens, district director of the railroad administration, states that practically 100 per cent. was attained during the week in furnishing freight cars for coal transportation to the miners. He declines to attribute any of the shrinkage in production to car shortage.

Another drawback in production for the week ended Aug. 31 was the loss of four days work at the Lewisburg mines, where a cloudburst did much damage, drowning four men and wrecking the main entry and flooding the mines. These mines had a daily output around 1250 to 1500 tons.

Among the interesting announcements in Birmingham coal circles during the week was the reported purchase by the Texas Steel Co. of Beaumont, Tex., of two coal beds in this district. The company, according to this announcement, expects to build coke ovens and manufacture coke to be used in some prospective steel works in Beaumont. One of the coal beds purchased by the Texas company is situated on the Warrior River, close to the Louisville & Nashville R.R., and is estimated to contain more than 2,000,000 tons of fuel. The other property is located in the same section and is known to contain a large tonnage of coal.

The coke production in Alabama and the Birmingham district for the past week is holding near maximum, though the Alabama company is expected to cool down its coke ovens at Lewisburg because of the coal shortage resulting from the mine accident there. It will require from 30 to 40 days to repair the damage to the Lewisburg mines, and this will have a material effect on the coke production of the Alabama company. Byproduct coke oven production shows a slight increase.

Victoria, B. C.

Throughout the four Western Canadian provinces the announcement of Hon. Martin Burrell, Minister of Mines, that a Lignite Utilization Board has been appointed to deal with problems concerned with the further development and use of deposits of lignite coal in this section of the Dominion, has been received with satisfaction by operators. Mr. Burrell states that the action is the result of negotiations between the Provinces of Saskatchewan and Manitoba and the Federal Government, and further asserts that his department has been for a long time engaged in an investigation of the possibilities of carbonizing and briquetting lignite coal for household use as well as for producing byproducts such as ammonia, sulphate and gas. It is explained that the Dominion Government passed an order-in-council some time ago authorizing the Minister of Mines to enter into an agreement with the governments of Manitoba and Saskatchewan providing that they would contribute $100,000 each and the Central Government $200,000, for the establishment of an experimental plant and for investigation and experimental work whether before or after the establishment of the said plant, as might be deemed necessary or advisable. Owing to the absence of the Prime Minister of Manitoba in England, the matter was delayed for a time, but the agreement now has been concluded and the Board appointed R. A. Ross, consulting engineer of Montreal, as its chairman. He has been an active member of the Council for Scientific and Industrial Research and has taken a keen interest in the problems under consideration. J. M. Leamy, of Winnipeg, Man., provincial electrician, and J. A. Shephard, a businessman of Moosejaw, Sask., are the other members.

Anchorage, Alaska

Consideration is being given by high officials of the Administration to the matter of expending the $1,000,000 carried in the naval appropriation bill, for the mining of coal in the Matanuska field for the use of the navy. A press dispatch, under date of Aug. 10, from Seattle, reads as follows: "Secretary of the Interior Lane is negotiating with Secretary of the Navy Daniels, whereby the Interior Department, acting through the Bureau of Mines, may superintend the expenditure of the million-dollar appropriation, carried in the naval appropriation bill, for the mining of coal in the Matanuska coal fields for the benefit of the navy. If Daniels rejects the proposal, the navy bureau of supplies and accounts, at the head of which is Admiral McGowan, will create an organization to produce the coal."

Coal land development in the Nenana field is briefly outlined in a report by Andrew Christensen, head of the Land and Industrial Department of the Alaskan Engineering Commission, who recently made a trip of inspection to the interior country:

"Two parties are developing coal prospects along the line of the Government R.R., in the northern edge of the Nenana coal field," reads Mr. Christensen's report. "One prospect is a 5-ft. bed which was uncovered by the grading contractors at Mile 28, south of Nenana. W. F. Lynn has a free-use permit, and is driving on the bed. Some of the coal was used in a pile driver of the Alaskan Engineering Commission, and proved satisfactory. If the bed continues, and is of proper quality, it is the intention of the Alaskan Engineering Commission to enter into contract with Mr. Lynn for furnishing coal when the railway reaches that point.

"Robert E. Burns and associates have uncovered five coal beds near Mile 50, south of Nenana, on the west side of the Nenana River. These beds lie at a dip of about 45 deg. and appear to be an extension of the large beds exposed on Lignite Creek. They vary from 5 to 20 ft. in thickness, and the quantity of the coal appears to be as good, if not better, than the coal exposed on Lignite Creek. Mr. Burns is driving a tunnel on the largest bed, and is preparing to furnish coal to the railroad when the rails reach it. These beds are located about half a mile above the mouth of Lignite Creek.

"Arrangements will be made to have samples from these mines shipped to the Bureau of Mines Experiment Station, in Fairbanks, and careful analyses made from time to time. It is also planned to install an experimental drier for the purpose of drying the coal so as to improve its efficiency. The principal difficulty with the coal in its raw state is that it slacks rapidly, due to the amount of moisture it contains. Experiment with this coal is being looked forward to with considerable interest, because, if it proves satisfactory, it may be unnecessary to construct a spur across the Nenana River to Lignite Creek at this time in order to secure an ample supply of coal. Coal is badly needed by the railroad, and for domestic use in the interior. Wood is selling at an exceedingly high price, and is becoming rapidly exhausted."

PENNSYLVANIA

Anthracite

Pottsville—The Philadelphia & Reading Coal and Iron Co. has completed 84 model tenements of seven rooms each, electrically lighted, at its Eagle Hill colliery. The houses have ample garden room and rent for $7.50 per month.

Kaska—While the three years' accumulation of water is being pumped from the Kaska shaft of the Alliance Coal Co., the colliery is operating as a washery, loading the banks dumped by the former lessees, the Dodson Coal Co.

Freeland—Three miners employed at the Tomhicken colliery of the Lehigh Valley Coal Co. ran several loaded cars from the outside down the slope, wrecking the hoistway so badly that the mine was idle for nearly a week. When arrested they pleaded that the act was one of mischief and not committed with the intention of hindering production.

Bituminous

Connellsville—Prominent business men of this city did their bit on the coke yards in answer to an appeal by the fuel administration and the H. C. Frick Coke Co. A quantity of coke accumulated on the yards of the corporation's Davidson plant was much needed at the mills and could not be loaded by the workmen without cutting into the regular production. The volunteers—bankers, merchants and business

men—turned out each day for several days and went through a 12-hour shift, stopping only for meals. They were paid regular wages for loading the coke, but the majority of them indorsed their pay checks in favor of the Red Cross.

Pittsburgh—Charged with seeking to hinder coal production in the Pennsylvania fields by purchasing all available supplies of carbide, Charles W. Buck, aged 40, a German, of New York, was arrested on Sept. 6 and is being held for investigation by Federal authorities. It is alleged that Buck made attempts to organize a force of purchasing agents throughout the bituminous coal region of Pennsylvania to buy carbide.

Waynesburg—H. G. Rockwell, of Chicago, Ill., has recently purchased five tracts of coal land in Franklin Township, Greene County, aggregating more than 700 acres, at a uniform price of $400 an acre. A tract containing 333.314 acres was purchased from Judge James Ingram, Mrs. Sarah Lindsey, Mrs. H. D. Patton, of Waynesburg, and the heirs of Elizabeth D. Hook, of Leavenworth, Kan. The consideration was $133,325.60. Two tracts were purchased from I. H. Knox, of Waynesburg, one containing 29.7013 acres and the other 50.012 acres, the consideration being $31,885.32. Two tracts were purchased from J. R. Nutt, of Cleveland, Ohio, one containing 171 acres 107 perches, and the other 174 acres 137 perches. The consideration was $153,706.50.

Savan—Vernon F. Taylor, of Indiana, has sold his Savan mine to E. Walker Smith, of Indiana, and Louis Neil, of Kent. The new owners will continue under the old name of the Savan Colliery Co. The consideration is understood to be $50,000.

Starford—The new mine and tipple of Hetrick & Steward has been put into operation and the shipment of coal has begun. The mine is located on the Cherrytree & Dixonville R. R. and shipment can be made by New York Central or Pennsylvania.

Iselin—The Brown Coal Co. has opened the old Hart mine here and is loading coal over the Lowther Coal Co. tipple near Clarksburg.

Uniontown—An order from the Federal Fuel Administration prohibiting the reclaiming of coke and coal from the breeze dumps after 7 o'clock Monday, Sept. 16, has brought consternation to the many local workers of these dumps. The Fuel Administration believes that man power is better concentrated in straight mining and coke manufacturing. Many thousands of dollars have been invested in this side line and profits have been large.

Connellsville—For the six months ended Aug. 31 Luigi Tucci, 33 years old and single, an Italian miner at Leisenring No. 2, drew down just $1,543.18 in pay. His lowest two weeks' pay check was $106.58, and his largest $146.28. He lost two days' time in the entire half-year stretch.

WEST VIRIGINIA

Logan—Coal is now being shipped from the No. 1 and No. 2 mines of the Jones Coal Land Co. on Dingess Run creek in Logan County.

Fairmont—Among numerous improvements being made at the mines of the Horchler Coal Mining Co. at Hiorra, in the Preston-Monongalia field is the construction of a new boiler house and a new bin for the tipple there.

Kingwood—The Irvona Coal Co. expects in the near future to reopen its No. 1 mine, for which a modern tipple has been constructed. Motor haulage is also one of the improvements just made at this operation, of which D. J. Williams is superintendent.

The work of equipping the mine of the Hoffman Coal Co. has been completed and the company has also built a new office building as well as other buildings usually needed for such an operation.

Charleston—The State Department of Mines will conduct special examinations for mine foremen and bosses at Charleston, Oct. 7-8 and Dec. 9-10, making both examinations on Monday and Tuesday, so that those contemplating taking the examination can travel on Sunday.

Moundsville—Charles Fogle, employed at a local mine, has made a new individual record for loading coal. In one day of eight hours he loaded 30 tons, receiving $18.20 for the day's work. He is 55 years of age and his last 11 days earnings totaled $169.69.

Newburgh—Among numerous improvements made at the plant of the Irvin Coal Co. at this place are the construction of new outside buildings. The company has also equipped its plant with motor haulage as a means of speeding up production.

Dan—The Bradshaw Coal Co. is extending the transmission lines of the Appalachian Power Co. from English, W. Va., to its mines at Dan. The company expects to have power available at the mines by Nov. 1.

INDIANA

Petersburg—The Pike County Coal Co., which operates a mine just east of Petersburg, has increased its capital stock from $100,000 to $250,000 and is enlarging its railroad facilities by building one additional mile of trackage. Hoisting machinery is being put in to increase the capacity of the mine to 4000 tons.

Brazil—The scarcity of coal miners has caused a number of retired miners to return to active work. Permits have been issued by the Clay County miners' examining board, in session in this city, to a number of miners who have been out of active work for three or four years. It is said that there is hardly a mine in the state which is not working short-handed and some of them have lost almost 50 per cent. of their working forces through the draft and volunteer enlistments.

ILLINOIS

Harrisburg—All mines in Saline County have resumed operations after four days of idleness caused by Big Four switchmen quitting work because two roadmen began working in the railroad yards here. Employment was refused 64 switchmen, and new men have been sent to Harrisburg to take their places.

Peoria—Declaring themselves to be 100 per cent. American, more than 300 miners, members of local union 1800, have pledged themselves to produce the greatest tonnage of coal possible to aid in winning the war. This action was taken following the reading of President Wilson's appeal that all energies be directed toward the mining of fuel during the period of the war.

Centralia—Work at the No. 5 mine of the Centralia Coal Co. was resumed after a three-day suspension caused by the miners' dissatisfaction over the discontinuance of the 2 o'clock cage, which is an alleged violation of an agreement between mine officials and the miners. District President McAllister, of DuQuoin, arrived in Centralia to aid in adjusting matters and upon his advice work was resumed. The number of men affected by the three-day cessation was 600, and the loss of coal during the three days' idleness was 7800 tons.

Decatur—The Decatur Coal Co. is asking for an injunction against William Kastner, an employee, and the members of the industrial commission, which ordered the coal company to give him a life pension. The suit is filed by the Employers Liability Insurance Co. for the Decatur Coal Co. On May 27, 1917, Kastner was injured in the mine of the Decatur Coal Co. and in February, 1918, at a hearing before an industrial commission arbitrator, he was given $6 a week allowance for 41 weeks, and a further sum of $6 a week for 175 weeks for the loss of his left leg, injured in the accident. The company was dissatisfied and filed an appeal, the matter being taken to the industrial commission. This commission awarded Kastner $6 a week for 272 weeks and $2.48 for one week. After the 272 weeks period has expired the Decatur Coal Co. is to pay him $10.90 a month as long as he lives. The company now contends that it agreed with Kastner two days before the finding of the industrial commission on a settlement on the basis of the first award and now seeks an injunction to set aside the results of the appeal.

Collinsville—Digging coal is better than being chief of police and water commissioner in Collinsville, Tony Staten, chief of police, and Sam Harrison, water commissioner, have resigned to go back to the mines. They have been getting $100 a month each as officials. They say they can make twice as much as miners.

Benton—T. O. Ratramel has just completed a successful drilling at Dale, near Benton, on the Louisville & Nashville R.R., where he struck a good vein of coal 7 ft. 9 in. thick. Ratramel has a contract to drill down to the lower vein before completing work. Dale and McLeansboro capital is interested, and a $60,000 company has been incorporated to sink a shaft and to operate a mine. A total of 10,000 acres of land has been leased, and a mine will be operated on a royalty basis.

ALABAMA

Lewisburg—The mines of the Alabama Co., which were put out of commission by a cloudburst late the evening of Tuesday, Sept. 5, will not be in a position to resume operations for 30 days or more, pending the repair of extensive damage. John Pennington, contractor, and three negro miners lost their lives in the catastrophe. The work of rescuing the men caught underground following the cloudburst reflects great credit on the officials of the company, C. H. Nesbitt, chief state mine inspector, and others who remained in charge until every man had been removed. A number of large auxiliary pumps are working steadily to clear the mine of water. It is estimated that damage to the mouth of the mine will exceed $15,000, while the loss underground is placed in excess of $10,000. The Lewisburg mines have been in constant operation for 30 years and the output is approximately 1500 tons of coal a day.

Foreign News

Victoria, B. C.—Permission has been granted by George Wilkinson, Chief Inspector of Mines for British Columbia, for the opening of the Jingle Pot coal mine, Vancouver-Nanaimo Coal Mining Co., Ltd., which was ordered sealed ten months ago, owing to the discovery of fire. In the interim the mine has been flooded.

Vancouver Island coal is being utilized by the United States Navy Department on a large scale, the Canadian Collieries (Dunsmuir), Ltd., having entered into a contract to supply as much as can be mined for export. One of the company's officials, in confirming the report, stated that there was no limit to the amount, it being understood that the Navy Department would take as much as could be delivered. Some weeks ago the first cargo of coal under the new arrangement was loaded by a vessel of the United States Shipping Board's fleet at Comox for delivery at the Pearl Harbor Naval Station, Hawaiian Islands. Others have made calls for coal, having a similar destination, and all ships making their base at the Bremerton navy yard will burn Comox coal. This coal, some years ago, was subjected to exhaustive tests as to its suitability for use on American warships and, as a result, the British Columbia production was declared to be almost as good in steaming qualities as the American navy standards.

Personals

Clarence W. Hippard has been appointed research graduate assistant in mining engineering in the University of Illinois. He graduated from the Missouri School of Mines in 1917 with the degree of bachelor of science in mine engineering. From 1909 to 1913 he was engaged in practical coal mining and served one year as assayer for the Stewart Mining Co. at Kellogg, Idaho.

W. E. Seese, of Echo, Penn., has resigned the superintendency of the Black Diamond mines in order to devote his time to several operations of his own in the same locality. Mr. Seese had been superintendent of the Black Diamond operations for about six years.

L. A. Osborn, of Welch, W. V., has succeeded C. L. Biddison as general manager of the Bradshaw Coal Co. at Dan, W. Va.

John Gibson, Jr., of Pittsburgh, Penn., general manager of the Penn Smokeless Coal Co., operating in Somerset County, Pennsylvania, has been commissioned captain of engineers in the army and will leave in ten days for Camp Humphries, near Washington, D. C.

Francis W. Lockhart, of Somerset, Penn., secretary of the Somerset County Coal Operators' Association, has been appointed production manager for that district.

M. M. Broughton, of Connellsville, Penn., superintendent of the Connellsville division of the Baltimore & Ohio R. R., has resigned his position to become connected as a partner in a new coal company.

George Cokely has resigned his position as superintendent of the Tide mines of the Tide Coal Mining Co. near Homer City, Penn.

Frank H. Crockard, for the past year president of the Nova Scotia Steel and Coal Co., has accepted the presidency of the Woodward Iron Co., of Birmingham, Ala.

Obituary

Fred Lesser, mine foreman of the J. S. Wentz Co., Hazlebrook colliery, died recently at the Hazleton Hospital, due to an attack of intestinal trouble.

Publications Received

The Santo Tomas Cannel Coal, Webb County, Texas. By George H. Ashley. Department of the Interior, United States Geological Survey. Bulletin 691-I. Illustrated, 6 x 9 inches.

Methane Accumulations from Interrupted Ventilation, with Special Reference to Coal Mines in Illinois and Indiana. By Howard I. Smith and Robert J. Hamon. Department of the Interior, Bureau of Mines, Technical paper 190. Illustrated, 42 pp., 6 x 9 inches.

Trade Catalogs

"The Standard" Scales. The Standard Scale and Supply Co., Pittsburgh, Penn. Catalog A.235. Pp. 48; 8½ x 11 in.; illustrated. The scales described and illustrated in this handsomely printed catalog include those that will weigh anything from a small package to a carload of coal. A telegraphic code and comprehensive index is included.

Industrial News

Louisville, Ky.—The Mountain Gem Coal Mining Co. has filed amended articles authorizing an increase in the capital stock from $10,000 to $20,000.

Jacksboro, Tenn.—The Smith Blue Gem Coal Co., capital $4000, has been incorporated by A. W. Smith, Jr., R. Y. Gray, Jr., Jay Lindsay and others.

Youngstown, Ohio—The United States Railroad Administration has authorized the construction of the 5½ mile railroad required to connect the coal property of the Youngstown Sheet and Tube Co. in southwestern Pennsylvania with the steam carrier serving that territory.

Charleston, W. Va.—Suit has been instituted by the New River Co. and by the other companies operating in the same section against the Virginian Power Co. for $150,000 for damages for failure to furnish power to operate the mines in the territory covered by the power company.

Frontenac, Kan.—Two or three coal mining plants will be erected by the Jackson-Walker Coal Co. at an expenditure of $25,000. It is reported that the material needed will include belts, boilers, cages, cars, concrete, conveyors, hoists, lumber and track for inside and outside the mines.

Cleveland, Ohio—The Jeffrey Manufacturing Co., of Columbus, Ohio, has reopened its branch office at 437 Leader-News Building. P. C. Dierdorff and C. B. Reed, who have had years of experience in the solving of elevating, conveying, crushing and mining machinery problems, will be in charge.

Arma, Kan.—The Central Coal and Coke Co. will start work about Oct. 1 on the opening of two mines, each to cost in the neighborhood of $25,000. The material and equipment not yet purchased includes lumber, roofing, engine, boilers, hoists, screens, conveyors, belts, concrete mill and hardware.

Pittsburg, Kan.—Work will be started Oct. 1 on the coal mining plant of the Machie-Clemens Co. D. W. Jones, the superintendent in charge, states that about $25,000 will be expended. Some of the material and equipment not yet ordered comprises belts, boilers, cages, car loading device, coal cars, conveyors, hoists, lumber, etc.

Cleveland, Ohio—To facilitate the handling of its mine hoist business, the Ridgerwood Manufacturing Co. has opened a branch office in the Union National Bank Building. Ernest F. Pegg, who until recently was associated with the W. M. Pattison Supply Co., former selling agent for the Lidgerwood Company, will be in charge of the new office.

Milwaukee, Wis.—Six steel cranes (Brownhoists) formerly used by the Milwaukee Western Fuel Co. have been commandeered by the Government and will be dismantled and shipped to war plants in the East. The cranes originally cost $125,000, but at the present price of materials and labor it is said they could not be constructed for less than $500,000.

St. Louis, Mo.—Barge service for coal and other freight will be inaugurated on the Mississippi and Black Warrior rivers on Sept. 28. At 5 p. m. that day a fleet of seven towboats and 30 barges will leave St. Louis for the first trip down the river. According to announcement stops will be made only at the cities which have provided suitable docking facilities.

Washington, D. C.—The Interstate Commerce Commission was asked recently by the Western Trunk Line Committee of Chicago, representing 30 railroads, some of which are not under federal control, to grant an increase of freight rates on interline shipments of bituminous coal so that the rate on non-controlled lines will be the same as on Federal controlled lines.

Indianapolis, Ind.—It is believed that the production of 2,886,422 tons of coal during the month of August has established a new record in the hoisting of coal by Hoosier mines. The record of July, 2,865,163 tons, has been exceeded by the August production. This new record has been established in spite of the fact that work in the Knox County mining fields was hindered for several days on account of a shortage of cars.

Indianapolis, Ind—A total of 12,000 additional tons of coal mined in Indiana will be delivered daily to the number of railroad lines to make up in part for the portion of the railroads' supply of coal taken over by the Government officials for use in navy and transport work. The daily average of Indiana coal used by the railroads has been 18,000 tons during the recent weeks and this amount will now be raised to 30,000 tons of coal daily.

Pittsburg, Kan.—The Western Coal Co., which has started work on the development of its coal property at Franklin, Kan., expects to be ready to ship coal by the latter part of November. About $25,000 is to be expended on lumber, concrete, hoists, wire cable, engine, boilers, belts, pumps, roofing, coal cars, tracks, conveyors, screens, pipe, etc. It is understood that none of this equipment and material has been purchased. Philip Rayer is superintendent in charge.

St. Louis, Mo.—Coal is to be stored in the streets of St. Louis if there is not room enough elsewhere. Fuel Administrator Crossley has ordered the St. Louis Board of Public Service to issue a permit to the Monsanto Chemical Co. for the use of Geyer Ave. east of Second St. for that purpose. The company has not adequate storage facilities without using the street. It is engaged on war contracts. This is the first time that the use of a street for that purpose has been allowed.

Whitesburg, Ky.—The Elkhorn & Jellico Coal Co., which was incorporated in July, has been organized with M. K. Marlowe as president and general manager; H. L. McGhee, vice president; P. E. Marlowe, secretary; and James A. Marlowe, treasurer. The company has 550 acres of coal land to develop, and has leased other lands and proposes development of a townsite, etc. The company is capitalized at $500,000 and plans immediate development, having started placing inquiries for mine cars and equipment.

Birmingham, Ala.—Motor truck transportation of coal on an extensive scale is being projected by the Birmingham Civil Association, working in conjunction with the County Board of Revenue and the Board of City Commissioners. A contract has been made with the Jenkins Motor Co. to establish two motor lines within the next 30 days capable of moving 200 tons of coal daily. Plans have been perfected for the establishment of a municipal coal yard to supply domestic trade as soon as the movement of coal starts.

Fairmont, W. Va.—Team-track loaders in the Fairmont district, which includes 12½ counties of West Virginia, are back on their old basis. The plan of D. R. Lawson, district representative, to have all wagon-mine coal consigned to the Fuel Administration at the scales at Keyser proved unwise and resulted in a congestion of box cars of coal. Mr. Lawson called team-track loaders together and explained the situation, putting it in such a light as to win their interest for the report system, which wagon-mine operators had not taken seriously up to this time.

Toledo, Ohio—Considerable activity was shown at the Toledo docks in loading lake coal during the week ending Sept. 7. This activity is taken as an indication that the lake quota will be made up unless some untoward event occurs. The Hocking Valley docks loaded 227,252 tons during the week as compared with 180,878 tons during the previous week, making a total of 3,089,542 tons for the season. The Toledo & Ohio Central docks loaded 66,000 tons as compared with 81,000 tons the previous week, making a total of 1,357,000 tons for the season.

Wellsburg, W. Va.—The Electric Mining Co., of Wheeling, a $1,000,000 corporation, has been granted a charter in Charleston to operate mining interests in Brooke County. The company a short time ago acquired control of the J. V. Thompson Coal interests, and one of the most modern mines in West Virginia will be put in operation within a short time. About $550,000 will be expended for machinery, etc. Stockholders include R. E. Breed and H. L. Montgomery, New York; H. L. Finley, Brooklyn; George N. Tidd, Elizabeth, N. J., and Frank B. Ball, Plainfield, N. J.

Harrisburg, Penn.—John T. Dempsey, president of the Miners Union in District No. 1, and Samuel J. Jennings, assistant to the president of the West End and Price-Pancoast coal companies, were on Sept. 12 named additional members of the board of appeals for the middle district of Pennsylvania, division No. 1, with headquarters in Scranton. The appointment of Mr. Dempsey and Mr. Jennings will give the miners' union and the coal industry three men on the board, the other being Thomas Davis, of Nanticoke, who is an international executive board member of the union.

Lexington, Ky.—The May Branch Coal Co., of Lexington, has been reorganized through filing amended articles of incorporation in which the name of the company is changed to the White Ash Fuel Co., while the capital stock is increased from $25,000 to $75,000, and arrangements made for opening a branch office at White Ash, where the company has mines. John W. Masner, W. M. Parrish and James T. Garey, of Lexington, are directors and officials of the company. The amended articles allow the company to deal in timber, coal and mineral lands, and sell the products of such lands.

Frankfort, Ky.—The Secretary of State has handled the following new corporations charters or amendments within the past few days: Blackey Coal Co., Letcher County, increasing capital from $3000 to $40,000. East Kentucky Coal Co., Perry, increasing capital from $25,000 to $50,000. Redwine Cannel Coal Co., Morgan County, increasing capital from $2000 to $10,000. Bruner Coal Co., Manchester, Ky., capital $500; incorporators, G. C. Hibbard, Gertrude Hibbard and G. B. Bruner. Lackey Colleries Co., Ashland, Ky., capital $10,000, R. D. Clere, Myrtle Dennis and E. E. Seaton. Upper Harlan Coal Co., Harlan, increasing capital from $60,000 to $100,000.

St. Louis, Mo.—The recent action of the St. Louis Fuel Committee in ordering a reduction in the price of coke from $13 to $11.25 a ton has been confirmed by Federal Administrator Garfield. When the price was fixed by the St. Louis committee Aug. 6, the coke distributors balked and continued to do business on the basis of $13 a ton. Meetings were held but no settlement was arrived at. The matter was referred to Garfield and he summoned the parties to Washington. The committee was represented by Advisor E. J. Wallace and C. E. Morrow. The reduced price was ordered enforced as of date Aug. 28. Retailers who have purchased on the basis of the higher price will be reimbursed $1.75.

Charleston, W. Va.—The necessary sanction to install sidings having been secured from the Fuel Administration, the Newcourt Coal Co., with an authorized capital of $100,000, will at once proceed to develop a lease of 1300 acres in the Black Band seam, near Brounland, on Brier Creek, in the Coal River section, tests showing a thickness of from 43 to 54 in. in the coal. A modern tipple will be constructed, and when the plant which is to be electrically equipped is ready for operation, it is estimated that the capacity of the plant will be at least 200 tons a day, and later from 500 to 1000 tons a day. W. J. Newenham, formerly of the Pocahontas Consolidated Collieries Co. and of the H. C. Frick Coke Co., has been made president of the new company, with T. E. Courtney, of Charleston, as secretary-treasurer.

Pittsburgh, Penn.—Nine large coal operations in western Pennsylvania, southern Ohio and West Virginia, which were originally purchased by John H. Jones, have been taken over by the Consumers Fuel Co., a Pennsylvania corporation. This company, and the Consolidated Fuel Co. an Ohio corporation with which it is closely allied, have a combined capitalization of nearly $4,000,000. The two organizations are now producing yearly 2,000,000 tons of steam, gas and byproduct coal, and expect to increase the production ultimately to 4,000,000 tons a year. Mr. Jones is retained in charge of production. The companies merged include the Miners Block Coal Co., the Maple Hocking Coal Co., the Goucher Mine Co., the Miners Coöperative Co., the Louise Coal Co., the Quality Cement Coal Co., and the Rachel Gas Coal Co.

MARKET DEPARTMENT

Weekly Review

Labor Day Cuts Into Coal Production—Many Miners Made Up Holiday by Working Extra Time—Soft Coal 17,000,000 Net Tons Behind Schedule—Anthracite Output Ahead of Last Year—No Change in Market Conditions

AS was to be expected, the observance of the Labor Day holiday throughout the mining regions cut into the production of both anthracite and bituminous coal during the week ended Sept. 7. Bituminous output totalled 11,249,000 net tons for the week (5⅓ days), while anthracite shipments for the same period amounted to 1,617,579 net tons.

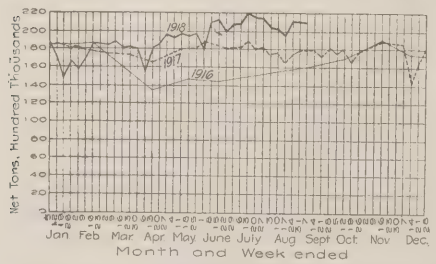
It should be recorded, however, that the miners at quite a few operations made up for the holiday by working extra time the Saturday preceding, and another fact which should be emphasized is that the percentage of absenteeism the day following the holiday was negligible. Appeals to the miners for more regular working time are undoubtedly having their effect.

Bituminous coal output is now approximately 17,000,000 net tons behind schedule, and production for the rest of the coal year must be maintained at the rate of 2,041,000 net tons a day if the deficit is to be made up. The car supply is now excellent, however, and the bituminous mines have everything in their favor for a drive on greater output. Anthracite production for the coal year to date is estimated at 45,645,597 net tons, which is an increase of 1,084,000 net tons over the same period of last year.

Market conditions present no radical changes. The Fuel Administration has the distribution and allotment of all grades of coal well under control, and a determined effort is being made to supply the Northwest before navigation on the lakes closes for the season. Dealers have many unfilled orders on their books, but the total quantity of coal delivered to domestic consumers to date is far greater than was true at this time last year. Conservation, diligently practiced, will be necessary, however, to avert a shortage this year.

WEEKLY COAL PRODUCTION

Production of bituminous coal during the week of Sept. 7, while limited by the loss of time on Labor Day, exceeded production during the week of July 6 when production was also limited 1,000,000 net tons by a holiday. The output during the current week (including lignite and coal made into coke), is estimated at 11,249,000 net tons, a decrease compared with the week preceding of 1,455,000 net tons or 11.5 per cent. and an increase over the corresponding week of last year by 1,257,000 net tons or 11.2 per cent. The average production per working day during the week of Sept. 7 (5⅓ days), is estimated at 2,110,000 net tons as against 2,117,000 net tons during the week of Aug. 31 and as against 1,874,000 net tons during the same week of 1917. The loss of time during the current week places production for the coal year to date approximately 17,000,000 tons behind the summer requirements outlined by the Fuel



Administration and makes necessary an average daily production during the balance of the coal year of 2,041,000 net tons to make up this deficit. This, it will be noted, is 3.2 per cent. in excess of the average daily production for the coal year to date.

Production of anthracite during the week ended Sept. 7 is estimated at 1,617,579 net tons, 28 per cent. less than the production during the week preceding, due mainly to loss of time on Labor Day, and 3 per cent. less than the corresponding week of last year. The daily average during the week of Sept. 7 is estimated at 323,516 net tons as against 338,111 net tons during the coal year to date and as against the daily average of 330,081 net tons during the corresponding period of 1917. The total production for the coal year to date is estimated at 45,645,597 net tons, an increase over the same period of last year of 2.4 per cent.

Shipments of bituminous coal, during the week of Sept. 7, decreased from all districts with the exception of Southwest Virginia, where the increase was slight and amounted to approximately 1 per cent. Material decreases were reported in central Pennsylvania where shipments amounted to 32,122 carloads against 36,724 carloads during the week of Aug. 31, from western Pennsylvania, where shipments amounted to 9098 as against 12,048 carloads; from Ohio, where shipments amounted to 22,545 carloads as against 26,942 carloads; and from the districts including Illinois, Indiana and western Kentucky, where shipments amounted to 44,085 carloads as against 49,614 carloads; and from the district including Iowa, Texas and western states, where shipments amounted to 12,632 carloads, as against 15,603 carloads. Compared with the corresponding week of 1917, all districts, with the exception of Michigan, report considerable improvement.

A considerable decrease occurred in dumpings at lake ports during the week ended Sept. 8. The tonnage dumped during this week (including bunker coal), is estimated at 1,012,297 net tons, a decrease compared with the week preceding of 13 per cent. and with the weekly average during July, August and September of 3 per cent.

Shipments of bituminous coal to New England during the week ended Sept. 7 are estimated at 574,194 net tons as against 604,158 net tons during the week preceding, or a decrease of 5 per cent. Compared with the weekly average for the coal year to date, shipments during the current week were approximately 3 per cent. higher. Rail receipts through New England gateways during the week of the 7th are estimated at 226,130 net tons, slightly in excess of the receipts during the week preceding and the weekly average. Tidewater shipments, amounting to 348,064 net tons, while approximately 10 per cent below the shipments during the week of Aug. 31, are slightly in excess of the weekly average. Shipments during the week declined from all harbors with the exception of Baltimore, from which harbor shipments increased 6.5 per cent. while shipments from New York and Philadelphia decreased 22.3 per cent. and from Hampton Roads 8.3 per cent.

Shipments of bituminous coal during the week ended Sept. 7 not only fell below the shipments during the week preceding, but also below the weekly average for the coal year to date. Shipments from North Atlantic ports and Hampton Roads are estimated at 895,278 net tons, all harbors falling behind the performance of the week preceding. Shipments from New York and Philadelphia decreased 6 per cent. from Baltimore, 0.6 per cent. and from Hampton Roads, 1.8 per cent.

Production of beehive coke in the United States during the week ended Sept. 7 is estimated at 616,000 net tons as against 608,000 net tons during the week preceding, or an increase of approximately 2 per cent. The operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania report production for the week ended Sept. 7 at 390,010 net tons and the operation of their plants at 76.2 per cent. of present capacity. Yard labor shortage was slightly greater than during the week preceding, but such loss was offset by causes not reported.

Operating conditions in the byproduct industry improved slightly during the week ended Sept. 7, such slight improvement being attributed by the operators to a better supply of byproduct coal. The plants of the country were operated during the current week at 90.6 per cent. of their present capacity, shortage of byproduct coal causing a loss of present capacity of 2.5 per cent., labor trouble 1.5 per cent., repairs to plants 4.1 per cent, and all other causes 1.3 per cent. Material improvement occurred in Illinois, Kentucky, Maryland and Pennsylvania. In Illinois the improvement is attributed to a better supply of byproduct coal, in Kentucky to repaired plants, and in Maryland and Pennsylvania to better labor conditions. Tennessee was the lone state reporting material decrease during the week, the cause not being reported. Increased capacity of Illinois plants during the week was brought about by an increase at the Semet-Solvay Co.'s plants at South Chicago, Ill.

BUSINESS OPINIONS

Marshall Field & Co.—Current shipments were largely ahead of the corresponding week of a year ago. Road sales for immediate and spring delivery also showed an increase. Not quite so many customers were in the house compared with the similar period of 1917. Collections continue excellent.

Bradstreet's—Insistent demand for war materials, the return of confidence in previously drought-stricken areas, indications of a heavily increased winter-wheat acreage, a record movement of grain, high prices for all farm products, and the certainty that orders offering are far larger than supplies, stand out as the prominent features of this week's news. Widespread rains putting the soil generally in good condition for a record winter-wheat seeding, some improvement in cotton and corn that had not been injured beyond repair, and unprecedentedly high prices for all kinds of farm produce and meat-producing animals, have removed some of the hesitation shown in the southern and southwestern sections.

American Wool and Cotton Reporter—There is just as much uncertainty as there was some time ago in regard to the available supply of raw wools. Until the maximum army has been developed, it is quite

likely that a conservative policy will be followed in regard to letting out wool for civilian fabric production. Some hope that better conditions will come about is held out through a possible agreement as to raw material supply for all of the allies, and by the increased purchasing of South American wool by the commission handling this portion of the problem. In the cotton market it is thought that with the scarcity of money the banks in the South are not going to be so lenient as previously. For this reason, it will be necessary for many of the Southern farmers to sell their cotton. This ought to be felt fairly extensively and should reduce the price of futures on the exchange when the movement takes place.

The Iron Age—The vast scale of the plans for the offensive in France appears in weekly calls for more steel. The distribution of 34,000 tons of barb wire for the Government is just completed, with 22,000 tons for France in abeyance, when larger war demands for this product came up than have been considered at any time thus far. In the Cleveland district, the placing of 10,000,000 additional shell forgings is one indication of the tremendous recent enlargement of the munitions program. The ordinary consumer's chance of getting steel, judged solely by the developments of the past week, will grow steadily less in the final quarter of the year. Some letting down of demand may come in the structural field. Probably all the fabricated ship work for next year has been contracted for, and it is expected that all essential work will be let before 1919, with a total that will not keep the monthly volume of awards to the 60 to 65 per cent. of capacity that has been the rule so far this year. The poor financial showing of the railroads may rule out much railroad bridge work that earlier was thought certain.

Atlantic Seaboard

BOSTON

Diminished receipts already noticeable. Hampton Roads loading continues slow. Baltimore dispatch not improved. Byproduct and railroad fuel tonnages readjusted. Movement slackens all along the line. Long lists of consignees embargoed from central Pennsylvania. Rail movement falls off slightly, but full effect of embargoes not yet felt. Box cars come forward in volume, mainly to New England, although number is expected to be cut down. Several steamers withdrawn from coastwise coal service, but more due from the lakes. Fires in railroad storage interfere with receipts. Connecticut an area that needs coal. Movement to New York piers not yet sufficiently increased. Baltimore & Ohio movement reduced. Anthracite shipments also sag slightly. Average daily receipts at gateways less than in any month since February. No change as yet in retail prices.

Bituminous—The trade is beginning to realize that already coal is coming forward in less volume to New England. Instead of the harbor being congested with ships, so far as unloading facilities were concerned, there was actual inquiry this week for spot cargoes. A week ago it was next to impossible to comply with the Washington ruling as to permissible stocks and still free cargoes that were waiting to be discharged. It is felt that the visit here last week of J. D. A. Morrow, of the United States Fuel Administration, contributed a great deal to a better understanding on the part of Washington as to the actual situation here, and it is likely there will be a more evenly managed distribution, especially with regard to Hampton Roads. Close observers seem to be agreed that another ten days will see the New England situation materially changed as to current receipts. Both by water and rail there are influences at work that will undoubtedly reduce flow of coal this way. Fuel authorities here are keeping close watch of local conditions and where a plant is found to have an undue supply on hand the fact is promptly reported. On the other hand, if it is found that a plant should not have had coal shut off at the source, the mistake is promptly rectified.

Loading at the Virginia terminal continues slow and causes much anxiety to New England consumers who are counted upon to pay the demurrage bills. The tonnage of bottoms waiting is still far in excess of coal available, and it is probable that this will continue indefinitely or until the number of bottoms is reduced to a really considerable extent. More and more of the modern type of collier, self-trimming and of fair speed, will be taken for oversea work as the season advances and requirements for supply service are increased. The Inter-Allied Shipping Board is watching this situation carefully.

Baltimore dispatch varies from Hampton Roads only because less tonnage is involved. The flow of coal has slackened materially, but steamers are still being entered to load. It is not that the coal is moving to the New York piers rather than to Curtis Bay, but that more is being ordered west and to plants along the line.

District representatives and others have been engaged now for more than a week in readjusting tonnages for railroad fuel and for byproduct use. Government requisitions for byproduct plants have enormously increased the last few weeks, and to meet these some radical cuts have had to be made in other directions.

Railroad fuel receipts are about the same, although due for an increase soon. The average for 12 days in September for bituminous at the five gateways, commercial coal and railroad fuel together, was 708 cars, or less than the average in March, 1918. Particularly is this cut in receipts noticed in the last few days, the average of which would be 50 cars less per day. It is another sign of the decreased shipments that prevail or are soon to prevail in all quarters. It is likely that September as a whole will show a very marked reduction in New England receipts, especially where the full effect of embargoes is evident.

Wagon-loaded coal continues to come forward in volume, and practically 80 per cent. of that from the central Pennsylvania district comes to New England. Early in July this coal was most welcome to New England and the fuel authorities have been grateful for the extra volume of coal this has meant. Everything has been done in the way of prompt payments, etc., to make shippers feel the coal was being put to good use, but latterly it has become increasingly difficult to find consignments for the whole 600 cars per week. Labor is scarce, the railroad authorities are constantly complaining of delays in unloading, and the inferior quality of much of the coal have all been against a growing tonnage. The result is that for the next few weeks New England will hardly be in position to take more than half what was readily absorbed a few weeks ago.

Colliers, in tonnage amounting to approximately 90,000 tons, have been released from the trade and are now being made ready for general cargo use to France. Most of these were ships not well adapted to coal carrying, although some were built for this trade. The latter will doubtless be requisitioned as colliers, to help meet the demand for coal overseas.

Perhaps the one area in New England where reserves are less than the Washington rule allows is Connecticut. Industries in that state have not had the advantage of the increased movement of steamers because there are no ports where such ships could unload. In fact, the increased volume of coal for Curtis Bay, Baltimore, meant reduced shipments to the New York piers and these have not yet been built up to a point where cargoes could be regularly loaded for points on Long Island Sound where the need is greatest.

Anthracite—Receipts of domestic sizes both all-rail and by water have also sagged the past fortnight. The average number of cars per day at the New England gateways for 12 days in August was 452. Some of the days recently the movement has fallen below the mark for any week since February. Receipts of anthracite screenings remain fairly stable, although practically all this coal is moving on old contracts.

No change has yet been made in retail prices to affect the recent 30c. advance. Dealers are hard put to it to make deliveries in sufficient volume. Some retailers are making an effort to deliver at least one ton on each requisition on file.

NEW YORK

Dumpings of anthracite at the local docks show a decrease, but dealers are kept busy. Conservation of fuel urged by Fuel Administrators if serious shortage is to be averted this winter. Producers directed to increase shipments to certain localities. Bituminous market in better condition than it was a year ago. Demand continues heavy.

Anthracite—Reports of heavy production and shipments from the anthracite fields cannot be said to be reflected in receipts here. While shippers and dealers are not gloomy as to what conditions might be next winter, they are not over-enthusiastic as to the prospects. They confess to handling an unusual amount of coal this summer and the retail dealers admit having placed a heavier tonnage than usual; still they say that more coal must be sent to this market if serious conditions are to be averted. One shipper who handles a heavy tonnage, especially through New England, probably voiced the opinion of most members of the trade similarly situated, when he said, in reply to a question concerning trade conditions: "We are just holding on."

Urging conservation of fuel several statements were issued from the offices of the local Fuel Administrators last week. One of these limited the amount of coal to be delivered to consumers until other consumers have received a portion of their winter's supply.

Receipts here are reflected in the number of cars of anthracite dumped at the local docks. For the seven-day period ending Sept. 13, this amounted to 6635 cars as against 6719 cars for the week ending Sept. 6, a decrease of 84 cars.

There has been no relative change in the positions of the domestic coals. Demand for each is about evenly divided, stove being the shortest. The steam coals are differently situated. Buckwheat No. 1 is long, rice moves slowly, and barley of which there was an overabundance a few weeks ago, is short with some of the large producers.

The retail situation is active. While the dealers are not getting all the coal they would like they are kept busy because of the lack of labor. They admit putting considerable more coal in consumers' bins than usual, but their orders are far from being cleaned up. In the Bronx the dealers have fixed upon a week in October as a time to make a clean-up of one or two ton orders.

E. E. Hawkins, Jr., Fuel Administrator for Suffolk County, Long Island, has announced the allotments of domestic sizes of anthracite for the various towns and cities of that county for the fall and winter, and also the maximum prices allowed for the various grades of coal. The prices average about $1 a ton higher than those of the April to September schedule and range from $10.05 to $10.55 for broken and egg sizes; from $10.30 to $10.75 for stove and chestnut, and from $9.40 to $10 for pea coal, the variations in prices being based on transportation charges. The allotment is 189,604 gross tons, not including the tonnage needed in Camp Upton. Mr. Hawkins believes that with economy there will be sufficient coal to go around. No coal is allowed for houses opened only part time, such as summer residences which it has been the owners' custom to visit occasionally in winter. The supply is cut for commercial greenhouses to half of demands, and none is allowed for private greenhouses.

Current quotations, per gross tons, f.o.b., tidewater, at the lower ports are as follows:

Circular	Individual	Circular	Individual
Broken..$6.75	$7.50	Buck...$5.10	$5.90
Egg.... 6.65	7.40	Rice.... 4.65	5.10
Stove... 6.90	7.65	Barley.. 4.15	4.30
Chestnut 7.00	7.75	Boiler.. 4.60	
Pea..... 5.50	6.25		

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates. Prices for buckwheat, rice, barley and boiler are not fixed by the Government.

Bituminous—The bituminous situation continues to move slowly, with comparatively little tonnage moving compared with the demand. While some consumers have large stocks on hand others have barely enough to keep their furnaces going. However, the situation as a whole is better than it was at this time last year.

Efforts are being made to secure a modification of the order of Aug. 2 fixing a maximum storage period, and already nearby New Jersey manufacturers believe they will be able to secure an increase of storage time from 30 to 60 days. After argument by the committee representing the New Jersey manufacturers it is said consent was given whereby that State is allowed an extra supply of coal on tidewater deliveries.

There was an improvement in the dumpings at the local docks during the week ending Sept. 13. 7630 cars of bituminous having been dumped as against 6823 cars dumped the previous week, an increase of 807 cars. Much of this coal was sent, however, to New England and Long Island Sound points, with the result that local dealers did not reap much benefit.

The bunker situation is looming up again. Because of the vast number of vessels continually in the harbor demands for this grade of coal are heavy and shippers are sometimes hard pressed, but so far there has been no delay in loading.

There is enough of the ordinary grades of coal to go around, but spot buyers can-

not be supplied, free coals not being obtainable.

This is due in part to the shipping by nearly every operator, on orders from Washington, of a substantial part of his output, leaving the balance for his old customers.

Current quotations, based on Government prices at the mines, net ton, f.o.b., tidewater, at the lower ports, are as follows:

	Mine Gross	F. o. b. N. Y. Gross
Central Pennsylvania:		
Mine-Run, prepared or slack	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of-Mine	3.08	5.23
Prepared	3.36	5.51
Slack	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite trade stirred by cool weather. Customers complain of distribution. New allotment figures given out. Shipments show falling off. Operators hopeful as to future. Criticism as to retail prices. Steam sizes show some easing off. Little demand for culm. Bituminous helped by improved car supply. Distribution plans working well. Brokers easier.

Anthracite — Cool weather brought trouble for all dealers. They were besieged by their customers, for few seem to be satisfied. Those who have had no portion of their orders delivered insisted on a few tons immediately, while the more fortunate, whose coal bins are partly filled, demanded the balance due. The dealers were kept busy explaining how impossible it is for them to care for a year's business in six months.

A number of representative dealers have recently expressed regrets for not having distributed their receipts of coal differently. They claim they would be in a better position today if they had received only a few tons on every order received. Then all their customers would be in shape to at least start their fires when necessary. In giving the full two-thirds to many of their larger buyers, who as a rule are the most impatient, they have not only failed to satisfy them but they have been forced entirely to neglect many small orders. The same conditions prevail in the suburban sections.

This week the anthracite committee gave out the long awaited new allotment figures based on an increase of 18 per cent. over the basic year of 1916-17. This list covered every community in the state entitled to anthracite coal, as it will be recalled that thirty counties by a previous ruling are not to receive any anthracite. For this city the increase amounted to 451,155 tons, or a total of 2,800,000 tons. While the trade was satisfied in a way that the figures had at last been given out, yet there is a feeling that they would rather have shipments than estimates of what they are expected to receive. Coincident with this announcement shipments seem to have experienced a decided falling off. The shipping companies are advising their trade that New England territory is again receiving preferred treatment.

There has been considerable newspaper agitation about the difference in the retail rates as charged by the different dealers. It seems that some dealers are in a general way accused of charging higher prices than allowed by law. This is due to the two different wholesale prices adopted for the company and individual product, and there seems to be little possibility of correcting the evil while the Government allows the so-called independent operator to charge 75c. above company prices, with an additional 20c. when sold through brokers. Some dealers have coal coming from all shippers and middle houses and as they are expected to establish new rates every two weeks based on the average price paid the 15 days previous, it is an almost hopeless task for the fuel administrator to keep a strict check upon them. Investigation shows the dealers who buy most of their coal from the big companies are selling far below the dealer who is chiefly supplied by the smaller houses. We are inclined to believe the representative houses are well within their rights and if there is any abuse it is among a class who handle very little coal.

The retailers are meeting little success as yet in breaking down their customers' preference as to sizes. Certain it is that those buyers who are the least particular in this respect are the ones who are getting the best service these days. While the buyers still indicate their preference for stove and nut, it makes no difference in the dealer's demand upon his shipper for coal of any size. For this reason there is some slight accumulation of egg, as well as a slight increase shown in the quantity of pea, in the bins, but the stocks of even these sizes are not of sufficient volume to cause any comment.

The fuel authorities are continuing their efforts at conserving every possible ton of coal and have now issued an edict that no club in the city shall have more than a week's supply of coal on hand at a time. They are also further restricted in that they will be ordered to close their buildings at 11 p.m. when the cold weather comes.

There is just the slightest easing off in the steam trade. This is perhaps only noticeable to the largest producers and is even indicated in buckwheat with them. Not that this size is in actual surplus, but they are having less trouble in filling their pressing requisitions. With one company handling a special grade they were actually looking for increased business on it and notified some of their choice trade that they could possibly accommodate them with a few hundred, or even a thousand, tons. Very often, however, the exemption law on this size causes trouble. It was reported on rice that some of the big shippers could actually handle some new business, although they did not go after it. With culm the activity seems to have almost ceased for the time being and no particular demand is now looked for until winter is well upon us.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.25	Buckwheat	$3.40	$4.45
Egg	4.80	6.15	Rice	2.90	3.80
Stove	5.05	6.40	Boiler	2.70	3.70
Nut	5.15	6.50	Barley	2.40	3.30
Pea	3.75	5.00	Culm	1.25	2.15

Bituminous—There is something of a changed tone in the bituminous situation. Most operators are reporting a better car allotment, although disappointment is expressed at the inability to keep sufficient labor on hand at times to load the cars. The distribution of coal to the smaller war plants, as well as some of the non-war industries, is progressing satisfactorily. The plan of giving the former at least a 30-day supply and the latter 15 days seems to meet with favor, although the larger concerns are somewhat anxious now that they are not receiving storage coal in the volume they have been accustomed to all summer long. Some of the larger concerns have had trouble during the previous month with spontaneous fires and this as much as anything led the distribution committee to make the change, as their attention was in this way directed to the large quantities which they had accumulated.

The brokerage trade is also somewhat brighter, as with the increasing car supply they have been able to handle a better tonnage than for some time back. Of course there is no solicitation on their part to dispose of this coal, as they all have standing orders that would take many times the quantity they are able to procure. It is now a settled practice for at least the smaller houses to keep a representative in the region gathering in coal.

BALTIMORE

Good tonnage flow of bituminous continues, and there is a betterment noted in grade. Still room for improvement, however. Anthracite tonnage for August disappointing. Prices go up 40c. retail.

Bituminous—A fairly liberal tonnage flow continues here. Because of the fact that quite a number of industries, well supplied under priority deliveries in the months past, are temporarily off the supply list, the distribution here in some cases has been liberal enough to allow stocking up in some measure by industries that had been living virtually from hand to mouth on fuel needs. Following some rather strenuous complaints, including one of an ice company that was shut down because it could not maintain steam with the kind of coal supplied through the local administrator, the district representative promised a better flow, at least in part, and some little improvement is already noted. There is room for improvement, however. This bad coal is not only confined to the all-rail business, which is largely in box cars, but to the open-top car deliveries at the tidewater pool. Most of the coal that comes to the pool for local delivery over the piers is poor, and the condition was so marked that two pools of fair grade coals were recently abolished and all the fuel turned into Pool 18, which has always been a poor grade section and disdained by most industries in ordinary times. Two other better pools here are practically out of the market also because their coals are now going exclusively for railroad fuel purposes. The balance of the coal coming through is under Government control.

Anthracite—Figures just given out here of August tonnage of hard coal prove the dissapointment of the dealers, who had been led to hope that the month would see a big spurt to make up for the deficiencies in shipments in April, May, June and July. The tonnage indeed fell below all those months with the exception of July. During the month a total of but 50,750 tons was received. The tonnage on hand the previous month was 16,948 tons as compiled by dealers here. The tons delivered by dealers totaled 37,582, and the undelivered tonnage on books of retailers at the start of September was 199,245 tons. When it is stated that Baltimore has been allotted 713,318 tons, on a claim of needs around 850,000, and has up to Sept. 1 of this coal year received but 281,725 tons, the seriousness of the situation here can be judged.

Under order of the Maryland Fuel Administrator retail prices here on Sept. 9 were advanced 40c. a ton on all grades except broken and buckwheat. Thirty cents of the advance is represented in the wholesale advance and 10c. is allowed retailers to cover their claim that they should get at least 20c. a ton additional to care for added overhead charges on operation. The new schedule of prices is as follows:

	Ton	Half Ton
White Ash:		
No. 1 (broken)	$10.85	$5.60
No. 2 (egg)	10.85	5.60
No. 3 (stove)	11.10	5.70
No. 4 (chestnut)	11.20	5.75
Pea	9.35	4.85
Buckwheat	8.60	4.45
Lykens Valley:		
No. 2 (egg)	11.55	5.95
No. 3 (stove)	11.95	6.15

Lake Markets

PITTSBURGH

Mr. McAdoo brings coal production manager and director of steel supply together. Lake shipments still behind program.

The Director General of Railroads, who represents one of numerous Government activities that are steadily pressing the War Industries Board for larger supplies of steel, was in Pittsburgh last week. Mr. McAdoo refused to go into details, for publication, as to what was being done or is contemplated in the matter of railroad rehabilitation against the coming winter, but indicated that no extensive work along the line of additional trackage was contemplated for the Pittsburgh district. A significant item, however, was that he summoned to meet him in Pittsburgh, A. W. Calloway, manager of bituminous coal production for the Fuel Administration, who wants Mr. McAdoo to give him more transportation, and J. Leonard Replogle, Director of Steel Supply, whom Mr. McAdoo wants to furnish more steel for railroads. What transpired is not known, but that the representations made were interesting cannot be doubted. It is just learned that Mr. McAdoo has lately been calling for a supply of 60,000 tons of rails a week until further notice, rails to be laid in the north while weather permits, and then in the south. Steel men assert that such a tonnage cannot possibly be furnished, but the supply in the past few weeks has been much larger than formerly.

Lake shipments of coal continue decidedly short of the program and it will undoubtedly be necessary to continue shipping after Oct. 15, the date on which the program is based, and this will correspondingly reduce the interim period during which it was expected that byproduct coke plants and other important coal consumers would be able to stock up against the winter. The responsibility of the railroads by way of maintaining transportation in the winter is therefore increased. By paying close attention to the preference list of coal consumers the distribution of coal is fairly satisfactory with respect to current consumption.

The market as such is without incident, there being little movement except by way of allocations. Set prices remain: Slack, $2.10; mine-run, $2.35; screened, $2.60, per net ton at mine, Pittsburgh district, with 15c. brokerage allowed to be charged consumers by regular brokers.

BUFFALO

Trade much more tranquil than formerly. Indications of better supply. A little more anthracite now. Lake shipments in larger amount, though behind last season.

Bituminous—Somehow the general idea is that the supply is better than has formerly been supposed. Statistics on that point are not to be had, but observers who are used to studying the subject are sure that there is decidedly more coal in this section at present than there was last spring, and the belief is spreading that it will continue.

It has not been denied by anyone that Canada has had a big stock of bituminous all the season. The authorities seem to have had the same information, so that the reduction of allowance there comes from that fact more than from any special shortage here. Canada is not protesting against it, and the trade there is dull, perhaps quite as dull since the restriction was ordered as before. Had there been any fear of resultant shortage the demand would have sprung up.

Bituminous prices are steady. Jobbers like to sell at mine prices, on account of the complication of side charges and they do not always agree on the delivered prices, but the f. o. b. Buffalo, over net ton, is about as follows: Allegheny Valley thin vein, all sizes, $4.64; Pittsburgh lump, $4.45; Pittsburgh mine-run and slack, $4.20; smithing and smokeless, $5.85; cannel, $5.60 to $6.10 (in box cars).

Anthracite—The local distribution has improved a little of late, though not enough to meet the demand. As soon as the lake trade closes there will be an extra 100,000 tons a week to distribute, and Buffalo will of course get some of that. Shipments by lake are fair, though they steadily fall behind last season. For the month of August they were 482,000 tons, against 614,350 tons in August last season and a total of 1,777,476 tons for the season to September, as against 2,313,870 tons to the same date last season.

Lake shipments for the week are above recent averages, being 57,100 tons to Duluth-Superior, 20,500 tons to Milwaukee, 10,300 tons to Manitowoc, 8600 tons to Chicago, 7400 tons to Waukegan, 3200 tons to Fort Williams and 3000 tons to Sault, Ont.; total, 110,100 tons. Lake freights are strong at $1 to the Sault, 60-65c. to Chicago, 55c. to Milwaukee and Waukegan, 50c. to Manitowoc, 48c. to Duluth and Fort Williams. Side ports now pay $1 for small cargoes to slow docks.

CLEVELAND

Bituminous coal continues to move to the lakes and the Northwest in record style, shipments for the first eight days of September totaling 1,101,069 tons. Retail and industrial consumers are being pinched accordingly. Operations in the No. 8 district of southern Ohio were at a virtual standstill registration day — Sept. 12 — despite the fact that the means of registering at the mine had been furnished by operators, in accordance with the Federal Fuel Administration's request.

Bituminous—Charges that miners in the No. 8 district of southern Ohio have come dangerously near to sedition through refusing point blank to register at the mines Sept. 12 are being freely made by operators, who went to considerable expense to procure the proper blanks and have clerks sworn in by the proper authorities. Operations were practically down at many mines, operators said, and production for this week has been seriously impaired. Labor supply continues poor, both in quality and quantity, and the saving grace of the situation is the good car supply, operators declare.

The Pittsburgh Vein Operators' Association of Ohio has just announced shipments for the week ended Aug. 31, which show a total of 8876 cars dispatched in the week by members of the association. This shows the lake trade getting 5184 cars in the week, while railroad fuel amounted to only 1568 cars and Ohio shipments 1678 cars. The closest kind of a check is being kept upon shipments to industrials. Retail dealers continue to bear the brunt of the shortage by reason of the centering of efforts on the movement to the Northwest. Authorities at Columbus, Ohio, fear that Ohio mines will not top the 36,000,000-ton mark set last year, though 40,000,000 tons is the state's quota for 1918.

Retail dealers have come out publicly for increased charges for deliveries, claiming labor now is coming at 40 to 42c. an hour against 30 to 32c. when the present schedule was arranged. Delivery prices now permissible are $2.03 a ton to homes, $2.15 to apartments, schools and hospitals and $1.50 to large consumers. Both dealers and operators hold that a mild winter will mean coal enough for all, but a severe winter, like last year, will tax the industry as it never has been before. Production meetings at mines are not bringing material results, it is said. A start is being made on an inspection of power plants in northeastern Ohio to check back data gathered recently by questionnaires.

Lake Trade—September will prove a record month in the lake trade if shipments in the latter part of the month maintain the pace set by the opening eight days, when the fleet loaded 1,101,069 tons of bituminous, exclusive of bunker fuel. Coal is coming forward liberally, owing to diversions from other branches of the trade, and vessel capacity also is proving ample. Everything considered, the lake trade is in fair shape despite the fact it is a trifle over 1,000,000 tons now behind schedule. Shipments of bituminous coal westward through the Soo canals in August amounted to 2,517,000 tons, compared with 2,121,603 tons in July. Shipments of anthracite westward at the Soo in August reached 299,555 tons, as against 233,764 tons in July. Carriers are being slowed up by fogs in the rivers and channels, but dispatch is good at both ends of the route.

DETROIT

Supply of coal available for domestic use shows little increase in either bituminous or anthracite. Lake trade grows in volume of bituminous shipments.

Bituminous — While regulations of the state fuel administration have largely increased the tonnage of bituminous which must be consumed by household buyers, the supply of stock suitable for domestic use is not increasing rapidly. Jobbers report a slightly larger proportion of prepared sizes among consignments reaching Detroit, but mine-run is yet more plentiful than domestic lump and dealers report it is not easy to get stock adapted for use in hot-air furnace heating apparatus, which is the only equipment of thousands of Detroit homes.

The supply of coal for steam plants maintains a fair volume, though its quality evokes criticism from owners of some of the industrial plants which, under a recent order of the Federal Fuel Administration are obliged to supply their requirements from mines in Indiana and Illinois. The coal coming from these districts is described as far less desirable than the product of the West Virginia mines which the steam plants, with a few exceptions, are obliged to relinquish for the use of domestic consumers.

Anthracite—Applications for anthracite, received by the state fuel administration from owners of base-burner heaters, with the orders booked by dealers from consumers of the same class, are said to approximate 40,000. For supplying these consumers with the maximum of three tons, each, authorized by the fuel administration, about 120,000 tons of anthracite will be required. The rate at which anthracite is now coming into the city would indicate that orders will not all be filled for three months. Meantime the fuel administration has ordered dealers to deliver no anthracite on orders that have not been approved by the fuel administration, the purpose being to conserve all anthracite for the use of the base-burner owners. Homes dependent on hot-air furnace plants under the latest regulation may share any anthracite that remains when the base-burners are supplied. The furnace owners, however, must first obtain delivery of an amount of bituminous equal to one-half their total winter fuel requirement, which few are able to do at present.

Lake Trade—Loading of bituminous coal for shipment over the lake routes is proceeding in better volume than at any previous time this year. The vessel tonnage available is in excess of the cargo supply.

COLUMBUS

Lake and domestic demand holding up well. A slight overproduction of screenings. Car shortage reducing output in certain sections.

The coal trade in Ohio has been running along steadily during the past week. Demand for domestic and lake tonnage is as strong as ever and especial efforts are being made to supply the Northwest. More attention is being given to the domestic trade and a larger tonnage is being shipped to retailers, especially in the western part of the state. On the whole the tone of the market is satisfactory.

Lake trade is being rushed as rapidly as possible and the lower lake ports are busy. The movement of vessels is generally good and litte time is lost in loading and unloading. The upper docks are being kept free from congestion as the movement to the interior is good. Some progress has been made during the past few weeks toward making up the shortage which developed earlier in the season.

Domestic trade is showing considerable activity in every locality, but more especially in the western part of Ohio. Retail stocks are being replenished and dealers are making a large number of deliveries. The larger proportion of domestic grades comes from Ohio mines, as Pocahontas is now out of the market and only a limited quantity of West Virginia splints is arriving. Reports from many parts of the state show that 50 per cent. and even more coal is now stored in bins and cellars by householders, and the situation is well in hand. Retail prices are firm at the levels fixed by the Fuel Administration.

Production has been fairly good in most fields, but car shortage is now appearing on many of the roads and this will cut into the weekly output. Registration day was also partly celebrated as a holiday by miners, with bad results. Labor shortage is becoming more acute in the eastern Ohio district. It is estimated that the output in the Hocking Valley and Pomeroy Bend has been about 75 per cent. during the week, and in other districts about 65 to 70 per cent.

The steam trade is rather quiet. Because of a recent ruling of the Federal Administration no screenings or mine-run can be shipped into Michigan, and that is throwing a larger tonnage into Ohio. But prices are not being cut under the oversupply.

CINCINNATI

Disturbance to movement has been caused by embargoes, but demand from all quarters continues insistent, with good production and fair car supply.

Reports of confusion at mines and of anxiety on the part of manufacturing consumers and of the trade generally in parts of the Northwest, notably Michigan, affected by recent embargoes, indicate that the interruption to the usual coal movement has been received badly; but the shipment of a relatively large volume of fuel by all roads serving West Virginia and Eastern Kentucky mines continues, with a demand in excess of receipts.

The car supply varies, some mines reporting adequate rolling stock, while others still complain of lack of cars to take care of their present output. On the whole, it may be said to be normal, the difficulty being, as for some time past, that the demand is greatly in excess of the supply, which is true of cars as of coal, in spite of record loadings during the season

While the retail trade in this immediate section is well cared for, and will probably not suffer at all during the coming winter, industrial consumers, especially in nonessential or deferred lines of work, are now facing the probability of a lack of fuel, announcements from Washington plainly forecasting rigid adherence to the priority classes recently announced. The absolute necessity of giving war industries and the population at large all necessary fuel, for operating, on the one hand, and for warmth, on the other, is generally conceded, and this makes it apparent that current supplies during the winter may be below maximum needs.

LOUISVILLE

General situation shows little change. Good demand for all grades, and some western Kentucky mines turning down car-lot business except for old customers, being unable to take care of all demands. Eastern Kentucky production held back by shortage of cars and labor.

Cool weather during the past few days, coupled with idiotic rumors to the effect that the Fuel Administration would not allow coal for domestic stocking after Oct. 1, has resulted in a decided improvement in the domestic demand during the past few days. Numerous consumers who had been holding back in an effort to secure eastern Kentucky coal are now taking western, and glad to get it. Western Kentucky mines report production below normal, while the demand is much greater due to the fact that no eastern Kentucky coal to speak of is reaching Louisville or the western and southern sections of the state. Western Kentucky coal is going into Jeffersonville and New Albany, across the river from Louisville, but not into any other sections of the state. At the present time all Kentucky coals are barred from Indiana, causing much complaint in that state.

Eastern Kentucky is being held back by the shortage of the car supply, which is now only about 50 to 60 per cent. of the required allotment. The labor situation is poor and is becoming worse, due to men going into other lines and back to the farms for fall harvesting. The wagon mines are getting a good supply of box

cars from northern roads, which are being returned from southern points under load. However, gondolas and open cars are scarce, and many of the tipple mines are having trouble.

Most of the eastern Kentucky grades of coal, especially gas and byproduct coal, are now moving to the Northwest and the lake district, and with the exception of some mine-run coal, little is being consumed in the state or moving south to the textile and cotton districts. At the present time jobbers could place practically the entire output of eastern Kentucky lump without difficulty, there being a big demand and practically no supply.

BIRMINGHAM

Production lags despite special efforts to stimulate the output. Labor shortage and irregularity coupled with car shortage hinder operations greatly. Trade conditions without change of any import.

The output of coal from the Alabama field is falling much below the tonnage rightfully expected from the producing facilities afforded. The official figures for the week ending Sept. 7 have not as yet been compiled, but the output will probably not show much if any improvement over the week of Aug. 31, when it dropped to 390,000 net tons, the lowest previous record since June averages.

The loss of output from the Mary Lee mine of the Alabama Co., which was recently flooded, the accident resulting in the death of four mine employees and considerable physical damage to the entrance of the slope and manway, will approximate 8000 to 10,000 tons per week, resumption of operations not yet having taken place.

The building of a siding from the Frisco main line at Dora, Ala., to the mines of the Dora Fuel Co. will enable that operation to increase its production considerably.

Local trade conditions have shown no change of importance in the past week. Although the steam situation is not as tense as it was several weeks ago, there is a demand for more tonnage than is available by a good deal, and the domestic market is strong. There was a slight falling off in the volume of domestic coal sold by retailers during August as compared with July. Some adjustments are being sought in classification of mines and prices as announced in the Fuel Administration order of Aug. 23.

Coke

CONNELLSVILLE

Dry zone resolution important. Coking coal production heavy.

In view of the repeated assertions of coke operators for months past that the chief barrier to heavier production of Connellsville coke has been "booze," the most important item in the coke trade for weeks is the passage by Congress of the resolution empowering the President to establish dry zones around munition plants and coal mines. While there is no knowledge that formal steps have been taken to place before the President information that this power should be invoked in the case of the Connellsville coke region, it goes without saying that this will be done. Such things are no longer considered radical, as the question has just been raised whether the whole of municipal Pittsburgh may not become dry through the establishment of Student Army Training Corps at the University of Pittsburgh and the Carnegie Institute of Technology, as a permanent camp means a ten-mile dry radius.

There is no material change in the production of either beehive or byproduct coke. Taking the two together, the Connellsville region is supplying more coking coal than ever before. Lately it has been making about 340,000 tons of coke a week, and has been shipping somewhat over 200,000 tons of coal, most of which goes into byproduct coke ovens. The region's best coke output was about 425,000 tons a week, in 1916, and at that time scarcely any coal was shipped. To balance the loss in coke output in the region about 125,000 tons of coal would have to be shipped elsewhere for coke making, and doubtless the proportion runs higher than that.

Through the activity of the Fuel Administration the Consolidated Coke Co. has refunded to two consumers about $80,000 on account of inferior quality of coke furnished, the difficulty about quality having arisen from the destruction of the company's washery. The award is much less than the loss experienced by the consumers.

The coke market is in about the same condition as formerly, there being practically no open offerings of furnace coke, which is allocated whenever it appears in surplus, but with fair offerings of foundry coke. The best prepared material from old dumps, over ¾-in., continues to bring $6.75. The market in general remains quotable at set limits: Furnace, $6; foundry, 72-hour selected, $7; crushed, over ¾-in., $7.30, per net ton at ovens, Connellsville region.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended Sept. 7 at 345,210 tons, an increase of 6960 tons, and raw coal shipments at 203,700 tons, a decrease of 8300 tons.

Middle Western

MILWAUKEE

All grades of anthracite, except buckwheat, advanced 25c. per ton. Coke manufacturers refusing new orders. Coal trains moving out freely.

Milwaukee coal dealers have received orders from the fuel administration to advance all grades of anthracite, with the exception of buckwheat, 30c. per ton, dating from Sept. 3. No reason for the advance was given, but it is surmised that it is to cover the customary increase of 10c. per ton for June, July and August, which was waived this year in order to stimulate summer purchasing. The anthracite scale is now as follows: Chestnut, $11.60; stove, $11.50; egg, $11.30; buckwheat, $9.75. An additional charge of 50c. per ton is made when coal is carried in to bins.

Coal is coming in freely by lake, and dock men are using their best efforts to transport the product to the interior before the grain crop movement usurps cars and track facilities. One day during the past week a coal-laden train of 52 cars left the city northward bound. Five locomotives were required to move the train.

Receipts by lake thus far in September foot up 19,000 tons of anthracite and 197,988 tons of bituminous coal, making the aggregate of cargo receipts since May 1, 383,977 tons of hard coal and 2,344,400 tons of soft. The soft coal record is a little ahead of the same period last year, but hard coal shows a slight falling off.

Coke manufacturers are refusing new orders for the present, ostensibly to catch up with the accumulation of orders; but it may be that they prefer to stock up rather than sell at the 30c. cut recently ordered by the fuel administration on all coke produced in byproduct ovens except in the states of Alabama and Washington. Coke has been retailing at $10.25 per ton, with an extra charge of 50c. per ton for carrying in.

ST. LOUIS

A continued quiet market with a surplus of all sizes of coal from the Standard field unbilled. Steam and domestic demand easing up. Equipment more plentiful and conditions show improvement.

The local market is in an easy way. The demand for everything is exceedingly light, other than Carterville grades. The country call, which was anticipated to be good in September, has not materialized to any great extent up to the present. Steam coal continues to lag on all sizes and were it not for the demand for the railroad tonnage the Standard market would be in a deplorable condition.

In the carterville district the mines have been idle unnecessarily two days. One was for the primary and one for the registration. This idleness was not general, but at many mines the miners could have worked instead of laying off. Car supply is somewhat better in this district this week and transportation has also shown improvement, but the tonnage has not increased. It developed this week that a large tonnage of this coal was going to southern and southwestern points for steam, where other coals could have been substituted and permitted this coal to go farther north where it is needed. The Fuel Administrations of Missouri and Arkansas up to the present time have not taken the firm hold of this situation that necessity almost demands. The railroad tonnage out of this field still continues good. Labor is still short, and the power supplied the mines by the Public Utilities Co. is still the cause of much loss in idle time. Working conditions in the Duquoin field are somewhat similar to that in the Carterville.

The tonnage in the Mt. Olive field now exceeds the demand, and there is a heavy surplus unbilled daily on account of no available market. Up to the present this market has been taking care of all the business offered and the new condition was one that was not anticipated.

There is much agitation among the operators in the Illinois field that the zones in Missouri be raised. Some producers in Illinois have been able to secure a permit somewhere that enables them to ship Illinois coal in stock cars out into Nebraska, and there is some feeling between the operators over this discrimination.

Cars are not very plentiful, but even at that, they are furnished in greater numbers than the market can readily take care of. Considerable of this coal is moving to Chicago and into Michigan points, but not in a volume sufficiently great to keep the mines working full time. The prospects are not exceedingly bright for either the Standard or Mt. Olive coal for some time to come, unless severe weather sets in.

Steam sizes are exceedingly heavy and hard to move even when prices are cut. In St. Louis proper business is almost at a standstill. There are no eastern coals coming in and a very slight tonnage of Arkansas. The St. Louis Fuel Committee was sustained the past week by the Fuel Administration at Washington on the price it made on gas house coke of $11.25 to the consumer delivered. The previous price was $13.00.

The prevailing market price per net ton f.o.b. mines is:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.55@2.70	$2.55@2.70	$2.40@2.70
3x6-in. egg	2.55@2.70	2.55@2.70	2.35@2.55
2x3-in. nut	2.55@2.70	2.55@2.70	2.35@2.55
No. 2 nut	2.55@2.70	2.55@2.70	.....
No. 3 nut	2.55@2.70	2.55@2.70	.....
No. 4 nut	2.55@2.70	2.55@2.70	.....
No. 5 nut	2.05@2.20	2.05@2.20	.....
2-in. scrgs	2.05@2.20	2.05@2.20	1.25@1.50
3-in. lump	.....	.....	2.25@2.40
2-in. lump	.....	.....	2.25@2.40
Steam egg	.....	.....	2.25@2.40
Mine run	2.35@2.50	2.35@2.50	1.85@2.00
Washed:			
No. 1	2.75@2.90	2.75@2.90	.....
No. 2	2.75@2.90	2.75@2.90	.....
No. 3	2.55@2.75	2.55@2.75	.....
No. 4	2.55@2.75	2.55@2.75	.....
No. 5	2.05@2.20	2.05@2.20	.....

Williamson and Franklyn County rate is $1.10; Duquoin field, $1; Standard and Mt. Olive fields, 95c.

SEATTLE

Northwestern states consuming more coal than they produce by over three and one half million tons. Shortage to be felt this winter is prediction of operators.

That the four northwestern states of Washington, Oregon, Idaho and Montana are not producing coal to the extent that they are consuming it has just been brought to light by figures made public by the fuel administrations of the four states. Washington will produce this year in the neighborhood of 4,600,000 tons of coal (although this estimate, which was made earlier in the year, may be somewhat high now) but the estimated consumption is conservatively placed at 5,411,402 tons, a difference of over 800,000 tons. The difference may be increased materially if more labor is not forthcoming. As it is, the state has lost over 1000 coal miners since the first of the year, which means a daily loss of 1800 tons of coal mined, which if not remedied by the first of the year will mean over 1,000,000 tons difference between the production and consumption of coal in this state. Idaho is not producing any coal this year, and the consumption is estimated to be 725,000 tons. Montana will produce 4,400,000 tons and consume 5,500,000, while Oregon will produce 39,000 tons of coal and consume 786,446 tons. Both production and consumption figures show large increases over 1917, as may be seen from the following figures:

	1917		1918	
	Production	Consumption	Production	Consumption
Washington	4,002,749	4,161,402	4,600,000	5,411,402
Oregon	43,000	686,446	39,000	786,446
Idaho	.....	725,000	.....	895,000
Montana	4,400,000	5,378,202	4,400,000	5,500,000
Totals	8,445,749	10,951,050	9,039,000	12,592,848

These figures would indicate a shortage in coal in the Northwest this winter as coal operators have pointed out since the first of the year or since the Federal Fuel Administration ruled that the western states would have to supply themselves from their own mines this year.

COAL AGE

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Partners with the Kaiser

By Frank H. Kneeland

THE United States is engaged in a titanic struggle—a world conflagration—largely because a greedy national autocracy saw fit to break or disregard its plighted oath, to consider treaties made in all sacredness as mere "scraps of paper." The issues at stake are clear, the social and moral obligations distinct. Can we logically expect Uncle Sam, who is battling with all his might for principles of honor on foreign soil, to countenance, much less condone, breaches of faith at home?

President Wilson's reply to the striking machinists of Bridgeport, the taking over of the Smith & Wesson plant by the Government, and Dr. Garfield's recent message to the striking miners of the anthracite region make the Nation's position toward faithless firms or individuals unmistakable. While the country faces national autocratic greed abroad it cannot and will not be hamstrung by individual or class greed at home.

Guns, shells and coal are all war necessities. In this time of national peril, when the very principles of democracy and justice are at stake, whosoever willfully deserts his desk, his lathe or his pick cannot be classed as a mere drone or a slacker—he is a public malefactor. Such desertion cannot now be regarded in the same light as it might be in ordinary peace times. It is now little, if any, short of rank, vile, contemptible treason.

Nor can public opinion be expected to support the action of either anthracite miners or Bridgeport machinists. The payers of war taxes, the purchasers of Liberty Bonds, the buyers of thrift stamps, the conscientious obeyers of the food administration's and other Governmental edicts involving more or less sacrifice, all have a direct and vital interest in keeping the flow of war munitions continuous and unbroken.

Successful prosecution of the war means the practice of team work. Thus far in the conflict American labor as a whole has shown a decided will to do and a marked eagerness to coöperate with the Government of the United States against the common enemy of decency and humanity. The few instances of willful departure from this course are therefore all the more prominent and glaring. And no labor faction can justly claim that thus far the Government has ever been niggardly in fixing or helping to fix labor's compensation.

However, the higher standard by which a striking worker may be judged is a moral standard—a blood test. An idle lathe in a munition factory or an idle working place in a coal mine may in all possibility mean blood needlessly spilled on the already corpse-strewn fields of France. No right thinking person with kith or kin in his country's service can condone, much less sanction or approve, such infamous desertion.

IDEAS AND SUGGESTIONS

How to Blacken Bolt Heads

Specially prepared lacquers can be obtained from supply houses for giving metal work for electrical switchboards and other purposes a dull black finish. If such preparations are not available, dull black paints, which will serve in emergencies, can be obtained in 10c or larger cans at most hardware stores or paint shops. The following process has been used successfully for giving bright-finish, steel cap-bolt heads a dull black finish. First, heat the bolt to a dull red in a blowtorch flame, then dip it in asphaltum paint. Next burn the paint off with a blowtorch and rub the bolt head with a cloth while it is still warm. If the bolt is permitted to cool before it is rubbed with the cloth, the resulting finish will be glossy instead of dull.

Ramsay Automatic Switch

BY ERSKINE RAMSAY
Birmingham, Ala.

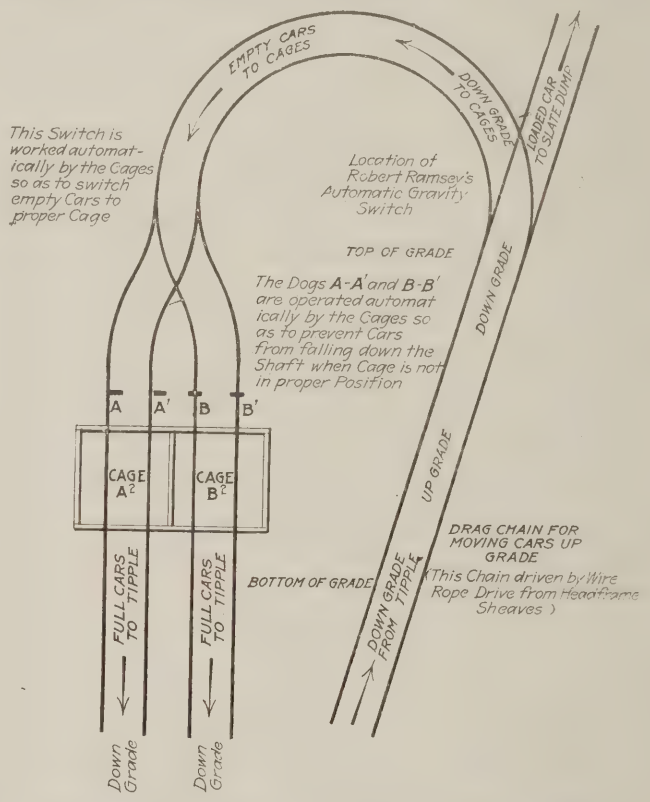
"The Automatic Tipple Switch," which appeared in the Aug. 8, 1918, issue of *Coal Age*, reminded me of the automatic switch which my father designed and installed along about 1880, at the Westmoreland shaft of the Westmoreland Coal Co., at the time he was connected with that concern. Before installing this switch, it was necessary to throw the switch by hand when a car of slate or rock came up, in order to prevent it from running around by gravity to the hoisting shaft.



SWITCH AUTOMATICALLY DEFLECTS LOADED CARS

On one occasion the switch was negligently not thrown, resulting in the loaded car of rock running around rapidly to the shaft, where it broke through the wooden gate and fell to the bottom, striking the cage on which a number of men were standing at the time, ready to be hoisted out. Fortunately, the overhead cover of the cage was strong enough to deflect the car into the bottom landing, and as a result nobody was seriously hurt.

This accident suggested to my father the advisability of getting up a switch that would automatically deflect the loaded cars to the slate dump, and as a result he designed the device shown in the accompanying illustrations. The then local superintendent of the Westmoreland shaft, a large man, contended that the additional weight of a loaded car would not throw the switch, and



DETAILS OF AUTOMATIC SWITCH INSTALLATION

after some discussion my father made a wager that the switch would be sensitive enough to operate with only the superintendent in an empty car. And on a first trial it worked perfectly. The sketch was made by W. P. Little, a young engineer student then on his vacation from school, and who visited the plant shortly after the switch was put in.

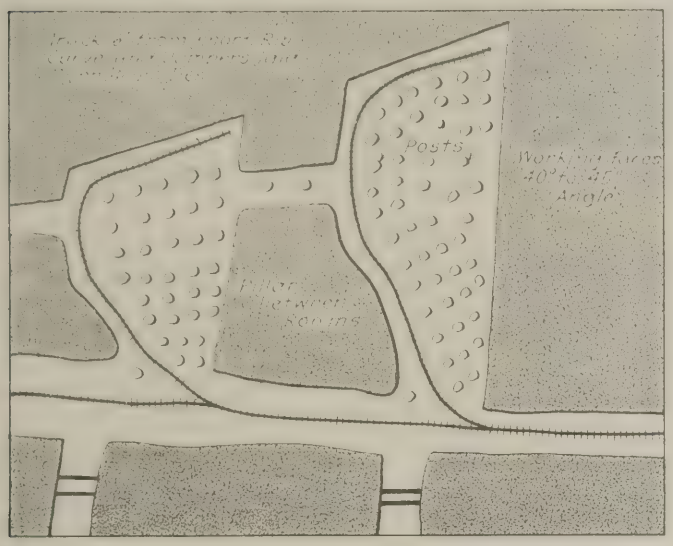
Oblique Faced Rooms

BY G. W. SUTHERLAND
Blakeley, W. Va.

A system of haulage and an arrangement of working face and room tracks that has proved its usefulness is shown in the accompanying illustration. The rooms are driven on 50- to 60-ft. centers, according to the conditions of top and bottom. These rooms are turned at right angles off both entries of a pair. When they are widened out the working faces are cut so as to form a 40 to 45-deg. angle with the ribs. This gives a longer working face without reducing the pillar between rooms. Suppose the rooms are 30 ft. wide from rib to rib, thus

affording a 30-ft. square face. The 40- to 45-deg. angle will increase the working face from 30 ft. to 40 or 45 ft., according to the angle.

This, of course, makes a short and a long rib. The track is laid 6 ft. from the short rib; that is to say, the center of the track is 6 ft. from it. This track is laid straight to within 15 or 20 ft. of the working face so as to allow a good curve and is then extended across the working face. As the face advances the track of course advances with it. To do this the curve is dis-



ARRANGEMENT OF WORKING FACE AND ROOM TRACKS

connected on the outby end from the straight track and thrown ahead with a bar, and short rails or jumpers laid behind the curve.

Where the mining machine undercuts 6 ft. there should be a pair of rails 6 ft. long and two pairs 12 ft. long. Thus when the track has advanced the length of these three pairs of short rails a pair of 30-ft. rails can be laid in their stead. The short rails and curve should be laid on steel ties and the joints fish-plated. Wood ties can be used under the long rails.

Where the roof is weak, timbers may be set up to the inside of the curve. If any impurities occur with the coal these are thrown back between the track and the long rib. Thus the short rib is always clean, and when the room is finished and the pillar ready to be drawn back the track is in place therefor, excepting the curve, which can be turned end for end, in other words, reversed, and in a short time relaid to the end of pillar. This track across the working face can be used to drive break-throughs without extra labor and expense when each room is finished.

If a shortwall mining machine is used to undercut the coal it can be unloaded and loaded from the straight track by disconnecting the curve and throwing it out of the way with a bar. Certain types of shortwall mining machines are provided with a reversible truck and can be loaded and unloaded at any angle.

This arrangement of working faces and room tracks gives the following advantages: (1) A longer working face is secured without reducing the pillars. (2) The same mining machine can undercut more coal with less unloading and loading, and with less moving. (3) Where there is an ample number of mine cars, each loader can have from two to four cars at the working face without being compelled to wait for the gathering locomotive, he can have work for two or three hours according to the size of the cars. If the cars hold two tons, four cars will give the loader eight tons. Two trips per day will allow him to load 16 tons, which is a big average per man. (4) One gathering locomotive can serve from 30 to 40 places with this arrangement and give the loaders all they can do.

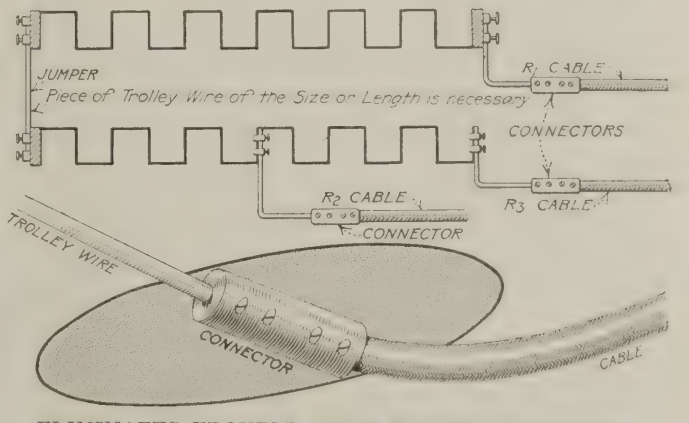
In my experience, when men have to wait an hour or so for their turn they get disheartened and go home. This arrangement keeps them busy. A storage-battery locomotive is the best to use with this layout, but a cable-reel locomotive can be employed with fair success if a double cable is used. By this means rail bonding will not be necessary in rooms.

Resistance Terminal Connections

By F. W. Sakon
Johnstown, Penn.

On mining locomotives the lead wires that go to the resistance terminals are usually soldered at the ends. After a few weeks' or months' use the solder runs out or melts, thereby leaving the strands of wire loose in the terminal. These then start to burn in the terminal, and when they are to be disconnected the wire must be cut off and the terminal drilled out or the resistance taken apart and the terminal changed.

I have successfully overcome this difficulty by taking a piece of copper trolley wire about 8 in. long, of either 2/0 or 4/0 size according to the diameter of the hole in the terminal, placing this in the terminal and bending it to suit conditions, and then taking a tube connector and joining the resistance lead to the trolley wire therewith and tightening the set screws and tap-

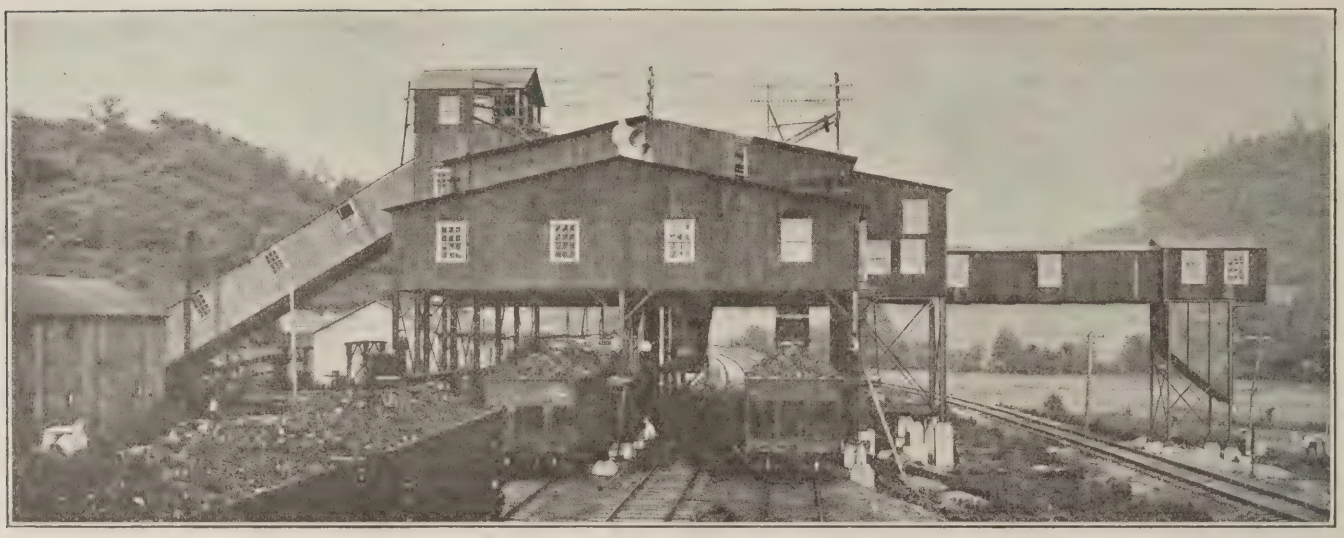


ELIMINATES TROUBLE FROM BURNED TERMINALS

ing them so that the screws cannot work loose. This makes a tight electrical connection and eliminates the trouble arising from burned terminals in the resistance.

I also use trolley wire in making jumpers from one resistance unit to another. I find that these give less trouble than soldering little tubes to short pieces of cable. When it is necessary to loosen the connection for testing purposes, they are more easily inserted again, with less difficulty than the leads which are soldered.

A miner refused to take the advice of a first-aid man and have a scalp wound dressed. As a result infection set in, and he lost several weeks' time. There are more ways than one of being a slacker.



Valley Camp Coal Co.'s Tipple at Parnassus, Penn.

By GEORGE S. JAXON
Philadelphia, Penn.

SYNOPSIS — *This tipple is designed to make four sizes of coal, the two larger of which are hand-picked. Bone is crushed and used as boiler fuel. A unique feature of the plant is a conveyor designed to facilitate cleaning the tracks under the tipple of spillage from the cars after the day's run.*

ON THE banks of the Allegheny River in Westmoreland County, Penn., approximately 18 miles northeast of the City of Pittsburgh and situated on the Buffalo & Allegheny division of the Pennsylvania R.R., lies the town of Parnassus. On the outskirts of the village is located one of the most modern and up-to-date steel tipples in the bituminous coal fields of the state, the property being known as the Kinloch Mines. The Valley Camp Coal Co. commenced mining operations here in the year 1917, working the upper and lower Freeport seams. The lease contains about 2500 acres of coal, which averages 84 in. in thickness. The president of the company is James A. Paisley, of Cleveland, and the general manager and superintendent H. E. Kinloch, of Parnassus. The development of the mine is carried on by the wall-and-pillar system through a slope driven on a 30-deg. inclination. Electrical power is utilized for both the inside and the outside operation, and a working force of approximately 330 men is employed. The output for the last fiscal year was 505,274 tons of run-of-mine coal. The coal is brought in wooden mine cars from the working face to the foot of the incline inside the mine, where it is transferred to power-driven machinery for removal to the tipple structure for the necessary sizing and loading.



FIG. 1. OUTSIDE VIEW OF TIPPLE EQUIPMENT

The coal company, being desirous of preparing its output for market in the best and most economical manner, sent out requests for competitive bids covering an equipment capable of handling an hourly output of 450 tons of bituminous coal based upon the following percentages of different sizes: Lump, 25 per cent.; egg, 18 per cent.; nut, 17 per cent.; slack, 40 per cent. The following is a detailed description of the equipment finally accepted by the company as being the one most suitable for the requirements. The leading illustration shows a general outside view of this equipment. The mine cars, which are of 2½ tons capacity with a gage of 44 in., are delivered to a Phillips automatic cross-over dump by which they are emptied into a steel hopper of five to six tons capacity. Under this hopper is located a steel apron

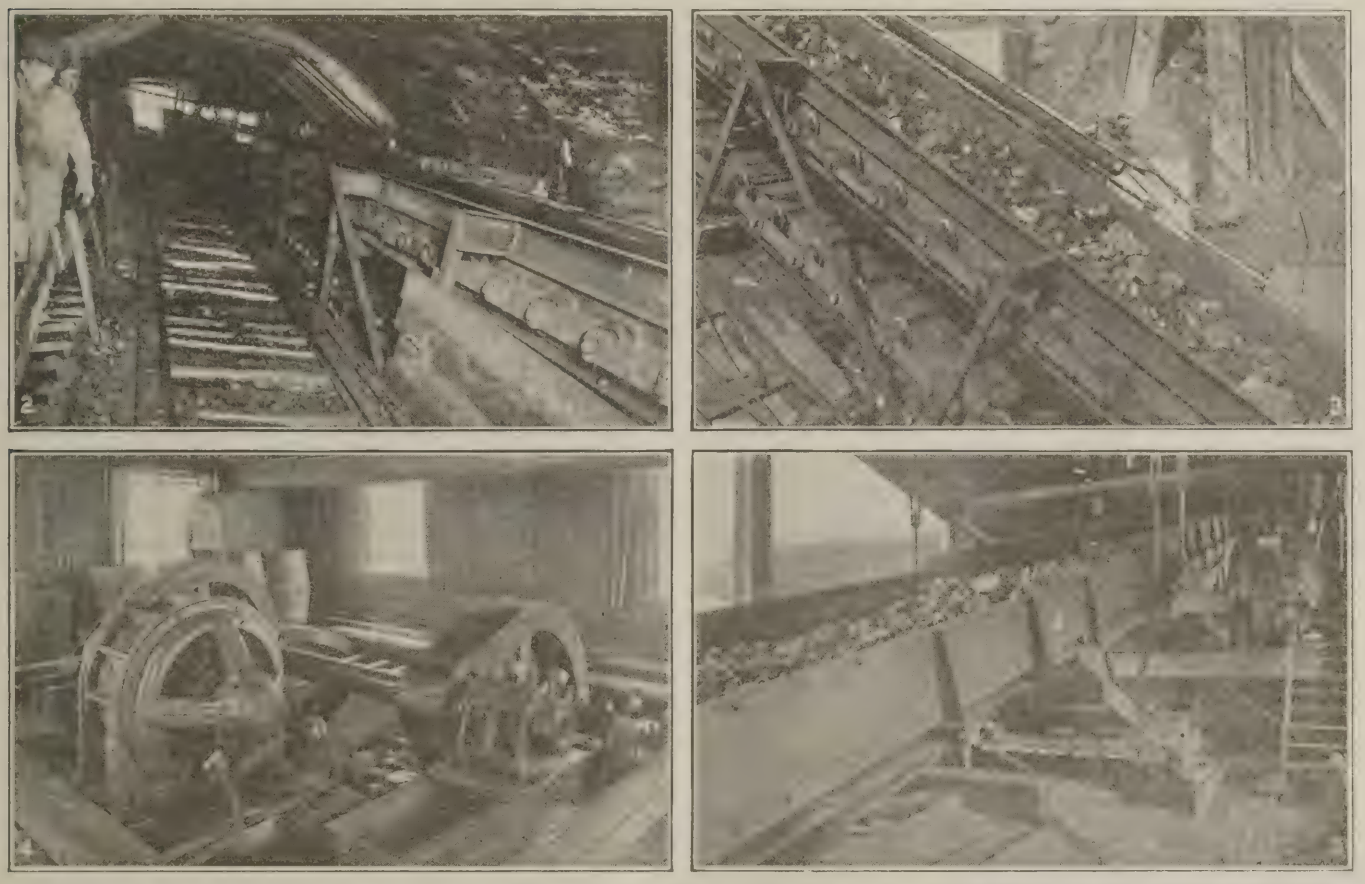
feeder conveyor 42 in. wide, which feeds the coal at a uniform speed over a slack bar screen onto the steel pans of an inclined apron conveyor. The feeder is constructed of ¼-in. steel pans mounted upon a double strand of 9-in. pitch steel-strap roller chain, which travels upon a 30-lb. T-rail track. The coal being screened before its delivery to this unit insures a cushioning effect that tends to preserve intact the large-sized coal. This passes over the screen and onto the conveyor, which already carries the small material.

The conveyor is slow moving, having a speed of 75 ft. per minute and an entire length of 428 ft. from the center of foot sprockets to the center of head sprockets. Of this length 403 ft. is on an inclination of 30 deg., while the remainder at the foot end is horizontal. This unit is employed for delivering the coal from the dump hopper to the shaking screens. The conveyor pans are constructed of $\frac{3}{16}$-in. steel plates of the double-beaded, corrugated, overlapping type, with a bead in the center to act as a stiffener. At the same time this prevents the coal from sliding back when traveling up the incline. The apron pans are attached to a double strand of special 18-in. pitch, forged-steel strap roller chain, the side bars of which are made of ½ x 5-in. steel flats with ends swelled to 1 in. in thickness. The joints are constructed with 2¼-in. diameter case-hardened steel pins, having milled ends fitting in the outer side bars, while steel bushings are introduced locked in the inner side bars. These bushings carry 8-in. diameter, flint-rim tread, single-flanged, inclosed oiling rollers, which in turn travel on a double track of 30-lb. T-rails, which form part of the structural steel supporting framework. Traveling steel side plates are used to insure a perfectly clean unit, while a continuous stationary side plate of No. 10 steel is placed above the entire length of the conveyor pans for the purpose of easily carrying the capacity of 450 tons per hour.

At the head of this conveyor a substantial steel discharge chute delivers the coal either to the shaking screens or by means of a mechanically operated fly-gate diverts the run-of-mine through the slack hopper to railroad cars upon the nut track. This is employed in case of emergency, when for some reason parts of the tipple machinery may be out of commission.

The foot shaft is equipped with a chain sprocket for operating the apron feeder through a strand of combination drive chain. Fig. 2 shows a view of the conveyor traveling up the inclined slope. Fig. 3 shows the same conveyor with the coal on the upper strand. In Fig. 4 is shown the 150-hp. electric motor with back gearing, which actuates this unit.

The coal is delivered from the conveyor onto the shaking screens, which are moved back and forth at the rate of 100 shakes per minute. The screens are of the hanger type, 7 ft. 6 in. wide, with sides approximately 12 in. deep. They are constructed of steel throughout and stiffened by means of structural shapes. Great care was exercised in designing these screens to prevent excessive drops to the coal, thereby eliminating breakage as far as possible. Fig. 5 shows the coal passing over the shakers with steel veil plates in their



FIGS. 2 TO 5. VIEWS OF CONVEYOR FOR DELIVERING COAL FROM DUMP HOPPER TO SHAKING SCREENS
Fig. 2—A view of the conveyor traveling up the inclined slope. Fig. 3—Same conveyor shown in Fig. 2, with coal on the upper strand. Fig. 4—The 150-hp. electric motor which actuates the conveyor. Fig. 5—Coal passing over the shakers



FIG. 6. LUMP TABLE AND PICKERS AT WORK

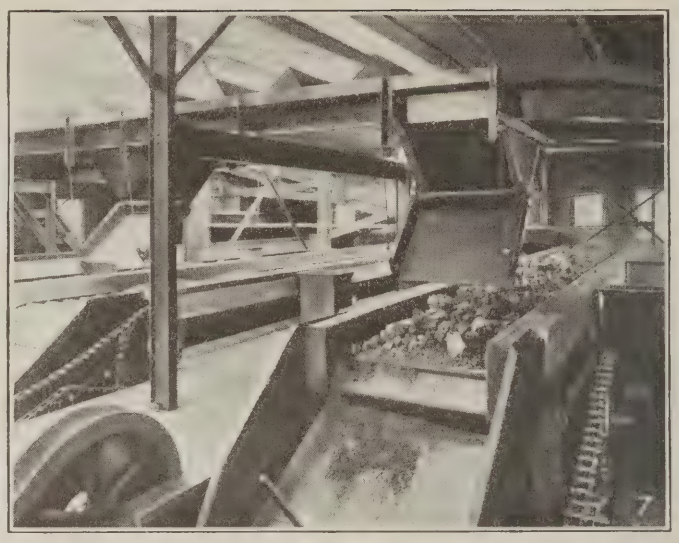


FIG. 7. INTERIOR VIEW OF PICKING HOUSE

bottoms for the purpose of loading run-of-mine coal onto the lump-coal picking table. The shaking screens are operated by means of an eccentric shaft of sufficient size and strength to oscillate them at the speed mentioned above. Eccentrics of the ball-and-socket type are utilized to insure perfect alignment.

Considerable care has been exercised also in the design of the picking house, so as to secure ample lighting and ventilation. This insures the proper cleaning of coal before its delivery to the railroad cars. Fig. 6 shows a view of the lump table and the pickers at work. Fig. 7 is a view of the interior of the picking house, showing the lump, egg and nut tables. The amount of light secured from the skylight visible in this illustration may be readily perceived.

The picking tables discharge their contents over perforated plates in discharge chutes. These take out the final breakage that has been made by the pickers on the tables, before delivery is made to the loading booms.

The tables are constructed of $\frac{3}{16}$-in. steel corrugated pans, mounted on a double strand of steel-strap chain whose joints are $\frac{3}{4}$-in. steel pins, carrying steel bushings encircled with $3\frac{1}{2}$-in. single-flanged rollers traveling on 20-lb. T-rails, carried on structural-steel frames throughout their entire length.

The coal is delivered from the picking tables over the discharge chutes to the loading booms. These convey it to the railroad cars. Fig. 8 shows a typical view of the lower floor with the booms passing through openings therein to the cars. The booms are of the same general construction as the picking tables and are of ample capacity. Fig. 9 shows a general view of the machinery for driving the picking tables and loading booms, with all gears and chain drives properly protected by steel guards.

The refuse and bone picked from the tables is delivered to the bone conveyor by chutes, the bone to the upper strand and the refuse to the lower strand. The refuse travels on the lower strand to the steel bin shown on the right in the leading illustration. This bin is constructed of $\frac{1}{4}$-in. plate and is equipped with draw-off valves at the lower end of the hoppered bottom to facilitate loading into railroad cars on the outside track. The bone is conveyed along the upper strand to the bone coal crusher, which reduces this product to slack size for fuel purposes. The conveyor in question is composed of suspended $\frac{5}{16}$-in. steel flights, attached to a double strand of 12-in. pitch steel-strap roller chain at 36-in. intervals. The steel flights measure 8 in. deep and 20 in. long. This unit measures 112 ft. center to center and is mounted inside of a structural-steel frame throughout its entire length.



FIG. 8. TYPICAL VIEW OF LOWER FLOOR



FIG. 9. GENERAL VIEW OF DRIVING MACHINERY

The slack coal is delivered from the shaking screens by means of a hopper and chute direct to the slack conveyor. This conveyor is made up of ¼-in. steel-plate flights measuring 10 in. deep and 36 in. long, rigidly attached to a double strand of 12-in. pitch steel-strap roller chain at intervals of 36 in. The chain is made up of 2½ x ¾-in. steel flats and the joints constructed with ¾-in. diameter steel pins provided with case-hardened steel bushings carrying 3½-in. solid straight-face cast-iron rollers. On both the carrying and return runs the chain rollers travel on steel angle trackage, which forms part of the structural-steel frame in which the conveyor is mounted. Provision is made at the discharge end for delivering to railroad cars. This conveyor is shown in Fig. 10.

The mixing conveyor is employed for delivering lump, egg and nut coal to the crusher or for mixing the foregoing sizes with slack for delivery to any of the tracks. It is located at the discharge end of the picking tables, where the lower strand passing beneath the tables collects the different sizes of coal by means of a fly gate in the table discharge chutes. The coal is then carried along this strand and up the vertical strand to the upper runway, where by means of valve openings it can be delivered to the crusher or to the different tracks. This unit is composed of gravity discharge buckets measuring 24 in. wide by 54 in. long and 11 in. deep, rigidly attached to a double strand of 18-in. pitch steel-strap roller chain at intervals of 36 in. The side bars of the chain are made of ½ x 2½-in. steel flats with joints constructed of 1¼-in. steel pins. These are provided with case-hardened steel bushings carrying 5-in. straight-face, flint-rim tread, inclosed oiling rollers fitted with Bennett self-closing oilers.

The entire machine runs on steel tracks supported by structural steel framework, which in turn is securely attached to the driving terminal and corner shaft supports. The buckets are guided on the vertical runs by means of steel angles. This machine is driven through gears from an electric motor. Fig. 11 shows the lower strand of this conveyor, while in Fig. 8 the discharge chutes from the top strand for mixing purposes is clearly shown. In connection with this conveyor a clean-up elevator is employed for the purpose of ridding the tracks beneath the tipple of the spillage which accumulates at the end of a day's run.

At the time the accompanying photographs of this equipment were taken the erection was not quite completed. However, Fig. 1 shows a second typical outside view of the equipment. The long inclined conveyor carrying coal into the tipple may be here plainly seen.

The electrical equipment for operating all the apparatus here described may be enumerated as follows: One 150-hp. motor for driving the inclined conveyor and apron feeder; one 35-hp. motor for driving the shaker screens; one 30-hp. motor for the picking tables, booms, boom hoists and slack conveyor; one 40-hp. motor for driving the mixing conveyor and the clean-up elevator; one 7½-hp. motor for the refuse and bone conveyor; one 150-hp. motor for the large run-of-mine crusher; one 35-hp. motor for the small bone-coal crusher. These are of the General Electric Co.'s make and are complete with automatic starting panels arranged for push-button control.

The tipple building is of steel construction, covered on sides and roof with "Duck Brand" corrugated asbestos-protected metal. The picking house section is equipped with "Lupton" steel frame skylights and "Larson" suction ventilators. The entire equipment was designed, fabricated and erected complete by the Link-Belt Co., of Philadelphia, Chicago and Indianapolis.

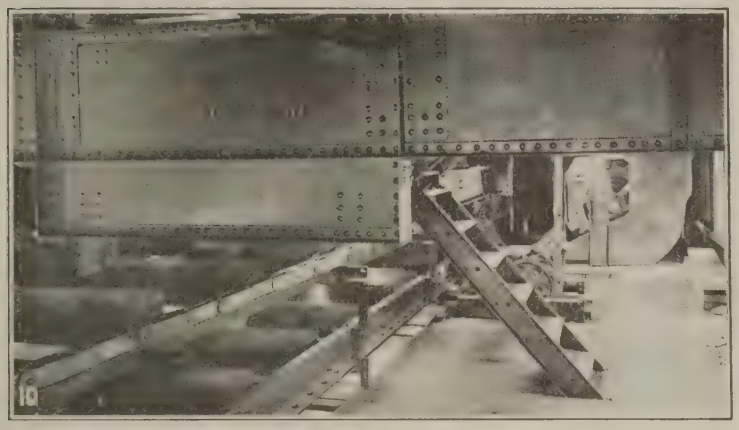


FIG. 10. THE SLACK CONVEYOR

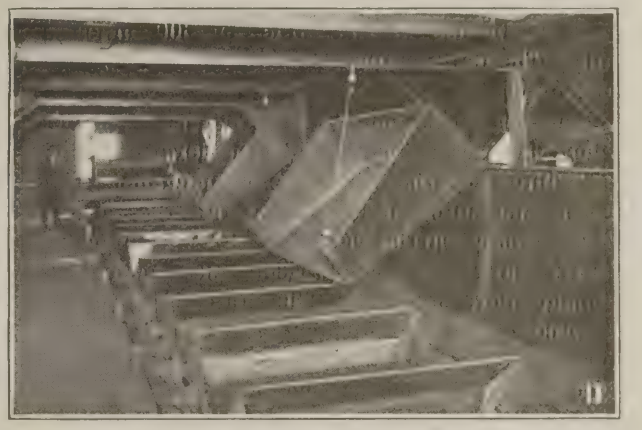


FIG. 11. LOWER STRAND OF CONVEYOR

Excess Air and Heat Efficiency

For a given furnace and a given fuel there is a certain percentage of excess air which gives the maximum over-all efficiency of a steam-generating apparatus. If the supply of air is increased beyond this percentage the over-all efficiency drops because of the heat lost in heating this extra air. If, on the other hand, the air supply is decreased below this best percentage, the heat losses increase on account of less complete combustion. These are the two principal causes of heat not being available for a boiler and the ones that are at all times affected by the air supply.

The percentage of excess air giving the lowest sum of these two combined losses varies with the size of the combustion space and the kind of coal. When the combustion space is large smaller air excess is necessary to obtain good combustion than when the combustion space is small. With coals having low percentages of volatile matter less excess air is needed for nearly complete combustion than with coals having high percentages of volatile matter.

Shipping Facilities at the World's Largest Coal Mine

By R. W. MAYER
Connellsville, Penn.

SYNOPSIS—*A mine that produces 7000 tons of coal per day requires somewhat elaborate tipple arrangements, especially as this tonnage may be shipped either by rail or river. In order to handle the output mine cars must be dumped at the average rate of one every 12 sec. throughout the entire day. Sometimes this speed is exceeded.*

AN ACRE of coal a day is removed from underground in the Vesta No. 4 mine. When working to capacity and full handed, this operation employs about 2200 men. Nearly 300 miles of steel track is in use in the mine, or 600 miles of steel rails. The daily output is in the neighborhood of 7000 tons of coal.

Last year this one mine produced 1,795,000 tons. When the fact is taken into consideration that during the winter months when the Monongahela River was frozen and shipments went by rail the mines had to work at only partial capacity, this output can be considered large. A comparison may make the large tonnage more striking. The State of Washington has 63 producing mines, which last year mined 3,623,196 tons of coal. The output of Vesta No. 4 mine was almost half as much as that of the entire state, which is the largest coal producer in the Northwest.

Vesta No. 4 mine is probably the largest coal mine in the world, and to any one interested in mining the methods employed here as well as the mine itself are fascinating. It is situated near California, Penn. California is a clean, beautiful, little city, the home of retired capitalists and the State Normal School. It is situated 50 miles south of Pittsburgh, on the Fourth Pool of the Monongahela River. The Pennsylvania R.R. runs through it, while the Pittsburgh & Lake Erie R.R. follows the opposite bank of the river.

The mine is operated by the Vesta Coal Co., J. B. Laughlin, president, and B. F. Jones, general manager. This company is a subsidiary of the Jones & Laughlin Steel Co., which consumes all the coal the Vesta Coal Co. produces and has to buy more. Ninety-two per cent. of the steel manufactured by this company is now sold to the United States Government.

The Vesta No. 5 mine produced 1,340,000 tons of coal last year. Vesta No. 6 has a daily output of about 2500 tons. It is not unusual for this mine to produce 12 tons per day for every man working at the face. Vesta No. 7 mine, which is just being opened on a large scale, will begin shipping coal about Nov. 1 of this year. It is on the left bank of the Monongahela River, opposite Silicia. The Crescent mine of the Pittsburgh Coal Co. adjoins these mines; last year its output was 1,115,000 tons of coal.

All of these operations are in Washington County, Pennsylvania. In this county 118 companies operated 161 mines last year. It is estimated that there are approximately 3½ billion tons of coal in Washington County yet to be mined, or about 448,000 acres of the Pittsburgh bed. The market value of this unmined coal is about nine billion dollars.

The Vesta Coal Co., the largest shipper of coal by water, owns and operates seven steamboats and over 100 steel and wooden barges. It recently let a contract for 50 more all-steel boats to be used for carrying coal on the Monongahela River. It is expected to turn them out at the rate of about seven a month. They are now being built at the South 34th St. plant of the Jones & Laughlin boat-building department. The all-steel steamer "Elsey," now being built at Neville Island by the Davis Engineering Co. for the Vesta Coal Co., should be in the water by Oct. 1. It is named in honor of the company's transportation manager.

Will Soon Construct New Marine Ways

At the present the company has not sufficient facilities for repairing its boats. It will soon commence the construction of new marine ways to be over 200 ft. long. These will be built below the Wilton tipple, above Lock 3, on the left bank of the Monongahela River. The barges at present in use are from 100 to 200 ft. long. A 200-ft. barge holds about 1000 tons of coal. It is brought under the tipple for loading, is loaded, and replaced by another empty barge in 50 min. Barges 150 ft. long hold about 775 tons. The 100-ft. barges hold 450 tons and are loaded in 18 min. It requires from 24 to 36 hr. for the steamer to tow loaded barges from No. 4 mine to the company's works at Pittsburgh and return with empty barges. A steamer usually tows four large barges and one small one.

Landing boats on the river at the tipple, with boilers and engines, are provided also with steam pumps which pump the water out of the barges. One end of the barge sinks when loading is commenced, causing the water to flow to that end. It is then easily pumped out. The steel barges are only pumped out once each trip, pumping being done at the tipple. The wooden barges have to be pumped out oftener. The steel barges are lined with wooden planks to save wear on their hulls.

The coal is loaded into the barges at the tipple in three layers to equalize the stress on the hull and prevent it from becoming "hogged," or broken. The barge is accordingly moved back and forth under the coal chute. All the coal from the tipple is loaded from one chute. A long steel boom with a sheave on its end, over which a steel cable runs, extends out on each side of the tipple over the top of the barge.

The cable which runs over the sheave on the lower boom is fastened to the upstream end of the barge. The cable running over the upper boom is fastened to the

downstream end of the barge. These cables are wound upon the drum of a steam donkey or hoisting engine, which is placed in the tipple directly over the river. The donkey engine pulling on these cables quickly moves the barge back and forth under the tipple coal chute.

A man stationed on the barge signals the donkey engineer how to move the barge by pulling a whistle cord. While the barge under the tipple is being loaded another empty one is placed upstream from and end to end with it, and the ends of the two barges are fastened together. When one is loaded it is pulled out from under the tipple by the cable on the donkey engine, and the empty barge, fastened to the end of the loaded barge, is pulled under the tipple chute by the same action, the loading being continued without interruption. The donkey engine cables for moving the barge under the coal chute of the tipple are quickly changed from the loaded barge to the empty one while one of its ends is receiving coal.

How the Work is Divided

One crew of men has charge of the loaded barges and another sees that the empty barges are placed in position as needed. A man stationed on the loading barge picks out what rock he can find. As the coal is fairly clean the amount of rock thus removed is small. An analysis of the coal shows about 3 per cent. of ash. About a foot of slate or cap rock overlays the coal and must be taken down. If this is carelessly allowed to become mixed with the coal, ash content may go to 15 per cent., but in practice seldom exceeds 9 per cent. As this drawslate is white in color it makes a contrast with the coal and is easily seen.

About 400 ft. above the tipple is an ice-breaking pier to which the barges are moored. This is built of heavy cribbing drift-bolted together and filled with rock. The tipple is an all-steel structure extending out over the river. Its outer end rests on a heavy cut-stone pier set at the edge of deep water on the river bank. Heavy concrete bulkheads extend from the pier back to the top of the river bank. Bulkheads, built of logs drift-bolted together and filled in behind with rocks, extend for several hundred feet up and down the stream from the tipple along the river bank. These are flush with the cut-stone pier under the tipple and are at the edge of navigable water. As they are in line with the tipple pier and in deep water they facilitate the movement of the barges and prevent them from grounding on the river bank.

The Pennsylvania R.R., whose lines follow the Monongahela River bank, has tracks underneath the tipple, while adjoining the railroad tracks is a street which branches into a wye directly underneath the tipple. The tipple crosses these on a single span having but one support, which is placed between the street and the railroad tracks.

Last winter the Vesta Coal Co. broke the ice in the river from Pittsburgh to Vesta No. 4 mine in order that river shipments might not be interrupted. Ice breakers were employed and the steamboat captains say the ice was 3 ft. thick at times. When the dam at one of the locks broke it lowered the water to such an extent that the barges had to be loaded to draw only 12 in. of water. This not only made transportation charges on the coal excessive, but what was more vital the requisite amount could not be handled. The Fuel Administrator in one day commandeered 400 carloads of coal in the freight yards at Connellsville for this company's use. The Jones & Laughlin Steel Co. at that period of car shortage used its own cars and locomotives on the Pennsylvania R.R. tracks for hauling coal from Vesta No. 4 mine.

A rubber belt conveyor line about 400 ft. long extends from the tipple at a level lower than that of the railroad tracks and parallel with them up to an elevation sufficient to load railroad cars. This conveyor line will handle the mine's capacity of production. A heavy electric motor with drums and cables, anchored to a concrete base, has been installed this summer to handle the loaded and empty cars after river navigation closes. As the coal is dumped at the rate of a 50-ton railroad car full in about 3 min. throughout an 8-hr. day, it is necessary to move the cars with ease and rapidity. No coal is shipped by rail as long as the river is open.

Between 2000 and 2800 mine cars of coal are dumped each day. These hold about three tons each, but if they are topped heavily four tons can easily be put on them. Two crossover dumps are used for discharging the cars. At each dump one man handles the dumping lever and hooks the ring on the car door, which automatically raises it as the car is tilted; another man removes the miner's checks; a third regulates the speed of the car by pushing or braking it as it moves toward the dump; another does nothing but work the lever that throws the switch, shunting cars to each of the dumps in turn; another man pulls the coupling pins as the cars move to the switch. He also shoves the coupling link to one side but does not remove it. Thus when the car strikes the one on the crossover dump and bumps it off, the coupling link is not in the way.

Chain Haul Pulls Trips to Dump

The loaded track is level or has only a slight grade as far as a chain haul, which carries them up a short grade about 10 ft. long. This chain haul is used to pull the entire loaded trip and feed it toward the dump, the coupling pins of the cars not being pulled until the cars are near the end of the haul.

At the top of the chain haul the switch is located which leads to the two dumps. The cars run from here to the dumps by gravity. They also pass by gravity through the dump onto the kickback at the end of the tipple and back onto the track for empties. Two kickbacks are employed, one for each dump. The cars are switched automatically by spring switches from both of these onto a single track for empties. A man is stationed at the kickback to give a stiff-moving car a shove and in general to prevent any tie up.

After passing through a crossover dump and kickback the empty cars have dropped, of course, to a low level. They are again raised by means of a chain haul. Here another man does nothing but couple the cars together as they come over the knuckle. The cars are oiled by a man who works between the loaded and empty tracks. The wheels on one side of the cars are oiled on the loaded track and those on the other side when the car returns on the empty track.

A 1-inch endless cable extends for 1500 ft. out from the tipple. This is guided by suitable guide sheaves and is driven by having four loops of cable passed around two grooved drums, placed tandem, the rope being in

contact with only half the circumference of each drum, the same as in the Whiting system of hoisting. An electric motor suitably back geared supplies the power.

This endless rope is used to move the trips of cars on the tipple. A special clutch is employed which grabs the cable and is coupled to the first car of a trip. As the cable moves the trip of cars goes with it; 120 to 140 cars are hauled at one time. As the cars are almost 10 ft. long each over all, a trip of cars is from 1200 to 1400 ft. in length. The tipple and steel bridge from the mine mouth to the river is about 3000 ft. long and 43 ft. high at its highest point, although the height is about uniform throughout its entire length. About 2000 ft. of this length is double-tracked. The right track is used as storage space for the loaded trip while being dumped and the left track for the empty trip of cars.

The coal from each crossover dump passes down through a crusher and thence moves by gravity to the barges on the river. In an emergency either crossover dump with its connected crusher would probably be able to handle the mine output.

Two scales are used for weighing the coal, one for each dump. They are placed between the crossover dumps and the switch on the loaded car tracks. A bridge about 12 ft. above the track carries two large rooms almost entirely inclosed with glass, one for each weighman, his scale beams and desk. As the cars pass over the scales on the track beneath, the weight is shown on the scale beams in the office on the bridge and is marked down on a weigh sheet. As the man at the dump removes the miner's checks from the car he files them on a spindle or needle-shaped steel wire passing through the hole in the check. The car checks are thus filed in the same order on this spindle as the car weights are placed on the weighman's sheet.

A clerk who has his station on the bridge coördinates all the car weights with the proper check numbers. He does this continuously throughout the day, not waiting until the day's run is over. A messenger carries the empty spindles from his desk on the bridge to the man taking the checks from the cars at the dump and returns with the spindle filled with car checks. As the weighmen's rooms are inclosed with glass it is therefore an easy matter for them to see what is occurring on the floor beneath.

Dumping 2400 cars in 8 hr. requires five cars to be dumped every minute continuously, making no allowance for time that may be lost. Such losses sometimes require that cars be discharged even more rapidly.

The material and supplies for the mine are delivered in railroad cars on the siding under the tipple. The mine cars are run alongside the railroad cars and loaded from them. Track of the proper gage is laid for the mine cars between the rails of the standard gage railroad track. The mine cars loaded with supplies from the railroad cars are moved on this track to a point directly underneath the side of the tipple, where a steel derrick capable of handling 50 tons is installed. A chain of sufficient strength is given one turn around the drawhead of the mine car and a hook attached to the chain, hooked over the top of the car end. One chain is placed on each end of the car in this manner, and the free ends of the two chains are fastened to a ring which is hooked onto the end of the derrick cable. The derrick hoists the mine cars from the railroad track up onto the tipple, a distance of about 40 ft. The cars are here landed on the track by two men.



The track on which they are landed is a spur from the empty car tipple track and is outside the tipple roofing. This allows freedom of movement overhead for the boom of the derrick to swing. The empty cars are lowered from the tipple to the railroad tracks in the same manner as the loads are hoisted. A 30-ton haulage motor used in the mine was easily and quickly raised from the railroad track to the tipple track by this derrick, the engine for which is placed in the lower part of the tipple, under cover.

Carbonization and Distillation of Peat

By M. Meredith
Liverpool, England

C. Galaine and C. Houlbert recently submitted a paper to the Paris Academie des Sciences on the carbonization and distillation of peat, sawdust, household refuse and other light organic products. The value of peat lies in the direction of distillation rather than combustion, and in these lines it could supersede wood in the production of acetic acid, methylated spirit, ammonia and tar, the basis of so many dyes.

In the process of distillation, peat, being a light material, requires larger retorts than coal, and these should be of a design that facilitates the transmission of heat from the surface toward the center. Experiments have shown that revolving retorts produce the best results. The apparatus devised and described by the authors is on the principle of the roasting appliances used for coffee, chicory, etc., but of course, with the addition of a receiver for collecting the distilled vapor, the great object being to provide an apparatus complete in itself for continuous and all-round operation.

This apparatus consists of six cylindrical retorts, each mounted on its own axis and capable of uniform rotation, while the individual cylinders are arranged in radial relation to a rotary central pivot, so that the retorts charged with peat can be entered into and withdrawn from a stationary semi-circular furnace in succession.

When the apparatus is in operation there are always three retorts undergoing distillation in the furnace, the other three being outside—one condensing, another being emptied, and the third recharging. The distillation takes on an average about 40 minutes for retorts holding a ton of peat and making six revolutions per minute.

To enable the gas arising from the carbonized peat to pass out of the retorts, the hollow shaft of each is perforated so as to provide a passage from the inside of the retort to a collecting chamber in the axis of the pivot and thence to the stills for fractional distillation. The rotary movement of the retorts insure rapid transmission of heat from the furnace, and as this heat acts on a large surface, the peat is uniformly carbonized in a short time at a relatively low temperature—a result which, it is claimed, it is impossible to obtain by the utilization of any other process.

A New Type of Screen

By M. RAYMOND
Tiffin, Ohio.

SYNOPSIS — A modified form of the American system of rope transmission may be used for coal screening. This possesses many advantages, not alone confined to the screen itself.

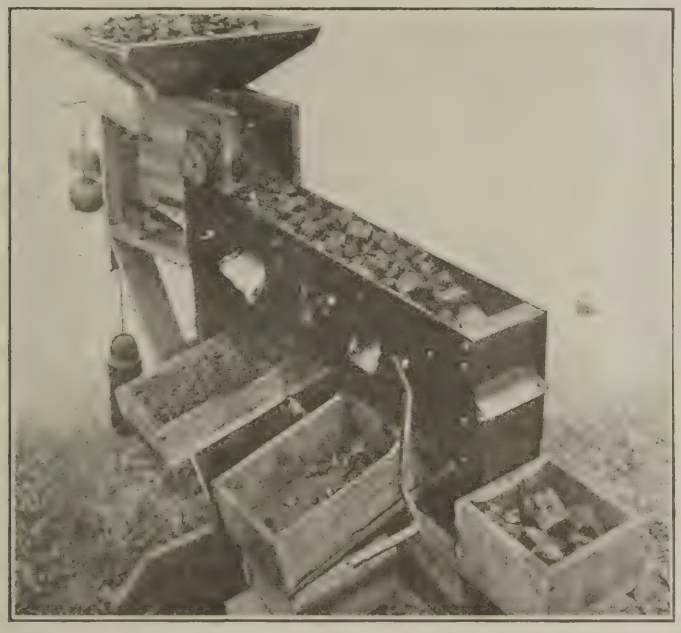
PRESENT conditions make it imperative for coal production to be as efficient as human brains and brawn can make it. The economical value of sized and cleaned coal is clearly demonstrated by the premium placed on prepared fuel by the Government in this crucial period of American history. Therefore, anything that will contribute to the more efficient production of sized and picked coal should be brought to the attention of operators and tipple experts at once. The records of the Patent Office contain data on an invention that gives promise of introducing radical changes in tipple design and construction that will make for greater efficiency and economy in coal preparation.

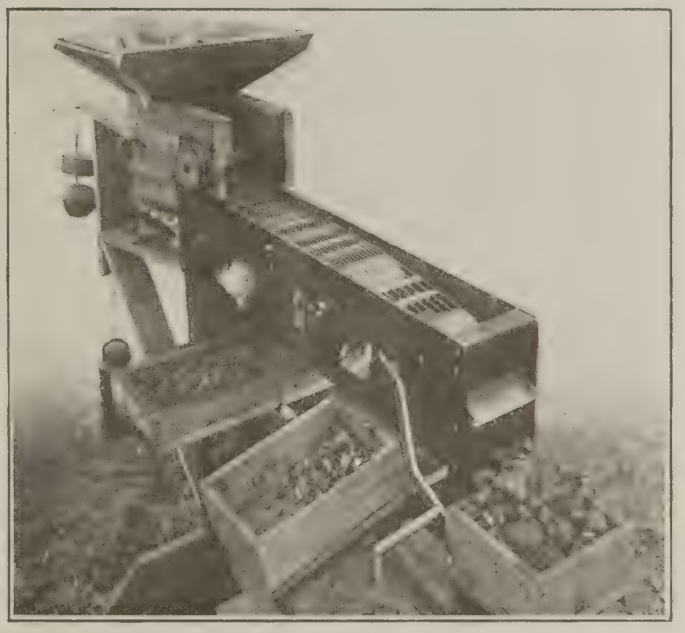
Generally speaking, inventions are of two kinds. One sort is based on an entirely new idea or law in science or mechanics while the other is an adaptation of a familiar device to a new use with such modifications as the new use may indicate. It is those of the latter class that are so simple and so self-evident that we are often led to exclaim, "Why didn't I think of that?"

The particular device under discussion has its base in the application of the multiple rope drive to coal screening. No doubt a large majority of *Coal Age* readers have seen many rope drives where the driving wheel or sheave carries a large number of ropes which are taken off in groups to several driven sheaves. The driving sheave may send out 20 ropes to four or five different parallel lineshafts, each shaft taking as many ropes as its power load may require. If three shafts are in approximately the same horizontal plane and are arranged so that every alternate rope is wound around the sheave nearest the driver, while its neighbors on either side pass on to the next sheave, it will readily be seen that the spaces between the second and third sheaves will be twice as wide between ropes as the spaces in the section between the first and second sheaves.

Now let the ropes be wire cable with enough tension to keep them taut and prevent horizontal spreading or swaying and you have the underlying idea of the Landahl patent cable screen. The section between first and second sheaves is the slack screen; between the second and third is the egg screen, while the lumps pass over the end.

Of course, in practice there are refinements embodied in the actual machine that do not appear in the foregoing. These are the result of long careful study and experiment with the model, of which illustrations appear herewith. The model here pictured is built exactly one-twelfth the size of a screen designed for a capacity of 200 to 250 tons an hour, depending on the speed of the ropes. These refining details will best come out in a description of a typical three-track tipple, such as is shown in Fig. 3, while the results will in no way be inferior to the separations given by the model and shown in Figs. 1 and 2.





FIGS. 1 AND 2. SHOWING WORKING MODEL FULL AND EMPTY

Coal is received in the dump hopper, which is fitted with a flygate for bypassing to the inner track, where unpicked mine-run is to be loaded. If coal is to be picked and screened, a reciprocating feeder driven from the cable sheave tailshaft feeds the coal onto the first section of the screen, where slack falls through the narrow spaces between the ropes to a collecting chute. (In the model a tiny belt feeder is used.) The run-of-mine, however, contains big lumps, and these carry slack on their tops; the problem thus arises of spilling this from the lumps without breaking the big pieces by a jar or fall. This is accomplished by fitting three

of the idler shafts near the end of the slack screen with stirring cams, which turn or roll the lumps sufficiently to spill the slack off them without making more slack by concussion. A sketch of these cams, which rotate with the travel of the coal, is shown in Fig. 3.

Suppose it is desirable to pick both the egg and the lump—and this should be done more frequently than is now the case—all that is necessary is to put steel plates between the rolls, directly under the ropes in the next section. No separate belt conveyor or steel apron conveyor is required for picking. This may be done on the screen itself without the rather severe exercise of the optic nerve or muscle which accompanies the removal of refuse on a shaker.

In the egg screen, the process is similar to that in the slack section, with stirring rolls as before followed by a plain steel section of sufficient length to slide the lump into the chute over the outer track. All that is necessary to mix the various sizes as may be required is to run a scraper conveyor beside the screen from feeder to the lump chute and discharge the screened

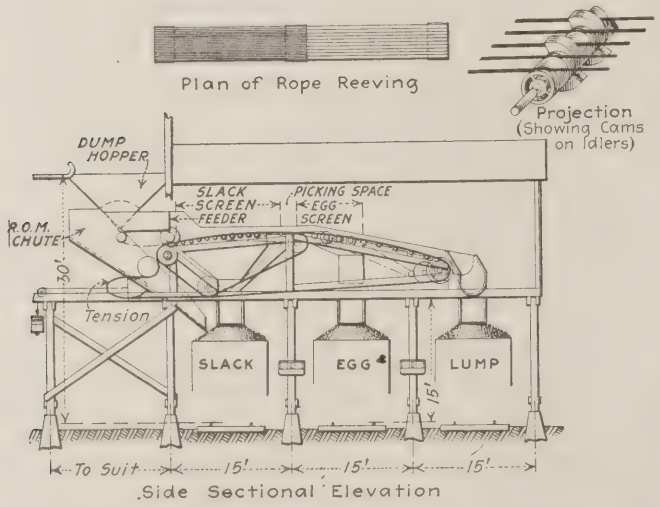


FIG. 3. TIPPLE PROVIDED WITH WIRE ROPE SCREENS

products into this conveyor for delivery with other sizes on either of the outer two tracks.

Compared to the ordinary forms of shaker screen, and even those more recent designs of shakers which have been brought out in the past few years, the Landahl cable screen has marked advantages in three directions—in the tipple structure itself, in cost, and in the minimizing of breakage. Regarding the first, there are two features which immediately appear, one of these being the saving in height. The screen is flat—indeed the tailshaft can be below the headshaft if advisable. This in itself will effect a saving in the size of the structure necessary. Then, again, no matter how carefully balanced a set of shaking screens may be, there is always vibration against which the building must be braced. Any pendulum with an oscillating motion, however smooth, will tend to vibrate its supports, and human ingenuity is not capable of producing two pendulums so accurate as to overcome this tendency when swinging in opposite directions, let alone the approximations which are customary in manufacturing shakers.

I have photographed interiors of many tipples and have often been unable to focus a camera correctly until the screens stopped running. With the Landahl screen this extra strength and rigidity of structure is entirely unnecessary, and any building that will stand up under the dead weight of the loaded screen is as strong as it need be.

The driving mechanism is correspondingly simple. There are no eccentrics or connecting-rods, no balance wheels and none of the elaborate mechanism sometimes seen to insure a forward travel of the coal over the shaker screen. All that is necessary is sufficient gearing to reduce the speed of the motor or engine to the proper speed of the driving sheave, and chain drives therefrom to the stirring rolls to assure their positive action. The only added feature is the tension, and this needs no extra room—it can be placed almost anywhere out of the way.

So far as breakage is concerned, the Landahl screen is nothing more than a smooth-running continuous conveyor and not a series of bumps which make up in the aggregate an intermittent progress. The coal does not drop so much as an inch during the screening or picking process. There are no breaks between upper and lower shaker, or at the point where the lumps fall into the chute or onto the loading boom. At the lower end of the cable screen there is a plate which fits closely up to the head sheave, onto which the lumps slide from the cables and from which they slide onto the loading chute or boom.

On the screen itself there is no breakage arising from lumps sticking in perforations only to be broken by the impact of a bigger lump from behind. The very construction of the screen itself guards against this. There are no edges or ends to the perforations against which the lumps may be crushed.

As to the cost, improved machinery usually is high in first outlay. Careful estimates based on actual expense show that the Landahl screen is at least 10 per cent. lower in first cost than a shaker screen outfit of the same capacity.

The screen here described was developed and patented by E. E. Landahl, who has had many years' experience in tipple design and who is at present assistant chief engineer of the Webster Manufacturing Co., in whose hands Mr. Landahl has placed the manufacture of this new adjunct to tipple equipment.

The volatile matter of bituminous coal would have greater economic value if converted into gas or liquid fuel than if burned under steam boilers. Under present market conditions heat in the form of coal gas brings 8 to 16 times the price of an equivalent amount of heat in the form of coal. Gas is extremely convenient fuel and can be used to advantage for many purposes such as cooking, lighting and heating buildings, municipal lighting, and in some industrial plants for obtaining a uniformly high temperature and clean products of combustion. The residue from the coking coals should find a ready market for house-heating and for steaming purposes. As both the gas and coke burn without smoke, their separate use would tend to make cities cleaner. The manufacture of gas from coal has been a commercial undertaking for many years and is still rapidly developing, the liberal margin between the price of heat in the form of gas and the price of heat in the form of soft coal making the conversion profitable.—*Bureau of Mines Bulletin No. 135.*

Use of Waste Gases for Steam Generation

By J. B. C. KERSHAW
Liverpool, England

THE general utilization of the waste gases from coke ovens and furnaces for steam generation has progressed rapidly in recent years, and had not the war checked development in many industries, still further progress doubtless would have been recorded. In view of the industrial struggles ahead, and the necessity that exists for utilizing our fuel resources to the greatest possible extent, it will be useful to study the progress and records of the past few years, to ascertain what economies are possible with the aid of waste-heat boilers.

THE heat carried away in waste gases may exist either as "sensible heat," that is, heat measurable by the thermometer and due to a failure to extract from the gases the whole of the heat generated by the combustion of the fuel, or as "potential heat," that is, heat represented by chemical energy. This latter is the result of incomplete oxidation of the combustible matter, and of the presence of hydrogen and carbonic oxide in the escaping gases.

In the latter case some form of burner or combustion chamber, with means for regulating the air supply, is necessary. When the waste gases carry only sensible heat, and combustion is completed, the addition of a boiler only is required to save some portion of the wasted energy.

In the earlier installations of waste-heat boilers the natural chimney draft was relied upon to overcome the increased resistance arising from the passage of the gases through the flues of the boiler. In many cases the boiler was erected directly above the furnace, in order to minimize the losses from this cause. This plan was never entirely satisfactory, and in modern installations artificial draft is always employed. In this way the draft of the original apparatus or furnace is increased rather than lessened by the installation of the waste-heat boilers. The use of fans furthermore enables much higher gas velocities to be attained over the water-cooled plates of the boiler, and increases considerably the rate of heat transmission and therefore the efficiency of the whole plant.

TABLE I. CHEMICAL COMPOSITION AND THERMAL VALUE OF WASTE GASES CONTAINING COMBUSTIBLE CONSTITUENTS

Type of Gas:	Per Cent. H	Per Cent. CH_4	Per Cent. CO	Per Cent. C_2H_4	Calorific Value*
Coke-oven gas	49.1	32.6	8.1	3.1	535
Blast-furnace gas	3.5	....	25.4	....	90 to 115

* In British thermal units per cubic foot of gas.

As regards the practical value of waste-heat boilers, it is possible with a modern plant to reduce the heat of the waste gases to 500 deg. F. Any furnace, therefore, which is allowing gases to pass away above this temperature may be provided with the necessary equipment for recovering the wasted heat, although as a general rule such recovery only pays when the gases are carrying 200 deg. F. or more of surplus heat up the chimney.

TABLE II. SENSIBLE HEATS OF WASTE GASES CONTAINING NO COMBUSTIBLE CONSTITUENTS

Type of Gas:	Temperature, Deg. Fahr.
Openhearth steel furnaces	1,100 to 1,300
Reheating furnaces	1,100 to 1,900
Cement kilns	1,300 to 1,800
Copper refining furnaces	1,400 to 2,200

In the United States it is calculated that the utilization of the waste heat from openhearth and other regenerative furnaces in the steel-making plants is equivalent to a saving of 250 lb. of coal per ton of ingots produced, or to an annual saving of two million tons of fuel. Of the total heat delivered to the openhearth furnace, 45 per cent. is wasted in chimney losses. From one half to two thirds of this heat can be recovered by the installation of waste-heat boilers.

Tables I and II show the chemical composition, thermal value and sensible heat of the waste gases from typical iron, steel and other metallurgical furnaces.

The following practical examples of waste-heat utilization for steam generation are drawn from the United Kingdom, Belgium, Germany and the United States; those are selected in which the data of test results are the most reliable and up to date.

Successful Plant in England

The Waste Heat and Gas Electrical Generating Stations, Ltd., was formed in 1907 to promote the use of waste heat for power purposes. This company has developed so satisfactorily, that it now controls nine of the waste-heat power stations running in the South Durham area. According to R. P. Sloan, who contributed a paper on the subject to the meeting of the British Association at Newcastle recently, there were 11 waste-heat power stations operating in the North East coast area. Two of these alone turned out 40,000,000 units of electricity per annum.

The waste-heat stations in the North East coast scheme operate in conjunction with the County of Durham Electrical Power Supply Co., and with the Cleveland and Durham County Electrical Power Co. The area served by these two power companies covers 1400 square miles, and the total power supplied at present is 343,000 hp. The waste-heat stations are placed close to the larger coke-oven and blast-furnace plants, and operate in parallel with the five main stations of the power companies. They are run at their maximum capacity, and all regulation of the power is effected by the main supply stations.

The main distribution and transmission system is three-phase, and the working pressure is 20,000 volts. The power is utilized chiefly in the machine shops and shipbuilding yards situated on the Tyne and Wear, and as the companies have a market for their current many times greater than the output of any individual waste-heat station, it is possible to run these plants continuously at their full capacity and to utilize to the best possible extent the machinery installed in them.

Unfortunately for scientific purposes, no figures have been published (or can be obtained) for the thermal or working efficiency of these North East coast waste-

heat stations, and therefore it is impossible to say how the system adopted compares in practical value and economy with the waste-heat stations situated in other countries. As the most notable and financially successful scheme of waste-heat utilization in the United Kingdom, however, the North East coast developments deserve first mention in any article on the subject.

In 1904 byproduct coke ovens were erected at the coking works attached to the Priestman collieries at Blaydon near Newcastle, and a complete installation of water-tube boilers was added in order to utilize the waste heat of the ovens. At Blaydon there are 90 ovens, and the steam produced from the waste heat is employed to generate electricity in an up-to-date power station, which is worked in coöperation with the Newcastle Electric Supply Co.'s stations.

At Rowlands-Gill there is an installation of 200 beehive ovens and in 1909 nine Stirling water-tube boilers were erected on the main flues which carried the waste gases from the ovens to the chimney. Two Bettington tubular boilers and four Stirling boilers fitted with under-feed stokers were added for the purposes of burning coke breeze and to provide an alternative source of steam power when the ovens were not working.

The electric power station at Rowlands-Gill contains four Westinghouse turbines coupled to three-phase alternators, generating current at 6000 volts for supply to the Newcastle Alloy Co.'s works in the vicinity of the generating station. This company has recently commenced the manufacture of ferrosilicon, ferromolybdenum, ferrochrome and ferrotungsten.

As regards the working efficiency of the Rowlands-Gill boilers, the following are figures given by A. D. Pratt in a paper read before the American Society of Mechanical Engineers (in New York) on Dec. 16, 1916:

Heating surface	1,610 sq.ft.
Gas weight	23,200 lb. per hour
Gas per square foot of heating surface	14.4 lb. per hour
Temperature entering boiler	1,720 deg. F.
Temperature leaving boiler	650 deg. F.
Drop in temperature	1,070 deg. F.
Horsepower developed	187
Approximate rate of heat transfer, per square foot per hour, per degree of temperature difference	4.7 B.t.u.
Draft (natural chimney draft)	0.56 in. of water

The test was made on one of the Stirling boilers rated at 161 hp. and worked in connection with 22 beehive ovens producing coke from an average of 3800 lb. coal per hour, or 173 lb. per oven per hour.

Belgian Waste-Heat Plant

The famous Cockerill Co., of Liege, started experiments in 1909 with the object of utilizing the heat contained in the waste gases from the large gas engines working with blast-furnace gas, the heat in these gases being estimated to amount to 2580 B.t.u. per horsepower-hour. The type of steam generator the engineers of the Cockerill Co. have evolved for the purpose consisted of a horizontal tubular boiler surmounted by a vertical tubular economizer. The gases which left the engine with a temperature of 446 deg. F. entered the boiler and were reduced in the economizer to 230 deg. F., while the water was heated up from 46 deg. F. to 338 deg. F.

The water then passed into the boiler, where it was converted into steam at a pressure of 114 lb. per square inch. Four boilers of this type had been installed by the Cockerill Co. before the war broke out and were developing 5000 hp. Steam was raised in the proportion of 1.93 lb. per electrical horsepower developed by the gas engine, and it was estimated that the boilers recovered 55 per cent. of the heat of the waste gases and increased the thermal efficiency of the gas plant by 13 per cent.

M. Greiner has calculated that with four gas engines of 1500 hp. each the savings effected by the installation of waste-heat boilers would amount to about $18,880 per annum. If it be accepted that a thermal efficiency of 30 per cent. can be obtained in the gas engine, then the addition of a waste-heat recovery apparatus would raise the efficiency of the entire equipment to 35 per cent., or to double that of the best steam plant.

An Illustration from Germany

As usual, most of the German records of trials and tests of waste gases for steam-raising purposes are more scientific and exact in their form than those of other countries. The most important and valuable of the results for comparative purposes are those recorded by Butow and Dobblestein in *Gluckauf*.

The data recorded related to trials with the Wefer patented system of boiler firing (with coke-oven gas), which was designed to secure a better mixture of the combustible gases and air passing into the boiler furnace, as well as to minimize the risks due to backfiring or to explosions in the mixing chamber. In the early types of burners for boilers fired with coke-oven gas, the gases were introduced by simple nozzles, air being supplied through openings in the furnace front. Imperfect mixing of gas and air led to imperfect combustion.

In the Terbeck burner a mixture of gas and air was obtained on the principle of the Bunsen burner, and a secondary air supply was introduced at the combustion point. By the use of this burner the steam output per ton of coal coked rose from 782 to 1320 lb., and the evaporation per square foot of heating surface per hour from 1.475 to 2.92 pounds.

In the Wefer system gas flows from the main into the 25 iron pipes feeding the graphitic burner tubes through a chamber, one end of which is formed by a hinged explosion cap. This uncovers the full section of the chamber in case of backfire and closes automatically when the latter has expended its force. It also affords easy access to the burner tubes. Air is supplied through a ring valve to a separate chamber, whence it flows concentrically with the gas tube for a distance, and is thus thoroughly mixed with the gas before ignition.

An eight-hour test on a double-flue boiler of 1280 sq.ft. heating surface gave the following results (summarized): Steam pressure (gage), 168 lb. per square inch; steam temperature, 592 deg. F.; mean gas pressure, 3.5 in. water; mean gas temperature, 80.6 deg. F.; mean calorific value of gas, 461 B.t.u. per cu.ft.; excess air supply, 1.71; evaporation, from and at 212 deg. F., 286.5 lb. per 1000 cu.ft. of gas; evaporation per square foot of heating surface, 4.47 lb. per hour; thermal efficiency, 79.2 per cent.

Forty-eight Wefer furnaces (in 1912) had been in satisfactory operation at the Victor Pit (Rauxel) for nine months. Assuming a boiler of 1290 sq.ft. of heating surface to yield 18,000 tons of steam during 300 working days, it is shown that the costs per metric ton of steam are: Wages ¾c.; maintenance and cleaning, ½c.; feed water, 1¼c.; interest and depreciation,

2½c.; total, 5c. per ton. This figure may be compared with the average estimate of 32c. per ton of steam in coal-fired installations.

Another series of trials carried out in 1914 with an improved form of the Wefer burner gave the following results, the tests being carried out on a boiler with the two flues fitted with the new burner: Heating surface, 1241 sq.ft.; gas analysis—CO_2, 1.6 per cent.; O, 1.8 per cent.; CO, 4.6 per cent.; H, 52.2 per cent.; CH_4, 28.8 per cent.; heavy hydrocarbons, 1.6 per cent.; N, 9.4 per cent.; mean calorific value, 428 B.t.u. per cubic foot; gas pressure, 5.8 in. water, barometer, 29.7 in.; flue gas analysis—CO_2, 8.30 per cent.; O, 3.24 per cent.; CO, nil; excess air ratio, 1.16; furnace temperature, 2560 deg. F.; steam pressure, 176 lb.; steam temperature, 567 deg. F. at the superheater; evaporation, 7219 lb. steam per hour; gas consumption, 24,854 cu.ft. per hour or 291 lb. per 1000 cu.ft. of gas, and 5.81 lb. steam per square foot of heating-surface per hour. The thermal efficiency, including superheat, amounted to 84.6 per cent. Loss by conduction and radiation was 15.4 per cent. Comparison with the earlier test data shows a net gain of 3.4 per cent. in thermal efficiency, despite the increase in evaporation from 4.47 lb. per square foot to 5.81 pounds.

In the improved Wefer burners used for these tests, the coke-oven gases flow from the gas chamber through 40 distributing tubes and are delivered about two thirds the distance along tunnels in the graphite burner block. The use of 40 distributing tubes in place of the 25 of the earlier burner secures a better mixture of the gas and air. The latter is admitted through a ring valve and flows concentrically with the gas tubes to the mixing chamber at the burner head. The original form of Wefer burner extended into the flue of the boiler for a distance of 2 ft., but the improved form is built onto a tubular extension of the furnace front, and thus the whole length of the flue of the boiler is available for heat transfer.

Provision is Made for Backfires

To provide for backfiring and explosions a central tube 8 in. in diameter is inserted in the burner, with a simple explosion valve on its outer end. The combustion chamber is lined with firebrick, and in order to promote more perfect combustion of the gases a perforated plate and a bank of short tubes of fireclay are mounted in the flue of the boiler. At the Victor pit, where these trials of the Wefer burner have been carried out, a gasometer with a capacity of 1,400,000 cu.ft. has been erected in order to secure a steady pressure of gas at the burners. As the gas is now being stripped of all its benzol in a byproduct recovery plant, the thermal value of the gas is not so high as it was at the time of the tests.

In comparison with the foregoing tests of the Wefer burner, figures given by Ortmann in the August, 1913, issue of *Stahl und Eisen*, covering the results of tests made with blast-furnace and coke-oven gases, may be quoted. The boiler used for blast-furnace gas had 968 sq.ft. of heating surface and was provided with an economizer. The thermal efficiencies in three separate tests were 79.4, 76.8 and 82.7 per cent., giving a mean of 79.6 per cent. The other boiler had a heating surface of 925 sq.ft. and showed in two separate tests efficiencies of 74.9 and 80.2 per cent. when fired with coke-oven gas, the mean in this case being 77.5 per cent. The calorific value of the gases and other details are not available in this case, so it is impossible to say whether the burner used was as efficient as the Wefer burner or otherwise.

Waste-Heat Utilization in America

A large amount of practical work upon the subject of waste-heat utilization has been carried out in America and in a paper presented at the 1916 annual meeting of the American Society of Mechanical Engineers, A. D. Pratt gives a review and summary of what has been achieved in connection with this problem.

The design and operation of boilers for utilizing the waste heat of openhearth steel furnaces, cement kilns, copper furnaces, beehive coke ovens, and heating furnaces generally, are discussed in this paper. From it the following particulars are abstracted concerning the waste-heat installation at the plants of the H. C. Frick Coke Co. at York Run, Penn., and of the Indiana Steel Co. at Gary, Indiana.

At York Run, 50 beehive coke ovens were connected to three Stirling boilers provided with standard type of baffles and 3600 sq.ft. of heating surface each. The test extended over a full week's run of 168 hours with an average of 44 ovens in service, coking coal at the rate of 13,800 lb. per hour, or 314 lb. per oven per hour. The weights of gas and temperatures varied considerably during the week, the lowest temperature noted being 1500 deg. F. and the highest 2075 deg. F. The exit temperatures varied from 475 deg. F. to 550 deg. F. and averaged 490 deg. F.

The gas consumed in this test, expressed as pounds per hour, was 83,650, and expressed as pounds per hour per square foot of heating surface, was 7.7. The drop in temperature of the gases in passing through the boilers was 1314 deg. F., and the horsepower developed amounted to 824, or 76 per cent. of the rated capacity of the boilers. The approximate rate of heat transfer was 3.2 B.t.u. per square foot per hour per degree of temperature difference.

The foregoing represents the results obtained with an early installation of boilers for utilizing the waste gases from beehive ovens. Later installations in the United States have shown considerable improvement upon these results.

At a more modern plant, provided with a specially designed Babcock & Wilcox boiler, 18 sections wide, each section made up of 26 twenty-foot tubes, and thus providing 10,200 sq.ft. of heating surface, the draft is furnished by a turbine-driven induced-draft fan, and a much higher rate of heat transfer is obtained, due to the greater speed at which the gases are passed through the boiler. The results of two tests with this boiler were as follows:

	No. 1	No. 2
Gas consumed, pounds per hour	125,500	155,100
Gas per square foot of heating surface per hour	12.2 lb.	15.2 lb.
Temperatures:		
Inlet to boilers	2,329 deg. F.	2,158 deg. F.
Exit from boilers	463 deg. F.	477 deg. F.
Drop in temperature	1,866 deg. F.	1,681 deg. F.
Power developed	1,750 hp.	1,956 hp.
Per cent. of rated capacity of boiler	172	192
Approximate rate of heat transfer *	5.6	6.8

* Expressed as B.t.u. per square foot per hour per degree of temperature difference.

The performance of this first boiler has been so satisfactory that six additional units have been ordered by

the owners of this coking plant, the only difference being that there are 27 sections instead of 18, and that each boiler possesses 15,300 sq.ft. of heating surface, equivalent to a capacity of 9180 hp. for the six units.

The utilization of the waste heat from openhearth steel furnaces has been practiced for many years in the United States, and according to Mr. Pratt (see paper previously quoted) there are already installed, or on order, boilers capable of producing 90,000 hp. from this type of waste heat alone. These boilers are connected to 190 openhearth furnaces which produce annually over nine million tons of steel. Experience has shown that through the use of these waste-heat boilers the net cost of production is reduced by 20 to 25c. per ton, and that a total economy of $1,840,000 is earned on the foregoing output of steel. The fear that the installation of waste-heat boilers, with their fans and other accessories, would cut down the production of the openhearth steel furnace has proved groundless, for the figures show that the improved draft resulting from the use of fans leads to a reduction in the time required for the separate heats and increases the tonnage capacity of the furnace.

The installation of waste-heat steam generators at the Gary works of the Indiana Steel Co. consists of 28 special six-drum Rust-type of boilers, equipped with special cross-baffles, in order to give the desired gas velocities over the heating surfaces. Each boiler has a heating surface of 4880 sq.ft., and the one to which the following test relates developed 393 hp., or 80.6 per cent. of its rated capacity.

Gas weight, per hour	83,434 lb.
Gas per square foot of heating surface per hour	17.1 lb.
Temperatures:	
Entering boiler	1,155 deg. F.
Leaving boiler	530 deg. F.
Drop in temperature	625 deg. F.
Draft at boiler inlet	1.47 in. water
Draft at boiler damper	3.95 in. water
Loss in draft	2.48 in. water
Approximate rate of heat transfer, square foot per hour per degree of temperature difference	6.92 B.t.u.

Philippine Coal Fields Develop Slowly

From the *Consular Reports* the following notes on the Philippine coal fields are taken, a map being added so as to enable the reader to locate the points mentioned:

"C. H. French, the new manager of the National Coal Co., has just returned from a tour of inspection of the company's property near Zamboanga and gives a favorable report. The company is not yet turning out any coal, but has finished the preliminary survey of the field and expects to be prepared in six months to put out coal in a small way pending the adequate development of the project. The preliminary output will probably not exceed 100 tons per day.

"The Sibuguey Peninsula, on which the National Coal Co.'s fields are located, contains approximately 100 square miles, all of which appears to be well underlaid with coal. The company is devoting its attention at present to an area about 10 miles square, which is especially rich in deposits. Of this tract some 4 square miles are fairly well located for immediate development work. This portion of the tract lies near the small Sibuguey River that is navigable eight or nine months of the year and will supply transportation facilities to Taba Bay pending the construction of the necessary railroads. [Sibuguey River and Peninsula and Taba Bay do not appear in modern atlases.—Editor.]



"It is the intention of the company's management to open up this tract provisionally and to get out as much coal as possible for immediate local needs while the more systematic development work is going forward. Under the present transportation conditions it will be impossible for some time to get the necessary trackage and rolling stock for the railways, and the same will be true of much other modern machinery required. Meanwhile, however, a considerable amount of coal may be taken out near the river and transported to ocean-going ships.

"The preliminary survey of this field shows the presence of considerable anthracite on the northern end of the coal-bearing tract. One vein of this, 13 ft. thick, has been uncovered sufficiently to show an extensive deposit. No attempt will be made to exploit the anthracite at present, as the islands are not prepared to use this class of fuel.



MAP OF PHILIPPINE ISLANDS

"Near the middle of the tract a 6-ft. vein of good bituminous coal has been found. Tests have shown the product of this vein to be good coking coal, considerably above the standard required of Japanese coal in this market. Another vein of noncoking coal has been located and explored to a considerable extent. The coal from this is of good quality and compares favorably with the Japanese product consumed in the islands. Two private operators are turning out coal on the island of Cebu. The Uling Co., whose mine is

situated south of the city of Cebu, and the Banao Co., whose plant is to the north of Cebu, claim to be turning out about 30 tons each per day. Their average output is probably considerably less than this amount at present. Their product is said to be of good quality, and they have no difficulty in selling all they can produce. The deposits at these places are said to be extensive. No data are available on which full reliance may be placed, as no official surveys have been made.

"On the island of Batan (not to be confused with the Province of Bataan on the island of Luzon), the Betts Coal Co. is turning out an average of 10 tons a day. All of this output is being consumed by the Legaspi line of the Manila R.R. No complaint as to the quality of the coal is made by the railroad, but the amount produced is not sufficient to meet the needs of the line.

"For the purpose of beginning operations as soon as possible the National Coal Co. has recently purchased some equipment from the Manila R. R. Co., including some engines, boilers, tackle and pumps. The company's engineer has recently resigned, and operations will be temporarily suspended pending the employment of another man with coal-mining experience. Such a man does not appear to be available in the islands at present, and it may be necessary for the company to send to the United States for him."

A Neglected Coal Field in West Virginia

THE recent increased demand for so-called smokeless coal has led to new investigations for such coal in fields along the eastern margin of the great Appalachian coal field, and particularly in the regions nearest tidewater. One of these, known as the Abram Creek-Stony River coal field, in Grant, Mineral and Tucker Counties, West Virginia, has recently been examined by geologists of the United States Geological Survey, Department of the Interior, which makes public the following statement:

The fields examined include the southeastern prong of the southern extension of the famous Georges Creek field of Maryland. The southwestern prong extends up the North Fork of Potomac River and over into the headwaters of Cheat River. At the north end of the Georges Creek field there is a single basin, the axis of which nearly follows Georges Creek across Maryland from Wellersburg, Penn. This axis passes a little east to the North Fork of the Potomac almost to Elk Garden, where it swings farther eastward and follows Abram Creek up to its head and thence passes southward a little east of the upper waters of Stony River across the divide into the basin of Red Creek, in Tucker County. The basin ends a few miles south of the South Fork of Red Creek. The southeastern and southwestern extensions of the fields are separated by the Canaan Valley anticline, which follows Canaan Valley northward nearly to the Falls of Stony River, then turns northwestward, crossing the North Fork of the Potomac not far from Stoyer. The northern part of Georges Creek-Elk Garden basin as far south as Emoryville is well known, but almost nothing has been published about the southern part. Around Elk Garden there are the remnants of the Pittsburgh coal, which in that region has a thickness of 12 ft. or more. This bed occupies only the hilltops and is now nearly worked out. Most of the present mining on it is done with steam shovels on the outcrop coal. Below the Pittsburgh, however, lie three beds that are widely minable in the area considered—the Barton bed, almost 400 ft. below the Pittsburgh; the Thomas bed, nearly 200 ft. lower; and the Davis bed, nearly 200 ft. below that.

As the recent field work has shown that the correlations of the coals given in the Survey's Piedmont geologic folio, published in 1896, are in many areas erroneous, and that the structure mapped in that folio does not quite agree with the structure as now determined, the following statement is made pending a more detailed report and map.

The Barton, Thomas and Davis beds crop out at the mouth of Abram Creek at Harrison, but between Harrison and Emoryville the Thomas and Davis beds pass below drainage level. From Emoryville to the Mount Storm-Petersburg road the Barton coal keeps a short distance above drainage level, and the other two beds lie below drainage level all along Abram Creek. The Thomas and Davis beds rise above drainage level near Bismarck. All the coals lie above drainage level at the mouth of Stony River, but the Davis coal goes below the level of Stony River about 3 miles from its mouth and the Thomas coal comes down to river level at the big bend north of Mount Storm. South of the Northwest Turnpike the Thomas coal is about at the level of the river, but it rises above the river still farther south, and about 3 miles below the Northwest Turnpike crossing of Stony River the Davis bed also rises above the river and continues to a point about three-quarters of a mile above the falls, where it again goes under. The Thomas bed keeps well above the river from the Northwest Turnpike to the mouth of Stingley Run, where it is just above the level of the river. From there southward all the coals rise, so that the Davis coal is above the river level a short distance above the mouth of Helmet Run. All the coals underlie the divide between Stony River and Red Creek and crop out in the upland divides between the branches of Red Creek. This basin is fairly flat, but its edge is sharply upturned on the east and less sharply upturned on the west.

The two upper beds, the Barton and Thomas, are similar in having usually one bench of clean coal, from 20 to 40 in. thick, overlain by a bench of mixed bony and good coal. The Barton coal differs, however, in having a parting near the bottom of this main bench of coal, and the coal below that parting is poorer than the rest of the bench. The Davis coal is generally much thicker, reaching in places a thickness of 9 ft., and there is usually a principal shale parting near the middle or above the middle and minor shale or bony partings in the two benches above and below the main parting. The Barton and Thomas beds will yield about 2½ ft. of coal and the Davis bed from 3 to 6 ft., the thickness depending on the number of smaller benches taken.

The coal of this field is much nearer tidewater than the so-called smokeless coals of Somerset, Cambria or Clearfield Counties, Pennsylvania, or the New River or Pocahontas coals of West Virginia. On the other hand, it is not generally as thick, or, if as thick, it is more broken up by partings than the smokeless coals of the regions mentioned. On this account it will be more difficult to mine and greater care will be necessary to obtain high-grade fuel. Furthermore, the average of many anaylses of the coal indicates that it contains a larger percentage of both ash and sulphur than either the New River or Pocahontas coals and more than that in most of the coals now mined north of this field.

The following estimates of the coal content of the three principal beds are based on the correlation of the beds made in recent field work: Assuming a recovery of 1200 tons per acre-foot, the Barton coal bed, with an estimated recoverable thickness of 30 in. and an available area of 19,200 acres, will produce 57,600,000 tons; the Thomas bed, with an estimated recoverable thickness of 30 in. and an available area of 45,880 acres, will produce 137,640,000 tons; and the Davis bed, with an estimated recoverable thickness of 36 in. and an available area of 63,200 acres, will produce 227,520,000 tons—a total of 422,760,000 tons.

New Apparatus and Equipment

New Mining Machine

The Brantley Coal Mining Machine Co., of Sand Springs, Okla., has placed upon the market the Brantley coal cutter. This machine, shown in the accompanying illustration, is claimed by the inventor to possess all the advantages of both the longwall and shortwall machines, as well as some others all its own.

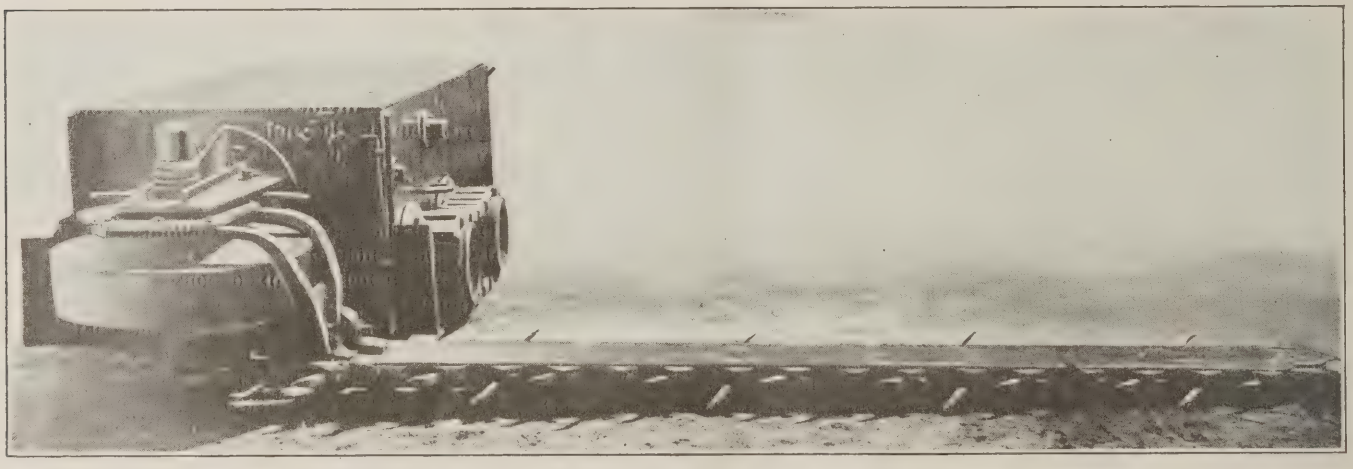
As may be seen in the illustration, the machine consists of an electrically operated mechanism driving a chain carrying pick cutters. The cutter bar, which may vary in length from 5 to 10 ft., may be swung in all directions and will cut at any angle to the body of the machine. Thus any kind of a cut desired may be made.

The truck upon which the coal cutter travels is made integral with the body of the machine, since due to the universal movement of the cutter bar there is no necessity for removing the machine from its truck. Propulsion is secured by means of a combination of track wheels and caterpillar chain. The machine will thus travel either upon rails or upon the floor of the mine.

The body of the machine is 6 ft. long, the height over all is 28 in. and the track gage is 36 in. The height of the kerf is 4 in., and timbers may be set within 4 ft. of the face. This coal cutter has three cutting and three traversing or traveling speeds. The cutting speeds vary from 2½ to 4 ft. per minute, while the traveling speeds range from 2½ ft. per minute to 4 miles per hour.

The arrangement of the propelling device is such that the machine may be made to turn itself around as if it were on a pivot. It will cross or leave the track at any desired point regardless of the position of switches. It may thus be used to advantage for driving either rooms or headings, air courses or breakthroughs.

The inventor of this machine has also developed a device for loading the coal onto mine cars as fast as it is cut by the machine. It is claimed that the coal cutter will mine coal as rapidly as 12 men could mine it with picks. If the loader will place this coal in a car as fast as the cutter will undercut it, it would appear that the combination of the two would do much to relieve the present shortage of labor in the coal mines.



MANY ADVANTAGES ARE CLAIMED FOR THIS NEW COAL-CUTTING MACHINE

Michaelsen Briquetting Machine

By L. Klebba
Minneapolis, Minn.

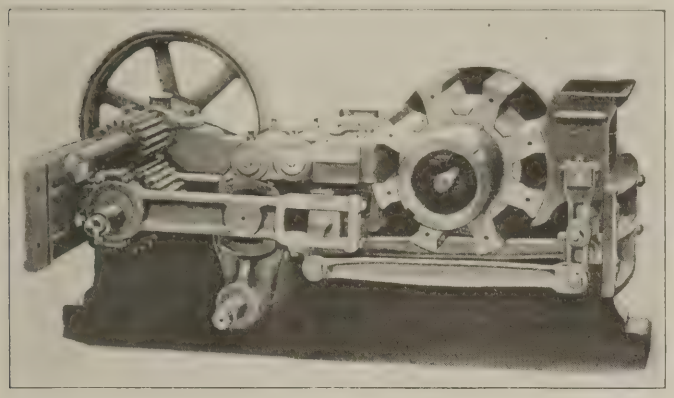
A new briquetting machine has been designed and patented by Private William P. Michaelsen, Co. C, 326th Field Signal Battalion of the United States Army. This machine is designed to press either granular or fibrous materials such as peat, lignite, coal dust, sawdust and the like into bricks or briquets suitable for fuel. In this process the machine differs considerably from others built for the same purpose.

As may be seen in the accompanying illustration, the machine consists of a revolving "cylinder" containing eight molds. This at one side revolves past a feed hopper from which each mold in succession receives a charge of the material to be briquetted. The cylinder is revolved by a succession of steps, each movement bringing one chamber or mold in front of the compressing plunger. This plunger then makes its stroke, compressing the contents of the mold in front of it into a briquet.

The bottom of each mold contains a movable piece carrying a plunger. When the chamber reaches its lowest position this plunger is acted upon by a cam inside the cylinder. The cam forces the bottom of the mold outward, pushing the pressed briquet loose from the walls of the mold. Upon a further movement of the cylinder the ejector plate is returned quickly to the bot-

tom of the mold by the action of a spring on the pin after this pin has been released by the cam. The briquet is thus ejected from the mold.

As may be seen, the feed hopper or block is made heavy and has a movement exactly opposite to that of the compressing plunger, so that the force of the

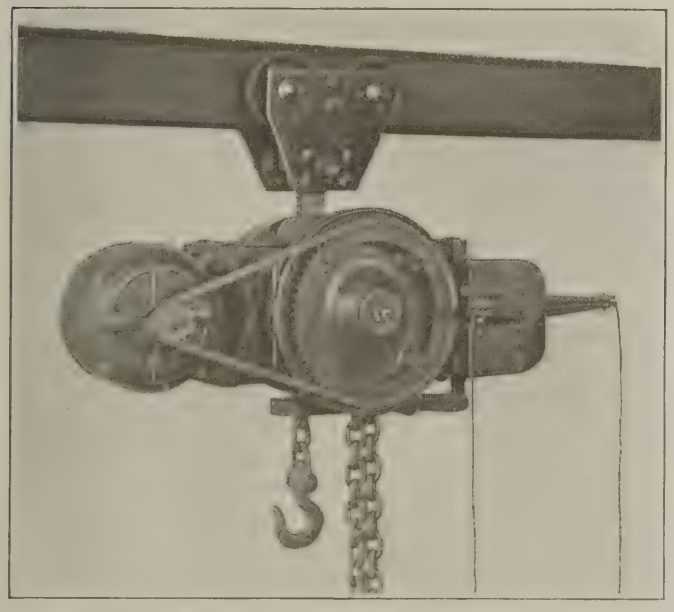


MICHAELSON BRIQUETTING MACHINE

plunger pressure is resisted not alone by the cylinder shaft but by an opposite pressure from the feed block as well. Any suitable means such a a chute or a conveyor may be employed to feed the material to be pressed to the machine. In like manner similar means may be utilized to remove the finished briquets from it. It would appear that this machine would find its greatest application in making large briquets of soft or fibrous material such as sawdust or peat.

Small Electric Hoists

Small electric hoists that are adapted to almost every kind of work involving hoisting form an economical means of handling loads of from ½ ton to 5 tons. These



SMALL ELECTRIC HOIST FOR GENERAL USE

machines can lift with from 5 to 10 times the speed of a hand-operated chain hoist, and their cost is but a fraction of that of an electric traveling crane. They can be suspended from a fixed point, shear-pole, jib-crane trolley running along an overhead track, or small traveling crane. The trolley or crane when used can either be pulled along by hand or operated by means of a motor.

These little hoists are controlled from the floor by means of pendant ropes. A brake, which is automatically applied when the controller is returned to the off position, holds the load suspended, and a safety switch automatically cuts off the current when the hook reaches its safe limits of travel.

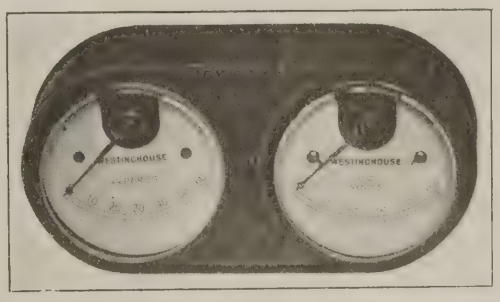
Special mechanical and electric features are employed in the construction of the motors to suit the service. The direct-current motors are modifications of the series-wound crane type. The alternating-current motors are of the polyphase squirrel-cage type with high torque, rotor windings. Motors of ¾ hp. are used for ½-ton hoists and 7-hp. motors for 5-ton hoists, the ratings being figured on a 30-min. basis.

The controllers of the drum type are designed to break heavy currents without burning the contacts. When the tension on the control ropes is released a spring returns the controller to the off position.

The hoist illustrated is built by the Yale & Towne Manufacturing Co., and equipped with Westinghouse electric apparatus.

New Duplex Instruments

The Westinghouse Electric and Manufacturing Co., of East Pittsburgh, Penn., has recently placed upon the market two new duplex instruments for battery charging, marine, dental, telegraph, telephone, farm lighting and other compact instrument panels where direct cur-



INSTRUMENTS MOUNTED IN METAL CASE

rent is involved. These duplex instruments consist of any two standard Westinghouse type AW or type FW instruments desired, mounted in an attractive dull-black metal case. The type AW instruments have round open faces, 3 in. in diameter, with glass cover and rear mounting studs; the type FW have 5-in. faces.

During the past 15 or 20 years considerable attention has been given to designing of furnaces that would burn bituminous coals without producing smoke. Campaigns have been conducted to educate the fireman and induce him to use proper methods of firing the coal so as to produce the least amount of smoke. Large cities passed smoke ordinances aiming to reduce the smoke by encouraging or forcing the coal user to install apparatus that would burn coal smokelessly. These methods of attacking the problem have had much success but the production of unnecessary smoke continues. A large part of this smoke is made in a way that can not be easily controlled, even with good intentions on the part of the offenders.—*Bureau of Mines Bulletin No. 135.*

Anthracite Mine-Cave Situation

FOR many years the people living in the anthracite region have been keenly alive to the necessity of obtaining some compensation for those whose surface property has been destroyed by mining operations. Similar controversies have existed in most of the important coal states and, in fact, wherever mining has been carried on under valuable surface holdings, either farmland or property otherwise improved. The solution of the Scranton mine-cave problem has, therefore, more than local interest. Problems of like character confront more or less the whole anthracite field, and the methods proposed and adopted in that region may be applicable wholly or in part to other sections of the country.

IN THE early days of the City of Scranton prominent members of the Scranton family acquired large holdings where the present City of Scranton now stands. A part of this property, that on the mountain to the southeast, contained iron ore. This fact and the abundance of coal in the region caused the Scrantons to organize the Lackawanna Iron and Coal Co. In 1841 the first furnace of this company was fired, and while the local ores proved a total failure, the project greatly encouraged the anthracite industry in the vicinity and had much to do with the early development of Scranton.

In 1851, to bring supplies to the furnaces and mills and to ship products out to markets, railroads were built extending east and west from Scranton. This was the beginning of the Delaware, Lackawanna & Western R.R. It was in these early days of the coal industry that the Scrantons began to dispose of some of their surface rights. It is stated that at first purchasers of land were given deeds in which merely the mineral was reserved. After a limited number of such transfers were made this form was discontinued; the next deeds reserved the mineral and also the right to mine it. This form was again soon modified so as to reserve to the mine owner the right to mine out all coal beneath the surface in question without liability for any damage which might result therefrom. This reservation has been held by the supreme court of the state to be valid. It is said that most of the deeds of sales for Scranton property are written with this latter clause, which waives for the grantee the right of surface support.

Area in Which Coal May Not Be Mined

In early transfers of property a tract was set aside for the business center of the city. No coal can ever be mined under six blocks to the east of the river. Thus the safety of the big office buildings of the city is assured. The original streets also were protected similarly, but those opened up later were not. Furthermore, in case of damage to their property the public-service corporations do not have any recourse in the wording of the original deeds.

As mining progressed in the different regions of the anthracite field and the workings became more extensive, difficulties with owners of surface property increased proportionately. Matters finally reached such a stage that a commission was appointed by Governor Tener during the legislative session of 1911 to investigate and report on the whole matter. This commission was made up of men prominently connected with the mining and engineering professions; it held many sessions in different parts of the anthracite field and made its report in March, 1913. The anthracite press commenting on this report at the time stated that in its opinion the commission had found a solution of the difficult mine-cave problem, at once prompt and effective as well as equitable to all the parties concerned.

That solution rested on certain voluntary, yet substantial, concessions which the principal mining companies of the anthracite coal region declared themselves willing to make to the surface property holders. They were willing to pay at least 50 per cent. of all the injuries suffered by structures in the progress of mining, where such structures are of a value of $5000 or less. This concession, conservative as it seems, was regarded as being liberal, for the assessment books of Scranton showed that more than 90 per cent. of the structures of the city were assessed at less than that amount and would be entitled to the compensation offered. The owners of structures exceeding $5000 in value were privileged to buy sufficient pillar coal for support of their premises at a rate not to exceed 25 per cent. above the prevailing royalty value at the time of purchase. This meant about 35c. a ton for pillar coal. It was also provided that the mining companies would erect artificial supports in the mines if the surface owners so desired—the expense of the work, however, to be borne by the surface owner. In case any disagreements were to arise between the interested parties, provision was made to refer the matter to a board of three commissioners. This agreement was signed by the presidents of the several companies which controlled more than 90 per cent. of the coal operations in the anthracite field.

During the years following this report much legislation was attempted in which politics played a prominent part; in fact the mine-cave situation was made the football of politicians. In the Scranton municipal election last year it was again a prominent issue. After the present mayor, A. T. Connell, was elected matters were taken up in earnest and the proposition referred to later in this article was put in shape. On July 22, 1918, the anthracite concerns operating mines under Scranton and Dunmore made a proposal to the people of Scranton through the Mine-Cave Committee of the Civic Bureau of the Scranton Board of Trade. On July 24, 1918, that body addressed the following communication to the authority by which it was appointed:

At a meeting of this body, held June 25, 1917, a resolution was passed authorizing the chair to appoint a committee of five for the purpose of meeting representatives of the anthracite coal companies operating in this vicinity, the purpose being to determine whether some practical arrangement could be reached which would relieve the surface owners and residents of the community to a large degree from the fear and distress arising from the fact that mine caves were occurring from time to time in certain parts of the city. During the past 13 months the committee has held 29 stated meetings and numerous informal conferences, most of them in this city, with several in New York. After your committee had held several meetings a joint conference was held in the Board of Trade rooms in this city. At

this conference the members of the committee carefully outlined to the anthracite operators the so-called "mine-cave problem" as it appeared to them, and suggested that it might possibly be approached from two different angles. First—either a special arrangement or contract could be made between each particular town or city affected and the companies operating in that community; or second—a comprehensive plan could be outlined which would apply to the problem wherever it occurred throughout the coal fields and one to which the anthracite interests and all the inhabitants of the entire region, and possibly the Commonwealth of Pennsylvania, also might be parties.

Much time was devoted at this conference to analyzing the advantages and disadvantages of the two plans suggested. The operators directed the attention of the committee to an announcement published in the Scranton papers on June 23, 1917, whereby the coal companies subscribing agreed to do certain things voluntarily and requested that the committee state in what respects this proposition was not satisfactory to them. The attitude of the operators at this meeting indicated very clearly that the voluntary agreement was the only plan they could see their way clear to seriously consider, and this impression was confirmed in subsequent meetings. On Monday, July 22, 1918, your committee received from the operators a voluntary offer or agreement, duly signed, and this we are prepared to announce for your consideration.

After submitting their proposal, the representative of the operators offered an explanatory letter, addressing it to the chairman of the Mine-Cave Committee of the Civic Bureau. Extracts from this letter follow:

In accordance with your request, I inclose herewith our proposal, duly executed by all of the companies who have been represented by our committee. If the same be acceptable to your committee, we will prepare and submit to you a proposed form of contract between the commission to be appointed and the coal companies, binding them legally to the terms of the within proposal, which we will forthwith put into effect. As to schools, our position has been that there is no reason why we should bear the whole burden of their protection. In Commonwealth vs. Citizens Coal Co., 256 Pennsylvania, at page 331, it is held that the school boards have the right to condemn the coal necessary for the support of the schools, and they also may purchase the same under the plan proposed, at a price to be fixed by the commission. In all cases where the school boards act, either by instituting condemnation proceedings or by filing an application before the commission, we will immediately discontinue all mining which might endanger the safety of school buildings, pending the determination of the questions of what support should be provided and the cost thereof. We, as taxpayers, will pay some 20 per cent. of all such awards. Our committee is unanimously of the opinion that this burden can be, and should be, fairly borne by taxation. Notwithstanding all we have read and heard of sentiments to the contrary, we have faith in the sense of fairness of the citizens of Scranton, and that they appreciate the difficulties and mutual obligations relating to the mine-cave problem. We believe the plan proposed will be reasonably acceptable to them and, with such modifications as experience may prove to be helpful, a permanent and satisfactory solution.

The proposal referred to follows:

At the request of the Pennsylvania Anthracite Mine-Cave Commission, a voluntary undertaking was made by various mining companies under date of Feb. 19, 1913, which was supplemented by a public announcement made June 19, 1917. As the result of numerous conferences with your committee, we have offered not only to bind our respective companies substantially to the obligations named in the foregoing, but to assume additional burdens as stated in our communication to your committee of Apr. 4, 1918. You now ask us to formally restate these offers in a written proposal.

The committee representing the coal-operating companies of the City of Scranton who signed such communication of Apr. 4, therefore, hereby submit the following proposal as a present adjustment of the mine-cave problem.

A large part of the surface upon which buildings have been constructed in the City of Scranton has been granted by deeds which expressly reserved the right to mine the coal thereunder without liability for surface damage. The legality of such reservations has been repeatedly upheld by the courts. In the development of the coal-mining industry the mining companies either constructed themselves or permitted the construction of homes for the workmen engaged therein, upon the surface over the mines, reserving, however, the right to remove all the coal when in the orderly process of mining the same became necessary. To the extent that they encouraged or permitted such construction a moral obligation may be attributed to them either to maintain such homes or to provide others. They are also very largely interested in the prosperity of the City of Scranton. Upon these grounds they have been and are disposed to voluntarily accept certain specific obligations.

On the other hand, it is essential to their continued existence that they be permitted to mine substantially all their coal. Indeed, such obligation has been, in many leases, legally assumed. Efforts have been made to obtain legislation which, if upheld by the courts, would have seriously interfered with mining operations, would have restricted the extent of the coal they might mine, to the detriment of the anthracite communities and the consuming public, and which even sought to penalize both the companies and their employees. The advocates of such legislation have been the very persons who have accepted the restricted deeds and who have sought to thereby obtain rights which they were not in law entitled to. The disastrous results which might ensue not only to the industry, but the City of Scranton, were not considered. It may not be generally known that the wages paid by the coal companies engaged in Scranton in the production of coal amount yearly to more than $15,000,000, a sum in excess of the aggregate of all other wages paid for all other work in that city.

Welcomed Appointment of Committee

We have, therefore, welcomed the appointment of your committee by the Board of Trade. We believe that our interests are altogether mutual, and that it is most advisable that some plan be adopted immediately, even though it does not fully measure up to your views of our obligations. You will appreciate that any legal obligation voluntarily assumed by us involving serious additional pecuniary burdens must be conditioned upon our freedom to exercise our present legal rights to mine our coal. We have, therefore, repeatedly stated and again advise that this proposal shall remain in effect so long and so far as the exercise of our rights to mine coal are not restrained, restricted or penalized by the passage or enforcement of state laws, municipal ordinances or court decisions. This does not mean that we will withdraw our proposal because of individual litigation which does not result in a general and material restriction of our rights to mine coal or because of efforts which may be made to obtain legislation.

With this preface, we propose: First, A commission of three shall be appointed by agreement of our committees, the salaries and all expense of which shall be borne by us. In case of any vacancy in the commission the same shall be filled by like agreement between the committees to be appointed by us and by the Board of Trade. It shall be the duty of the commission to coöperate with us and with the public both to prevent accidents which might result in personal injury and to minimize damage to property. Its members will be expected to become familiar with mining conditions and to be able to give expert advice to the people, the school boards and city officials. The commission will also be charged with the duty of determining, as between the different companies, the responsibility for surface damage; the value of structures damaged; whether the same have been satisfactorily repaired by the companies, or, if the owner desires to do his own repairs, what compensation should be made to him therefor. It will also be given jurisdiction to determine similar questions in the event of damage to streets. If it determines that pillar coal should

be sold for support it will finally determine such a valuation of the same as shall fully compensate the coal company therefor. It shall be vested with jurisdiction upon the application of an owner or lessee of property who desires to build a dwelling, after a hearing upon notice to any mining company owning or having any interest in the coal under the surface upon which such dwelling is proposed to be constructed, to certify in writing that the surface upon which such building is proposed to be constructed is reasonably safe with respect to the danger of surface subsidence within a period of 20 years thereafter. It will be expected to adjust any disputed questions which may arise between the companies and the owners of property. It will also have the custody and expenditure of the fund hereinafter provided for. A written contract shall be entered into between the commission and the coal companies, which shall be approved by your committee, and which shall expressly vest in it the powers above outlined, together with the right to enforce by suit against one or more of us the obligations we assume in this proposal.

Second, As to public highways and city streets. The principle of conservation of the coal under such highways and streets for market purposes is to be accepted where no serious public injury will result. The companies are to provide for the security and convenience of the public by giving proper notice of proposed mining under streets which may affect the surface by providing temporary ways of passage, and by repairing at their own expense any and all damage to streets or municipal structures therein. The companies are to be bound absolutely to promptly restore all streets to as good condition as before any damage except as to structures of individuals or private corporations therein or thereunder, and to indemnify the city against liability. Subject to the foregoing any and all disputes which may arise in connection with the mining of coal under public highways and city streets are to be finally determined by the commission.

Would Restore Buildings Valued Less Than $5000

Third, In case of damage to existing buildings or to dwellings occupied as homes constructed within the next 20 years at locations certified as reasonably safe by the commission as hereinbefore stated within the City of Scranton as now defined or within the present limits of the Borough of Dunmore (except those of mining or railroad companies) of the value of $5000 or less caused by mine caves, we will bear the entire cost of repairing or restoring the same to as good condition as before. The commission shall be empowered to enfore this obligation.

Fourth, We will provide a fund of $100,000 in cash, Liberty Bonds or other trust securities, with a trust company or companies of the City of Scranton, the income and principal of which shall be expended on orders of the commission to compensate for damage or to pay for the repairs to existing buildings in Scranton and Dunmore as aforesaid, of the value of $5000 or less, in cases where they are damaged by mine caves and where the responsibility therefor cannot be determined, or where it rests with a company which has no successors and has gone out of business or become insolvent. (We must here except damage caused by the Delaware & Hudson Co. or its successors.) Where damage is caused by one of us it is severally and not jointly assumed. We will guarantee the maintenance of such fund to the amount of $100,000 for the entire period of 20 years from this date (July 8, 1918), so that such amount shall be intact at the expiration of 20 years to cover any damage thereafter incurred, or for such other proper purpose as the commission with the approval of the board may direct.

Fifth, Where there is danger of surface subsidence and of resulting damage to a structure exceeding $5000 in value and the owner thereof desires to obtain either artificial support or to purchase pillar coal for such support, and shall obtain the formal approval of the commission thereto, of the application wherefor we shall have notice and an opportunity to be heard before the commission, we agree to provide such artificial support as the commission may direct at the expense of the owner or to sell him such pillar coal as it may direct us so to do at a price to be fixed in each case by the commission which shall fully compensate us for the value of such pillar coal, the decision of the commission, however, on the question of value to be final. Pillar coal so purchased shall be granted to the owner by the coal company for the sole purpose of surface support with restrictions against the mining or removal thereof, and the coal companies shall not assume, because of any such sale of pillar coal, any legal obligations because of any surface damage or injury to persons which may subsequently ensue.

Sixth, This proposal applies to all cases where the right to surface support has been waived and to those only, and the obligation of each company subscribing hereto is several and not joint, and applies to its own mining operations only.

Seventh, At our first meeting your committee submitted to us a written statement with respect to the mine-cave problem which closed with this paragraph: "This committee believes that if there was in operation at this time a plan under which the surface owners were assured that every precaution would be taken to protect the surface where possible, or, if support is not feasible, that they be assured of receiving full damage for any injury that might result to their property because of the subsidence of the surface, then the fear and anxiety now existing should be removed."

We submit that the plan hereby proposed complies with your suggested solution to the extent of covering some 96 per cent. of the buildings of the surface owners of the city, and that with respect to the remaining 4 per cent. of such buildings it differs only in obligating the owner instead of our companies to bear the expense of their protection. If your committee will agree with us, as to the members of the commission and the form of the agreement between it and ourselves, we will immediately carry out this proposal.

This proposal was signed by the following companies: The Delaware, Lackawanna & Western Railroad Co., by W. H. Truesdale, president; Scranton Coal Co., by John B. Kerr, president; Pennsylvania Coal Co., by W. A. May, president; Peoples Coal Co., by Frank P. Christian, president; Green Ridge Coal Co., by W. L. Connell, president; Bulls Head Coal Co., by Jay Law, treasurer; Quinn Coal Co., by T. F. Quinn, treasurer; Spencer Coal Co., by David Spruks, president; Carney & Brown Coal Co., by John Carney, president; Nay Aug Coal Co., by David Boies, president.

Quite recently the directors of the Scranton Board of Trade met in secret session. It has been stated they ordered that the proposition just recited be received and filed, and earnestly recommended that this voluntary offer of the anthracite operators be given a fair trial. This expression of approval from the Board of Trade is significant, as it comes from a group of men representative of the best business and property interests of the city. There are many individual expressions of opinion in favor of acceptance and various members of the Board of Trade have made and are making speeches upholding the proposal. On the other hand, the Scranton Surface Protective Association has expressed disapproval of the proposal made by the operators.

The Mine-Cave Committee is still continuing its efforts to secure additional concessions and it is endeavoring to get the Delaware & Hudson Co. to sign the agreement. The fact that this important coal company withholds its signature to the instrument militates seriously against its meeting with general favor.

In this connection it is important to note that the coal operators in June, 1917, made an offer to repair all damages to structures valued up to $5000 in case they were injured by mining operations, also to repair streets and sell protecting pillars. The Delaware & Hudson Co. signed that offer for a five-year term, and it is understood that it is living up to that agreement.

Since the proposal has been made public, popular sentiment has obtained two concessions which were not included in the original agreement: A proposal on the part of the coal companies to protect individual gas, water-service and sewer-pipe connections, and a modification of the terms of the proposal so as to provide for repairs to structures damaged from June, 1917, instead of from the time of the acceptance of the proposal as the provision now appears in that document. It is expected that the proposal now will come before the city council of Scranton, whose action is important, as the council is the legal agent of the people and the city.

An important feature of the present proposal is that it does not aim to give the coal companies any rights which they do not already enjoy, nor does it take away from the people any rights which they now possess. The proposal is a voluntary offer of the companies, who are willing to bind themselves to do certain things that present laws do not require them to do, and the people are not asked to sign any contracts. These concessions are conditional upon a reasonable attitude on the part of the people toward the proposal of the mining companies. The people will secure concessions simply by not resisting the proposal; if it is not accepted by acquiescence then the proposal is void. A strong opposition will put the matter back where it was and little will be gained.

The coal companies agree that if at any future time a better proposition should be brought forward they will welcome it and substitute it for the one under discussion at present. On the other hand, the anthracite mining interests will fight any legislation supporting a proposition making larger demands on them. The parties to the controversy represent large investment demanding an opportunity for development. The mining companies own the coal and those controlling the surface have valuable property upon which to build. The coal interests do not wish to stop the real progress of the city, but they do wish to regulate it on commonsense lines. They do not care to be placed in a position where they will have to settle for damages to new structures, therefore they claim that those desiring to build should first secure a permit. There is sufficient safe ground on which to build. In the course of time, when a section is mined out and has settled, then it will be suitable for building purposes. Most of the city is over deep mining, and it is only in limited sections where the question would come up. Permits would tend to prevent construction in unsafe places. The matter should be so adjusted as to permit of the proper recovery of the coal and yet not to restrict the natural growth of the city.

Last year's developments have modified many views which were previously held by the users of fuel, particularly by the consumer of the domestic sizes. The present would seem to be the psychological moment to adjust differences connected with coal mining, at a time when the whole mining industry is being reviewed by the Government, costs analyzed and so on. Our dependence upon coal was never before brought out so strongly. We possess vast deposits of fuel, but they are by no means inexhaustible—the limited quantity of anthracite especially should be most carefully conserved at every point. The hard coal of Pennsylvania is a valuable asset, not only to the companies who control it but to the many millions of anthracite mine workers who find it a source of income, to the state which receives from it much assistance from taxes, and to the manufacturers which by its aid make various products. It is inconceivable that any step would be taken which would seriously handicap so important an industry.

Anthracite Shipments Continue To Increase

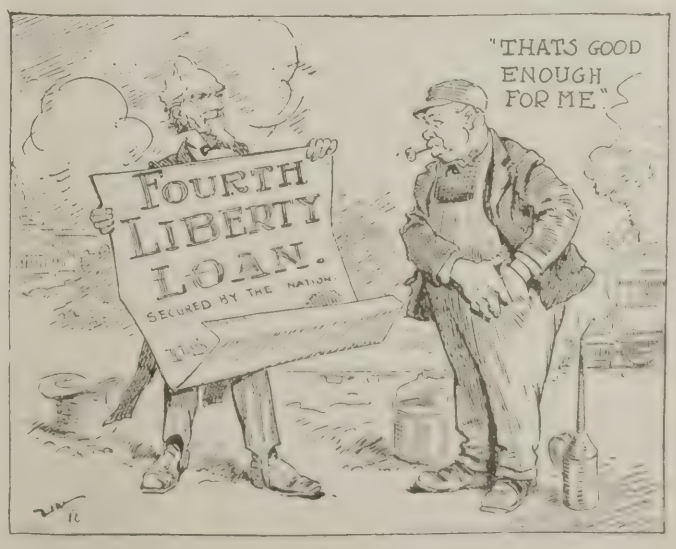
Anthracite operators and miners are keeping their promise to the United States Fuel Administration that the anthracite production of last year would be maintained and, if humanely possible, exceeded, as indicated by the statements of shipments reported to the Anthracite Bureau of Information. The shipments in August of this year have established a new record for that month, repeating a similar record made in July. The quantity sent to market last month amounted to 7,180,923 gross tons, an increase over July, when the shipments amounted to 7,084,775 tons, of 96,148 tons, and exceeding the tonnage of August, 1917, by 166,927 tons.

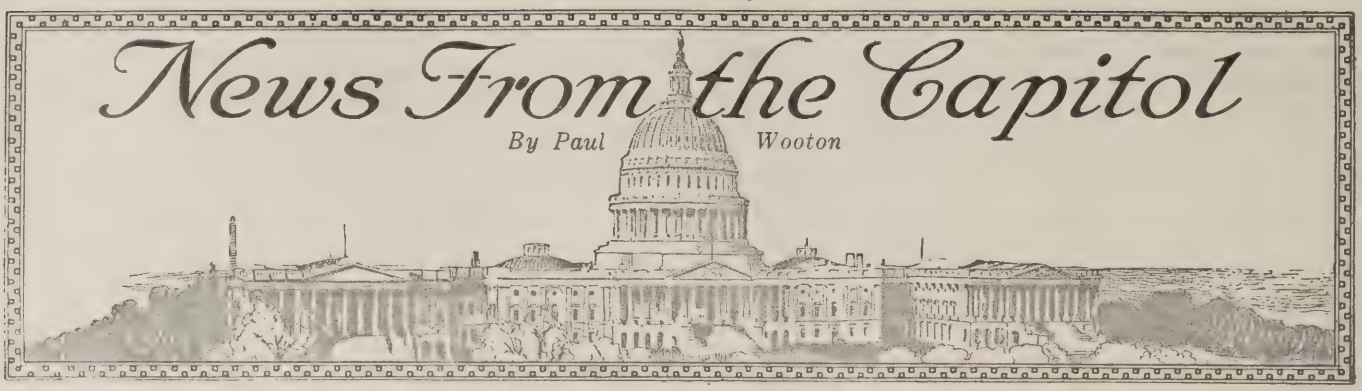
The total shipments for the first five months of the present coal year beginning Apr. 1, have amounted to 34,388,996 tons as compared with 33,297,109 tons for the corresponding period of last year, a gain of 1,091,887 tons, or a little over 3 per cent.

The shipments by companies were as follows:

	August, 1918	August, 1917	Coal Year, 1918	Coal Year, 1917
P. & R. Ry	1,408,501	1,373,473	6,764,594	6,316,774
L. V. R.R.	1,350,331	1,245,786	6,526,373	6,112,024
C. R.R. of N. J.	644,186	597,890	3,003,598	2,977,264
D., L. & W. R.R	1,048,346	1,118,986	5,143,966	5,241,109
D. & H. Co.	846,788	781,606	4,038,552	3,772,411
Penna. R.R.	504,367	504,819	2,433,488	2,447,163
Erie R.R.	847,169	812,114	3,884,290	3,839,010
N. Y. O. & W. Ry.	170,313	186,679	887,639	862,124
L. & N. E. R.R.	360,922	392,643	1,706,496	1,729,230
Total	7,180,923	7,013,996	34,388,996	33,297,109

Good Security





Revision of Storage Regulations

The United States Fuel Administration announced on Sept. 14 a revision of the regulations governing the storage of coal by consumers listed on different preference schedules. This revision brings the practical distribution of coal into line with the statistics of production and consumption in different districts as developed during the past 30 days.

With the present complete information coming to the Distribution Division of the Fuel Administration and showing exactly the production, consumption and stocks on hand in every district, it is possible not only to change where necessary certain movements of coal, but the accumulation of winter storage, which is at this time the most important element of distribution, can be made to play an important part in getting maximum production or utilizing all available transportation most efficiently. Each week the Distribution Division has before it accurate figures showing the production of every mine during the week previous, also the consumption by all consumers and the accumulation of stocks on hand. If coal is taken into storage wherever possible in each district along the lines laid down by the regulations, it will militate to the advantage of both consumers and producers.

The amount of storage allotted to each district will be altered from time to time as may be necessary to carry out the plans of the Distribution Division for the coming winter. This plan is designed to obtain the utmost from our transportation equipment with the least danger of any district being out of. coal next winter on account of its distance from the mines. Consumers on the preference classes recently defined by the War Industries Board are permitted to accumulate reserve stocks of bituminous coals as follows:

Maine, 135 days; Massachusetts, Vermont, New Hampshire, northern New York, 105 days; Connecticut, Rhode Island, southwestern New York, 90 days; southeastern New York and New Jersey, 60 days; Delaware, eastern Pennsylvania, Maryland, District of Columbia, Virginia, Florida and western Ohio, 45 days; western Pennsylvania, West Virginia, eastern Kentucky, eastern Ohio, 35 days; lower Michigan, 90 days.

Consumers in class 2 are permitted to accumulate reserve stocks of bituminous coals as follows:

Maine, 120 days; Massachusetts, Vermont, New Hampshire, northern New York, 90 days; Connecticut, Rhode Island, southwestern New York, 75 days; southeastern New York and New Jersey, 50 days; Delaware, eastern Pennsylvania, Maryland, District of Columbia, Virginia, Florida, western Ohio, 40 days; western Pennsylvania, West Virginia, eastern Kentucky and eastern Ohio, 30 days; lower Michigan, 75 days.

Consumers in class 3 are permitted to accumulate reserve stocks of bituminous coals as follows:

Maine, 105 days; Massachusetts, Vermont, New Hampshire, northern New York, 75 days; Connecticut, Rhode Island, southwestern New York, 60 days; southeastern New York and New Jersey, 40 days; Delaware, eastern Pennsylvania, Maryland, District of Columbia, Virginia, Florida, western Ohio, 35 days; western Pennsylvania, West Virginia, eastern Kentucky and eastern Ohio, 25 days; lower Michigan, 60 days.

Consumers in class 4 are permitted to accumulate reserve stock of bituminous coals as follows:

Maine, 90 days; Massachusetts, Vermont, New Hampshire and northern New York, 60 days; Connecticut, Rhode Island, southwestern New York, 45 days; southeastern New York and New Jersey, 30 days; Delaware, eastern Pennsylvania, Maryland, District of Columbia, Virginia, Florida and western Ohio, 30 days; western Pennsylvania, West Virginia, eastern Kentucky and eastern Ohio, 20 days; lower Michigan, 45 days.

Consumers not on the preference list are limited to the following stocks:

Maine, 45 days; Massachusetts, Vermont, New Hampshire and northern New York, 30 days; Connecticut, Rhode Island, southwestern New York, 20 days; southeastern New York and New Jersey, 20 days; Delaware, eastern Pennsylvania, Maryland, District of Columbia, Virginia, Florida and western Ohio, 15 days; western Pennsylvania, West Virginia, eastern Kentucky and eastern Ohio, 15 days.

There is no restriction on the stocks of screenings which may be accumulated by either preference or non-preference consumers in Ohio or Lower Michigan, nor is there any restriction on the stocks of Indiana, Illinois or western coal which consumers may obtain.

Supervision of the accumulation of stocks in accordance with these limits will be exercised by the several State Fuel Administrators who are authorized to make exceptions where special conditions make it necessary.

Keeping Tabs on Absentees

Under a modification of the Fuel Administration's production committee plan, the Clearfield Bituminous Coal Corporation, operating eight collieries, has attained gratifying results. H. J. Hinterleitner, general superintendent, with headquarters in Clearfield, Penn., says that a marked advance has been made in the average daily tonnage per miner employed and that absence from work has been reduced from 21 per cent. to 9 per cent. within three months.

It was in May that the foremen and superintendents of the company met to discuss production, and it was decided finally to have a committee at each mine, to be comprised of three miners in addition to the foreman and his assistants. The locals of the United Mine

Workers took an interest and assisted the foremen to choose representative miners, men of sound patriotism. Foreign-born citizens are included in these committees.

Through their work, these committees reduced the percentage of absence from 21 in May to 13 in June, and in July there was a general meeting of all the committees in the Clearfield office. Charles O'Neill, production manager for the district, and other prominent mining men attended. It was finally decided, among other things, that each absentee from work should be visited and invited to tell why he was absent. This phase of the work is not running so smoothly as it might just yet, but a good start has been made, according to M. D. Edmonds, of the Fuel Administration, who just has visited the section.

In August the total number of working days lost at the company's mines was 2379. The committees were able to report on 1620 of these lost days. Some of the reasons would be humorous, Mr. Edmonds says, if absenteeism at the mines were not such a serious matter. Liquor was responsible for 93 of the lost days. Soreness of arm, hand, leg, knee, foot or back accounted for 107. Sickness or other disability was responsible for 485 lost days. Mr. Edmonds believes that some of the ill health was chargeable immediately or remotely to liquor. Thirteen of the lost days were due to the fact that the man who should have been working was motoring instead. Ninety-seven days were lost because the miner was doing farm work. In 36 instances the miner failed to arrive in time to go to work. Nine gentlemen "did not feel like working," while 38 gave no excuse. Injuries and other reasons, most of them legitimate, accounted for the rest of the delinquency.

Suggested Changes in Revenue Bill to Benefit Coal Production

Changes in the revenue bill, which will improve the coal situation, were pointed out to the Senate Finance Committee by J. H. Allport. Mr. Allport appeared in behalf of bituminous coal operators. He was introduced to the committee by Senator Penrose of Pennsylvania. A portion of Mr. Allport's statement is as follows:

We find in reports of the probable wording of the new War Revenue Bill and in the rulings of the Treasury Department a strong tendency to put costs of certain necessary mine work usually paid out of earnings to capital account and thus increase the taxable earnings.

This, we believe, is resulting in a curtailment of improvements and developments in the coal mines which will inevitably result not only in checking increases in production, but in an actual and very serious decrease in the present production.

The operators cannot and dare not increase their capital by charging to capital account developments and replacements necessary to maintain production, nor can they thus charge the full cost of extensions and new machinery necessary for increased production and to replace man power by machinery at the present abnormal costs, as they well know that under normal conditions they will be unable to earn the interest charges on such inflated capital.

Under these conditions we would respectfully suggest that influence should be exerted to avoid such a catastrophe and we would urge that the utmost efforts be exerted to have included in the pending war revenue bill the following principles:

In all coal mines operating expenses to be deducted from gross earnings shall include all expenditures made during the tax year for:

1. All extensions required to maintain output, including the cost of all labor, materials, machinery, and supplies.
2. All machinery installed to replace human labor, including the cost of installation.
3. The cost, above pre-war figures, of all improvements and developments made to increase output, including all labor, machinery, material and supplies required for same. The cost of such improvements at pre-war figures to be charged to capital account.
4. An allowance for "mining hazards," if actually set aside in cash or invested in Liberty Bonds, of not exceeding 2½ per cent. of the value of the coal at the mines.

We believe that if the above can be included in the War Revenue Bill, the result will be to permit and encourage substantial increases of output, which under the law as now proposed and as interpreted by the Treasury Department, would not and could not be attained, and we believe unless action of this sort is taken that instead of the necessary increase an actual and probably serious decrease of production will result.

Further, with such a law the taxable income of the mines will, we believe, yield a far greater revenue to the Government than will be yielded if development and extension is penalized by putting these charges into capital.

Government to Operate Barge Line

Operation of the Government's barge line on the Warrior River in Alabama is to begin in the near future. A considerable number of barges have been secured by the Government, including several self-propelled steel barges. This equipment is capable of taking coal to tidewater at New Orleans at the rate of 300,000 tons annually. Marine designers, however, are at work on new steel barges especially designed to obtain the full efficiency of the Warrior River's locks. When these barges are in service, they will have a combined annual capacity of 1,600,000 tons of coal. The Railroad Administration has leased the Lake Borgne Canal, which allows the landing of coal at the locks in the Mississippi River at Violet, just below New Orleans.

Ordnance Department Officials Transferred

Twenty-two officers and civilians formerly handling fuel matters for the Ordnance Department and located in various production districts have been transferred to the Quartermaster Corps and have been assigned, under the direction of the Fuel and Forage Division of the Corps, to the offices of the State Fuel Administrators in New England and the states east of the Mississippi River, the War Department announces.

The location of these representatives of the Fuel Branch follows out the decentralization plan of the Fuel Administration, and while they will be located in the State Fuel Administrators' offices, their duties will be to assist all War Department contractors in securing their fuel requirements. They will also be of service generally to all coal consumers who are supplying equipment or material to the War Department.

A weekly meeting of the representatives of the various corps or bureaus of the War Department is held in the Fuel Branch of the Fuel and Forage Division of the Quartermaster Corps, at which are discussed all matters pertaining in any way to fuel assistance to army contractors.

Coking Coal Production Records Broken

Coal production in the Connellsville district of Pennsylvania continues to break all records. Reports forwarded to James B. Neale, Director of Production, United States Fuel Administration, by W. L. Byers, Production Manager, say that in the week ended Sept. 14 the output was 736,621 tons, a gain of 18,400 tons over the previous high record.

This continued increase in Connellsville coal is of direct importance to the military agencies responsible for supplying shells and guns to the American army in France. Connellsville coal is a high-grade fuel from which is derived much of the coke used in making steel for military use.

The increase of last week, 18,400 tons, if reduced to coke, would be sufficient to manufacture approximately 10,000 tons of pig iron to be converted into shell steel, gun forgings or plates for ships. It is the expectation of the local production committees to bring the weekly output of the Connellsville district up to 800,000 tons.

Production Committee Plan Successful

The production committee system, sometimes in modified form, is in force at mines representing 85 per cent. of the output in central Pennsylvania, according to Charles O'Neil, production manager for the Fuel Administration. Already a group of mines which embraces the Rochester and Pittsburgh Coal and Iron Co., the Jefferson and Clearfield Coal and Iron Co., the Tidewater Coal Co. and a few others is reported to be expecting an increase of a million tons during this coal year, or roughly 20 per cent. increase, through the work of production committees. The Allegheny River Mining Co. is finding the plan successful, and at the Seminole mine the committee has reduced the Monday idleness percentage from 26 per cent. to 7½ per cent.

United States Coal Exports in July

An increase is shown by official statistics in the amount of coal exported in July of this year, as compared with July of last year. Figures compiled by the Department of Commerce for July, 1918, and those for July, 1917, as finally revised, are as follows:

Exports	July, 1917	July, 1918
Anthracite, tons	390,619	395,537
Bituminous, tons	1,567,461	2,244,530
Exported to:		
Italy	28,522	.....
Canada	1,389,261	1,873,750
Panama	23,849	55,656
Mexico	5,334	11,536
Cuba	51,193	105,137
Other West Indies	25,805	19,437
Argentina	12,743	47,528
Brazil	12,122	68,362
Chile	.....	1,343
Uruguay	2,755	49,685
Other countries	17,883	12,095
Coke, tons	52,665	145,490

The only coal imported into the United States during the month under review was from Canada. The amount brought in during July of this year was 108,656 tons, which is 400 tons more than the imports for the same month last year.

American imports were $241,000,000 in July, compared with $260,000,000 in June. For the first seven months of 1918 the imports were $1,767,000,000, as against $1,779,000 last year.

Legal Department

United States Coal Land Entries.—Under Federal statutes authorizing entries upon coal lands of the United States, but declaring that the statutes "shall be held to authorize only one entry by the same person or association of persons," a corporation, although entitled to take up 320 acres under a single entry, exhausted its right in the taking up of a tract of 84.4 acres by an individual for its benefit, and could not acquire valid title under subsequent entries made for its benefit. (United States Circuit Court of Appeals, Eighth Circuit; Union Coal and Coke Co. vs. United States; 247 Federal Reporter, 106.)

Accident at Coal Conveyor.—Plaintiff, a laborer, was assigned to the task of removing rock, wood, etc., from a moving coal conveyor. The traveling wheels on which the conveyor belt ran were secured on their axles by bent nails used as a substitute for cotter pins. One of these nails caught in plaintiff's clothing, resulting in his serious injury. Held that the employing company is liable as for violating the Alabama Employers' Liability Act by permitting the existence of a defect in the condition of its ways, works and machinery, or on the theory that the foreman was negligent in assigning plaintiff to work in a dangerous place. (United States Circuit Court of Appeals, Fifth Circuit; Russell vs. Sloss-Sheffield Steel and Iron Co.; 247 Federal Reporter, 289.)

Explosion of Mine Gas.—If plaintiff, a miner in defendant's employment, was injured through an explosion of mine gases accumulated where he was working at the face of an air-course, driving the course and mining coal therefrom, and if the accident was due to the operator's failure to furnish a sufficient current of fresh air to the face of the course for the purpose of diluting and rendering harmless any noxious and explosive gases that might be accumulated there, plaintiff is entitled to recover damages, unless the accident can be attributed directly to some negligent act on plaintiff's part or to his so suddenly opening the gases in the course of his work that, in the ordinary and customary methods of inspection, the dangerous condition was not discovered or discoverable by the operator before the occurrence of the accident. (Oklahoma Supreme Court, Tolekis vs. Rock Island Coal Mining Co., 171 Pacific Reporter, 17.)

Liberty Bonds Keep Both Running



THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

Only with difficulty can one speak with composure about the strike in the area of the anthracite region lying between Shenandoah and Shamokin. Many of the mine workers themselves acknowledge that the action of their fellows was inexcusable. It is solely because of the generality of that opinion among the men that the mines are once more again at work. It is, however, hard to have to admit that in the coal industry there are so many disloyal men that a strike of the magnitude of that which occurred could be put into operation.

Let us resolutely turn our attention to the brighter side of the picture, remembering that the workingmen of America are so numerous that they truly constitute this nation. To doubt the essential rightness of their impulses is to question the essential rightness of the American people. It is treason to believe, as some of us do, that the heart of the workingman is not right.

NATION IS NO GREATER THAN ITS WORKINGMEN

We who believe that America is a shining exemplar among forward-looking nations must change our notion if we cannot on the whole indorse our working class. Labor must be regarded as loyal and patriotic, or we must despair of our nation. Under a democratic government a nation is no greater than its electorate, and its electorate being dominated by its laboring element is not greater than its workingmen.

There is no reason to believe that our laboring men are not animated by the purest of Americanism. The strength with which labor threw aside the Bolshevism of the leaders in this strike tends to prove this thesis. The nation must rest on its workingmen, and America can well afford to do so. The majority of them are sane, clean, sacrificing fellows to whom an opportunity for service is always a call of duty.

Because of this attitude the strike did not spread to the Wyoming-Lackawanna and Lehigh regions. At Hazleton there was no talk of trouble. The district officers of the United Mine Workers in District No. 7 met at Nesquehoning on Sept. 16 and passed a resolution condemning the unauthorized strike in District No. 9.

ANTHRACITE STRIKERS ARE MOSTLY FOREIGNERS

It is said that 80 per cent. of the strikers are foreigners and that a large number are of Austrian birth or of Austrian ancestry. The English-speaking miners are for the most part opposing the strike. As for the new union of petty officials, nobody expects any trouble from that source. They are recognized as "members of the official family," as Robert A. Quinn, the general manager of the Susquehanna Collieries Co., well says, and the companies are disposed to look upon their action with kindly consideration. They know these men are working harder and making less money than the miners under them. The operators contend and contend rightly, that before the war the work of the foremen was steady, whereas the mine workers received only part time. But the divergence in pay cannot be satisfactorily explained on that basis alone. There will never be any degree of difficulty between these bosses and the operating companies, for the common viewpoint of employer and employee makes a strike unnecessary and unlikely.

Although coal is an essential in the nation's warfare, commissary and mine clerks are not to be granted deferred classification. This fact has led some people to regard these workers as performing an entirely nonessential service. That is, of course, ridiculous. The orders of Provost Marshal General Crowder class these men as easily replaceable, though essential. When the draft fails naturally upon them they are subject to it, but unless it does, they cannot be required to enlist or leave their present service. They are working acceptably to the nation and the "work or fight" order does not apply to them. That order, however, is said to apply to sales agencies and sales companies.

In the Connellsville region the system of keeping track of the slacker recently put into operation is working well according to statements made at a recent meeting between Walter S. Blauvelt, coke director of the United States Fuel Administration, and the operators of the Connellsville region. The men are now working more steadily.

So far, for the most part, the companies have posted the names of those only who, without reasonable excuse, miss a day's shift. But they are now beginning to list the full-time men on the bulletin board, and at some mines a small button is issued to loyal mine workers. Production Manager W. L. Byers has been so much impressed with the value of posting records of full-time men that he has ordered the plan to be followed at all mines, the names being posted every two weeks.

EVERYONE MUST WORK FULL TIME OR FIGHT

It is quite likely that we shall soon write Provost Marshal General Crowder's famous dictum, "Work or fight," in a more wordy but more definite way: "Work full time or fight." W. L. Byers, the production manager just mentioned, and George E. Gay, a member of the appellate draft board, have decided that consideration shall only be given to full-time men when applications are made for deferred classification. Men who lapse will have no standing with the draft board and the production department will regretfully have to stand by when their enrollment is considered. Only a diligent mine worker will get credit for his win-the-war activities.

There are three bituminous regions which the United States Fuel Administration is particularly anxious to spur into activity. Naming them in order they would probably run: West Virginia, central Pennsylvania and western Pennsylvania. The first two produce the highest grades of coal for bunker, byproduct and smithing uses and the third furnishes a large production of the beehive coke. Being so near Pittsburgh, the output of the western Pennsylvania coal has from that fact alone an unusual importance.

NEALE GIVES GOOD COUNSEL TO MINE OPERATORS

A meeting was held at White Sulphur Springs, W. Va., on Sunday, Sept. 15, under the auspices of James B. Neale, the director of production of the United States Fuel Administration. More than 200 operators, managers and general superintendents, and prominent railroad men were present. Important heads of the Fuel Administration were also there to give counsel.

Mr. Neale appealed to the presidents of the companies and to all the other officials to get "to the pit just as often as possible." "Don't deceive yourself," he added, "with the idea that the office at New York, Philadelphia, or Boston demands your attention. Be shoulder to shoulder with the boys getting out the coal. Don't sit back on Broadway and write to them to "Go to it," but go down to the mine and urge them to "Come to it."

He then observed that the operators, like the mine workers, were obsessed with the idea that the interest in the

war lay in France. He impressed on them that an extremely vital part in the war was the work they were doing.

"You are not going to be in the spotlight," he said, "but I wish to emphasize for you the courage of the commonplace." Speaking of the lack of coöperation between the mine workers and their managers and employers, he said to the latter: "If your miners are not in sympathy with you, it is not wholly their fault. The time to change the attitude of the miners in your favor is now. I call upon all operators to do what is noble and fine. There is not a man in this room who does not accept the idea of the brotherhood of man as a theory. I want him to accept it as a fact. If this is a war of righteousness, we should be righteous here at home and do here those things we ought to do."

Neale Appeals for Greater Breadth of View

Mr. Neale referred also to the tendency of the operating heads to bewail the draft and the car supply instead of busying themselves to find out what they could themselves do to remedy the conditions by which they are faced. He urged the operators to put their stress on the righteousness of the cause rather than on the opportunity to make money, believing that the miner would be far more swayed by patriotism than by pelf. Speaking of production committees, he said: "Let us recognize that this is a big job and that the work to which we have set our hand cannot be done by little men—I don't refer to stature. Do nothing that betokens spite, envy or jealousy. Handled rightly, the committees will do important service. When the blame is found to lie with the bosses, let the bosses accept it as a fault of the company. If the company tries to pass the buck to the men or vice-versa, production committees will prove to be a farce." Mr. Neale said that the material support given to the boys in front would save their lives and he urged that between materials and lives there could be but one choice.

A letter from President Wilson to Adam B. Littlepage of the House of Representatives was read. It runs as follows: "I am sure that I am only one of thousands of Americans who have been proud of the fine spirit manifested by the operators and miners of West Virginia. West Virginia, as we all know, supplies the coal that must be used to run our battleships and destroyers and to enable us to transport our soldiers across the sea. The coal miners and operators of West Virginia, therefore, are playing a very direct and responsible part in the conduct of the war. Will you not take occasion to express to them the very high appreciation of the Government and its confidence in the continuance of their zealous and self-sacrificing efforts?"

The district draft board for the southern district of West Virginia has classified coal-mine workers, who are properly proven experienced and efficient, as "skilled laborers" in a "necessary industy" and has decided to classify them in Class 2-D. This ruling is applicable to the future only and does not in any way affect miners heretofore classified without deferment and who have been inducted into military service.

Consolidation Resolute for Wage Contract

The recent agreement with the union in the Fairmont region terminates a long period of cross purposes. The Consolidation Coal Co. was induced to accept the policy of the War Labor Board in favor of allowing union labor organizations to follow out their "legitimate activities." This decision, announced by the *Wheeling Majority*, a labor paper published in Wheeling, W. Va., was denied by a Fairmont paper on the authority of a leading official of the "Consolidation," but it ultimately proved to be true, for later George T. Watson himself came to Fairmont and broke the news.

The coal operators' association did not approve of this free-lance action of the Consolidation Coal Co., feeling that any such momentous decision should have been considered in conclave. But as this, the major company of the region, almost welcomed the labor organizers, nothing could be done to keep them out. While the organizers were building up a strong union membership, the Northern West Virginia Coal Operators' Association was expanded by the absorption of four minor organizations. When the association thus strengthened met at Clarksburg they were fully determined to give the mine workers no recognition.

Again the Consolidation Coal Co. acted independently, but when George F. Watson came to Fairmont and again put the matter before leading operators there was not a single one who heard his talk and held out. So a group of operators representing 87 per cent. of the production of the region met the scale committee of the miners and signed an agreement. In the latter part of last week Frank Keeney, president of District No. 17, with his scale committee, met the Sewickley vein coal operators at the Fairmont Hotel, Fairmont, W. Va., and they signed an agreement. In both agreements—that with members of the Northern West Virginia Coal Operators' Association and that with the Sewickley Vein Coal Operators' Association—the Flemington scale was accepted. Flemington is in the Fairmont district and it gives its name to a section which was unionized some time before the United States took any hand in the present war.

No Man's Wage To Be Lowered by Agreement

Some mines are paying more than the Flemington scale. The wages which are paid to the men in the employ of these companies will be regarded as a right of which they are not to be deprived so long as they remain in the employ of that company. When a new man is employed the rate of pay will be reduced to that provided in the Flemington wage scale.

More than 200 striking miners at the Devereaux mines near Springfield, Ill., have returned to work as the result of a conference at the office of United States District Attorney Knotts. The men had been idle about three weeks and production was curtailed 1000 to 1200 tons a day. Some time ago the company at the request of the miners' local substituted one make of powder for another. The miners after a short trial complained that the new powder did not work as well as the old, and submitted the question of discontinuing it to a commission composed of the district board members, Steve Sullivan and Dan Clark, representing the operators' association, which decided against the miners. The miners refused to comply with the finding and quit work. At the request of both parties the controversy was referred to the district attorney. Several conferences were held. At the final one the miners agreed to return to work pending an investigation as to the merits of the powder.

Local Wants Operator To Pay for Men's Bonds

In the Belleville district of Illinois one of the local unions has passed resolutions urging its district and national officials to do all possible to secure an increase in wages so that the miners may be enabled to subscribe for Liberty Bonds. The local (No. 99) passed the following resolution: "Whereas, an increase in price of coal has been granted the coal operator within the past year, thereby allowing him to exact enormous profits over and above the price at present paid for mining and whereas the Fourth Liberty Loan drive is fast approaching and may well place the coal miner in a bad light by reason of his inability to purchase bonds comparable in amount with those purchased by the coal operator with money which we deem rightfully belongs to the miner who produces the coal, therefore be it resolved that we, the members of Local 99, go on record as favoring a just and substantial increase in wages and urge upon the district and national officers to employ every effort toward securing it." The union voted to make an assessment of $1 per member for five pays, the money thus collected to be disbursed as donations to patriotic organizations.

All the 200 miners employed at the Groveland mine of the Groveland Coal Mining Co., Peoria, Ill., have returned to work, the trouble which brought about their strike being satisfactorily settled. The men refused to work when the company would not or did not install a heater to dry their clothes. The heater has been set in place and the men have returned to work. The Lake Erie mine was also idle because of a disagreement over the wage paid.

Anthracite Miners Strike and Resume

After much agitation several mines in the anthracite region finally went on strike, Sept. 16. Prior to that time there had been many suspensions, as will be seen by a perusal of last week's summary, but on the date just mentioned the disorder broke out in many more places and covered a new and larger area. The many mines located at Shamokin, Ashland and Shenandoah were involved, but strange to say Mt. Carmel, lying between the first two cities, and Mahanoy City, which is quite close to Shenandoah, was not affected.

Broad Mountain also, which shuts off the field just mentioned from the Lykens Valley, Tremont, Minersville and Schuylkill Valley operations, acted as a fire wall to prevent the strike from spreading southward, though at one point south of Broad Mountain a strike did occur, namely at the Lykens operation of the Susquehanna Collieries Co. In all about 25,000 men went on strike, and the output of the anthracite region was cut about 5 per cent.

It must not be thought that at the mines which suspended there was any unanimity in favor of the suspension. It was evident that a number of men were kept away from work by intimidation. The union was against the strike, but the radicals who favored a suspension and who were said to be Industrial Workers of the World picketed the plants and made all opposition to their plans dangerous and inadvisable.

Americans Do Not Believe in This Strike

Where men are ardently volunteering for war one will not fail to find a large number who believe that their duty lies in supporting those who have gone to the front, and it was so in the strike region. At Mahanoy Plane, Local Union No. 1542 expressed itself as wanting "the world to know that its membership is composed of good stanch American citizens who propose to stand by President Wilson and the international union officials until the wage question is adjusted in a business-like manner. This union will take no part in the walkout and the members will continue to work like true Americans in order that the war may be brought to an early and successful consummation."

In the village of Frackville, a short distance from Shenandoah, where John McGinnis and other citizens had organized a Home Defense League, the pickets were ordered to go home or go to work, pending the Government's decision, and the threat was made that if they failed to accept one of these two most wholesome alternatives they would be interned as enemy aliens.

Dr. H. A. Garfield, the United States Fuel Administrator, telegraphed James Matthews, the president of the district (No. 9), as follows: "Please make it perfectly clear to all your men that as long as they are out on strike I will not confer with them, nor take any steps in their behalf and that they will be held personally and strictly responsible."

Voices Are Raised Against the Strike

This was Sept. 16. The next day saw a big change. District No. 7 on that day decided that its 20,000 men would continue at work. The St. Clair district voted similarly, blocking the strike to the south. Reports from Shenandoah, Girardville and Ashland showed that the men were going back to the mines. A few bad men were not able to keep them away from work after once the clergy and the business men had had an opportunity to argue the matter with them and a chance to urge on them immediate resumption.

The men at two of the Madeira-Hill & Co. collieries voted to go back to work, and so also did the mine workers of the Reading Coal and Iron Co. except those at Shamokin. Several mines at Lykens were, however, by this time involved and the men at these refused to resume their labors. Shamokin proved more obdurate than the other regions because of the campaigning of Chris Golden, who is a candidate to succeed James Matthews as district president. His influence is largely local, and Ashland, Shenandoah, Mahanoy City, St. Clair, Tremont and neighboring towns were not nearly so disposed as Shamokin to follow Golden and discredit Matthews.

A convention on Sept. 18 at Shamokin ended the strike. This conference was called by independent strike leaders without the approval of the United Mine Workers of America, a body which in no way countenances the abstention from work or any activity in connection therewith. As a result of this vote, on Sept. 19, the strike practically came to an end. On that date only the Blackwood colliery of the Lehigh Valley Coal Co. and the Buck Run colliery of the Buck Run Coal Co., at Minersville, remained on strike but the resumption of both collieries was expected on the morrow.

The mine workers complain principally about the higher wages paid in the bituminous field, where large increases have been given to correct the irregularity in the running of the mines. Now, however, the bituminous mines run almost as regularly as the anthracite. Another complaint of the anthracite men is that the cost of living is rising. They also claim that wages are higher in other war industries, which are not in any way more necessary nor more hazardous. To cap the climax they allege that they have been importuned to buy Liberty Bonds and War Saving Stamps and to give money to the Red Cross. They believe that they should not give this money themselves. The companies should pay them more wages and thus give them the means to subscribe without sacrifice to these worthy objects.

Some Demand Money To Pay for Bonds

If the money must be given them to "put in the plate," it is idle to pass the plate to them. Let it be handed to those who are willing to give of their own. The public cannot afford to pay the coal miners for Liberty Bonds purchased as well as for services rendered. The public would sooner pay present prices for coal and buy Liberty Bonds itself. If Liberty Bond money is to be presented to the miner, then he is making no sacrifice in the buying of bonds, and he is rendering no service to the nation in purchasing them. Probably there are but few of the mine workers who harbor the foolish idea that bond purchases entitle the purchaser to a wage increase, though, of course, a man who has subscribed heavily would find such an increase more than convenient.

In the northern anthracite field the situation is quite tense though the strikes have been only local. There is a general movement for a strike and a new union. It is, however, general in this sense only that it is found at most mining centers, the degree of its strength in some places is possibly open to question. Most of the men oppose the strike and many are still loyal to the union. On Sept. 14 the Langcliffe mine workers of the Hudson Coal Co., in Avoca, who are mostly Austrians, voted to continue their strike till an increase of wages is granted. These men demand $7 a day for miners and $5.50 a day for all other workers about the collieries.

Langcliffe Miners' Demands Preposterous

These demands are preposterous. The wage earners in other industries who have received no increases in wage whatever since war began feel bitterly about miners like those of the Langcliffe type, who are putting both feet into the feeding trough and are absorbing everything for themselves while good American workingmen go without. The public will have to pay for the Langcliffe profiteering, and they are getting impatient. The American people are beginning to feel that it is time to cry "America for the Americans" and tell these foreigners that this country is not a place for their exploitations.

We are a long suffering people and have a warm place for the foreigners whose hearts and aims are in common with ours and who are willing to fare equally with us as citizens of a common country. But these rascals who strike while Americans work, who demand that they get twice as much as the generality of unskilled Americans, are arousing in America a spirit which they will keenly regret.

EDITORIALS

Miners Oppose Ending of Apprenticeship

MINERS in the anthracite region are strongly wrought up about the attacks now being made on the long-established apprenticeship requirement in the mining law of the hard-coal region. No man can act as a miner until he has had two years of experience. The miners say that if the law were repealed it would not aid in increasing production, for the shortage of men is greater in the ranks of the laborers, motor runners and drivers than in the ranks of certificated miners. They urge that if the employments now open to all comers cannot be recruited, what chance is there that the indiscriminate opening of other employments would cause those employments to be adequately filled with men?

The following table shows the facts as published by the anthracite operators. It will be seen that, at least in April, the shortage of miners was greater than the shortage of day men, but that condition was in some places reversed.

Employments	Men Employed, 1918	Men Employed, Apr. 1, 1918	Increase or Decrease	Per Cent.
Miners	42,830	42,186	—644	—1.504
Miner's laborers	21,990	20,768	—1,222	—5.557
Company men (inside)	42,763	42,143	—620	—1.450
Company men (outside)	42,949	42,515	—434	—1.011
All other employments at collieries	5,448	5,480	+32	+0.587
Total	155,980	153,092	—2,888	—1.8515

The table statistically supports the contention of the miners. The laborers from whom the supply of miners is to be replenished have decreased in numbers 5.557 per cent., whereas the loss in the number of miners has been only 1.504 per cent., or roughly a fourth as great.

But statistics occasionally form an unsatisfactory ground for an argument of this kind. The reason why mine laborers leave is because they are only mine laborers. They have the irksomeness of being tied down to a miner, who does little of the work and walks off with the bulk of the pay. The figures show that mining as compared with mine laboring is a desirable occupation, and that if it were thrown open to everybody it would prevent a number of men from leaving the industry and might well be the cause of a number entering the ranks.

The exodus of mine laborers results from a natural rebellion against the unfair conditions existing. Put the new man on a fairer footing, and it is quite likely that the ranks will be recruited. Where all employments are free and open there is a chance that they will be filled. Where privilege closes an employment it does not follow that it would not be filled if the privilege were removed. That men do not crowd to be underlings and to get poor pay is not a new phenomenon. So it is not strange, but natural, that the ranks of the mine laborers are the worst filled of any.

If the present conditions continue there may come a time when there will be no mine laborers whatever. It will mark a period of emancipation and democracy, and not at all a time to be regretted. In the soft-coal mines there is no distinction. All coal diggers are "buddies" with equal shares in the tonnage produced. There is no talk of "man and superman," and under this arrangement working forces of miners steadily increased till the war commenced. Even in 1917 the number of mine workers in central Pennsylvania was 7.5 per cent. greater in 1916.

A Corporal in Every Squad of Eight

IN THE army it is necessary so to arrange authority that every man is in touch with the commander-in-chief and can be set in movement by him. To such an extent is this carried that, as everyone knows, there is a corporal over every seven men.

We need an equal extension of authority in the mines. We do not want our men "bossed to death," but we want the coöperation and assistance which invariably result from the delegation of authority to an adequate number of men, and we want the complete knowledge which can only be attained by a sufficient extension of authority.

It is true that the appointment of an assistant foreman is often a misfortune. It furnishes a jealous foreman a chance to quarrel. It supplies an ambitious underling with an opportunity to strut in the limelight. It gives occasion to the assistant to put a burdensome yoke on the neck of the worker.

But while this may be the unfortunate result, it does not by any means necessarily follow, and the introduction of many subforemen instead of only one tends to have a totally different effect. The appointment of more numerous subordinates menaces the foreman's standing with the company less than the employment of one. When there are many of them there is less likelihood that the subforemen will overestimate their "brief authority." Appointed with the right kind of a talk, their appointment cannot fail to do good. They are there to help—to help the company, the mine foreman and the miners. They are to build up tonnage, to aid in securing clean coal, to increase enthusiasm, to represent the good will of the company, to coördinate the work of the various company employees, to learn just where the productive energy has or is about to be wasted or to be found lacking. They are not so much to rule as to aid. Good nature is as much needed as authority; leadership is required rather than drivership.

The companies with the biggest tonnages per man and the best handled mines are those with plenty of face bosses. The United States Coal and Coke Co. favors one sub-boss to 25 men. The Ellsworth Collieries Co. has always employed many subforemen. The Pennsylvania Coal and Coke Co. has just given its adhesion to a policy of one boss to 25 men and has appointed several "scouts" whose business it is to find why tonnage is not maintained. The Delaware, Lackawanna

& Western R.R., Coal Department, has had a number of men employed in just this capacity.

But it is a question whether that is really enough. The corporal is a fighter with his men. There is no reason why we should not have corporals in the mines who will work as well as lead the men. A man who can talk some foreign language could be corporal to those of the same nationality and could explain to them the conditions under which work is being, and should be, performed. He can explain why men are idle, why their tonnage is low, why their coal is not clean, why men are injured, and he can exhort them and the company to correct all the deficiencies whereby the tonnage is kept low, the coal is sent out dirty and men are converted into casualties.

The mine foreman cannot do all that is expected of him, but unfortunately he does not like to delegate authority. He will complain volubly about his inability to fill the myriad of activities demanded of him, but he is nevertheless opposed to dividing his responsibility. He is always on edge with the constant worry of his job, but just the same he wants to muddle along with it unaided. He knows he is performing it badly because one man cannot perform such a job well. When he is underground, he wishes he were at the tipple; when he is at the tipple, he wishes he were underground.

For the most part, he is in his little doghole of an office, scolding the miners for venturing to tell him that their places need rails or dewatering or a switch or air or props or something. He cannot correct these faults, for he lacks the subordinates to prove up the facts as stated or to put the necessary remedies in operation, and too often he lacks even the telephones to transmit his orders. If he goes underground, a quarter or a half a day is lost, and in the meantime he may be needed more outside. The superintendent will be storming because he cannot find him. So he finds it more profitable to swear at the miner and tell him to take his tools out if he doesn't like the place, all because he is not rightly equipped with help. So much for the present condition. Now for a statement of how it should be.

He should never even see that miner. The subordinate inside should have seen him and attended to his difficulty or should have corrected the trouble before the miner had time to complain of it; but in any event it should have been corrected by the subordinate before the miner made a two-mile trip to complain, only to meet with a rebuff from the foreman or to find a long queue of complainants ahead of him.

Lack of superintendence has broken many an industrial organization as lack of officers, commissioned and noncommissioned, has played havoc with many an army. The mining industry lacks officers. It gets along with a minimum of supervisors, and too many of those who do supervise are petty tyrants. They rule and make decisions without knowledge of conditions. They cannot get around the hundreds of places and see for themselves, and they lack the men who can. Let us get them out of this rut during the war. They are good fellows enough in their spare time; but at their work worry and the impossible demands made on them addle their brains, and in too many cases, we fear, unfit them for their positions.

Untrained Men Will Not Serve Our Ends

MOST of the industries have been content to take men in the rough and by putting them to work have endeavored to train them into industrial fitness, advancing them to places of importance according to the experience gained. The necessities of this war, however, could not wait on such slow processes of development. Every man was more or less a green hand in the game of war; defeat and perhaps death might have been the outcome of lack of experience, so it was necessary to accelerate the manifold processes by which the soldier's art was assimilated and take advantage of every facility.

The language question was tackled early. All the boys in the army will soon know how to understand their officers and how to report to them. All will know how to read a written order. These are elementary matters, but in mining we have not as yet reached them. Still the foreman goes from place to place and is met with "Me no forstay." Hurriedly an interpreter is summoned who may or may not correctly interpret the foreman's instructions. But the army is settling the matter fundamentally with the dictum, "Every man must know how to read and speak English."

But this is not enough. There are already 47,000 men being taught in army schools, and they will be turned out more or less completely trained at the rate of 23,000 a month. None of the colleges will operate this year except as military training schools, for the draft has wiped out all possibility of successful operation under civilian plans.

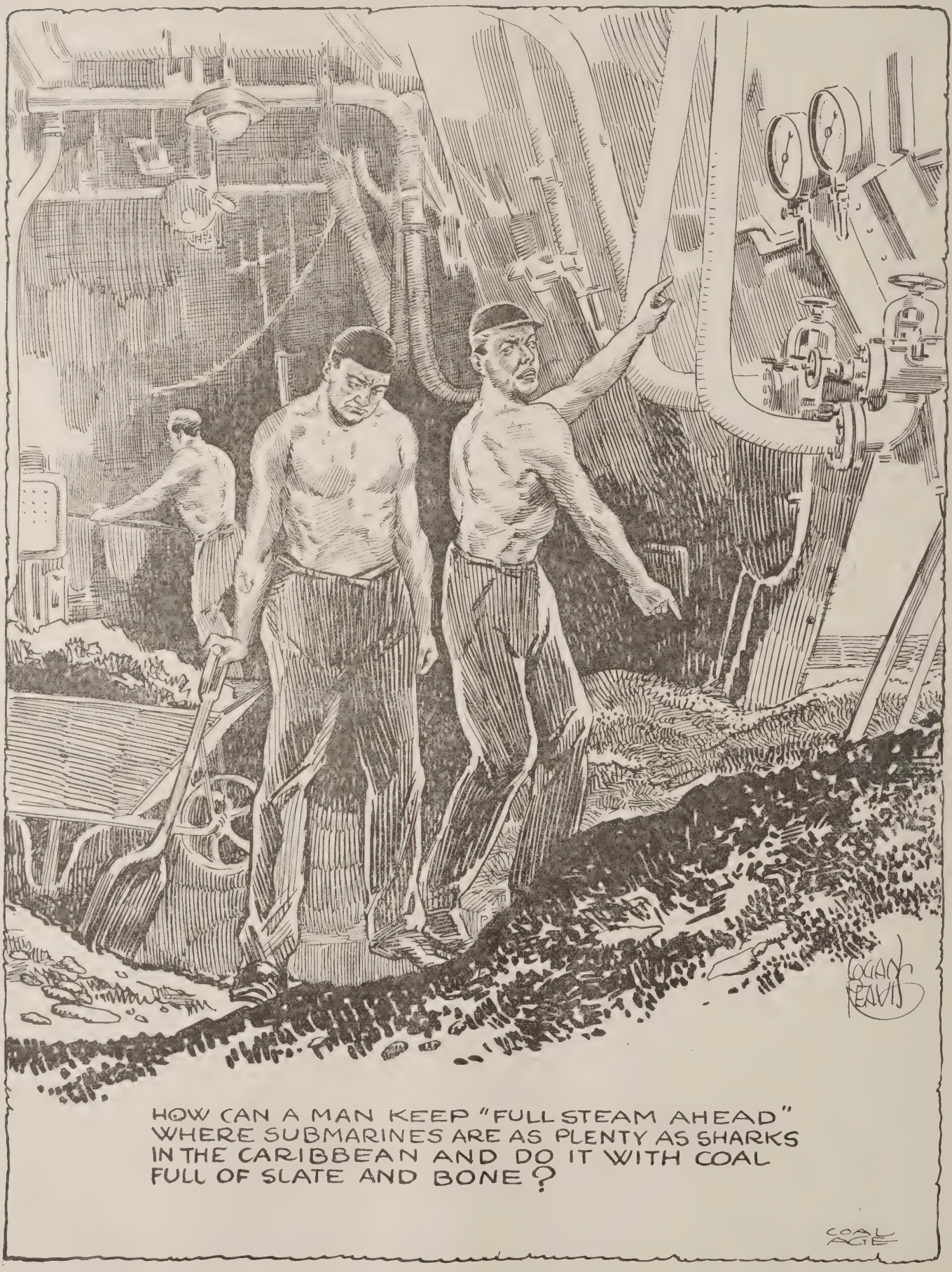
Those who enter college will be inducted into the army as privates, with a private's pay and subsistence, being under full military jurisdiction. Boys of 20 will stay in school three months, those of 19 six months, those of 18 one year. In all cases men who clearly show that they may make good officers or good technical experts may be detailed to take further instruction.

But besides these there are detachments of mechanicians under training. By Oct. 1, 90,000 men will be turned out, and the quota for the period between Oct. 1 and July 1 will be 220,000. Already 147 schools are engaged in this work, and 120 of them have been accepted for winter courses.

We are about to have a well-trained army. After the war we must have well-trained industrial workers. Not only the captains of industry, the managers, the engineers and the foremen must be trained, but the workingmen also must receive instruction. While there must be heads in every department of industry there is no greater need for the intelligent direction of industrial labor than for its intelligent performance.

The truth of this has been proved again and again. Our American engineers in foreign countries have repeatedly given up in despair the obtaining of a large output whenever the methods and mentality of the men in their employ militate against efficient operation. The industrial efficiency of the present day is only partly the result of our mechanical aids; it is at least equally the outcome of education and of the resultant psychological conditions.

Then Our Brave Ship's Stokers Lose Heart



DISCUSSION BY READERS

Scraper Mining in Low Seams

Letter No. 2—Kindly permit me to refer to the letter of John Lloyd, efficiency engineer, Lehigh Valley Coal Co., which appeared in *Coal Age*, Aug. 22, p. 371. The letter refers to the scraper system described by H. G. Davis, of the Lehigh & Wilkes-Barre Coal Co., in the issue of the same paper for July 20, p. 92.

Mr. Lloyd takes exception to the statement made by Mr. Davis, who refers to myself as being "the first to introduce this system in the coal mines." The exception taken by Mr. Lloyd is based on the fact that the Lehigh Valley Coal Co. had made experiments with scrapers, early in 1914, at the Seneca Colliery of that company. He refers to the fact that I did not enter the anthracite region until the fall of 1915, and seems to associate my interests in the scraper system for mining thin coal, with my employment, while general superintendent of the Delaware & Hudson Co., of a former employee of the Lehigh Valley Coal Co. Mr. Lloyd states that this man was acquainted with the experiments that had been conducted at the Seneca colliery and had sketches of the system there employed.

Allow me to say that, in making these statements, Mr. Lloyd does me an injustice that I feel sure he does not intend and of which he would not be guilty were he fully acquainted with the actual facts, which are as follows:

Experimental Development in D. & H. Mines

Shortly after entering the employ of the Delaware & Hudson Co., I was given the problem of mining the "Twenty-Inch Bed" by mechanical means. The company had purchased shortwall-mining machines and, upon the recommendation of our consulting engineer, Eli T. Connor, we tried out all the methods known to us for removing the coal from the face without taking rock for height. These methods were specifically mentioned in an exhaustive report, which Mr. Connor had made, at some time previous, covering this particular bed, and which included buggies, face conveyors and scrapers.

The buggies we already had, as the Delaware & Hudson Co. uses hundreds of them. These were immediately put to work and a longwall conveyor of the chain type was ordered. We knew, vaguely, of the use of a scraper by the Lehigh Valley Coal Co. and tried to get their permission to visit the mine where it was reported to be at work. Not succeeding in this, however, we started experimenting with scrapers of our own design. Our first scraper was built of plank bound with iron straps. It looked very much like a snowplow and was operated by means of a small two-drum electric engine. This scraper was awkward, but it did the work after a fashion.

It is true that, in the course of these experiments, I employed a man as assistant who had been on the surveying corps of the Lehigh Valley Coal Co. and who had seen the scraper of which Mr. Lloyd speaks. But the man did not supply me with any sketches of it, and the knowledge that he brought to me concerning its operation was meager and had no bearing on our developments.

Subsequently, we built several other forms of steel scrapers and many different forms of snatch blocks and guides, for the purpose of controlling the scraper and causing it to load itself without the necessity of hand shoveling. Finally, we developed a method of control that caused the scraper, of itself, to dig out and move the undercut coal. It is the combination of devices that accomplishes this result and is covered by U. S. Patent 1,268,557, granted June 4, 1918.

The patent covers, in explicit terms, an improvement in the art of moving loose material and makes no claim whatever to a monopoly in the use of a scraper. It described specifically a method by which a scraper can be caused to load itself in a chamber and this is something that, to my knowledge, no other scraper system has been able to accomplish. The operation of the apparatus, as described in the patent, is radically different from that used in the mines of the Lehigh Valley Coal Co. which is described in the *Employees' Magazine* of that company for April, 1916.

The patents have been passed upon by a number of eminent patent authorities and licenses to manufacture the "Evans Scraper Loading Apparatus" have been granted to the Engineering Development Co. of Scranton; the Cook-Wilson Electric Supply Co. of Pittsburgh and the Goodman Manufacturing Co. of Chicago. The Delaware & Hudson Co. has 35 of these patented scraper systems at work, and nearly 60 additional sets of apparatus are under manufacture. The Pennsylvania Coal and Coke Corporation of Cresson, Penn., has about 12 sets of apparatus at work and 50 more under construction. The patented device is a proved success and while other scrapers are in use, they seem to be still in the experimental stage.

Retsof, N. Y. CADWALLADER EVANS, JR.

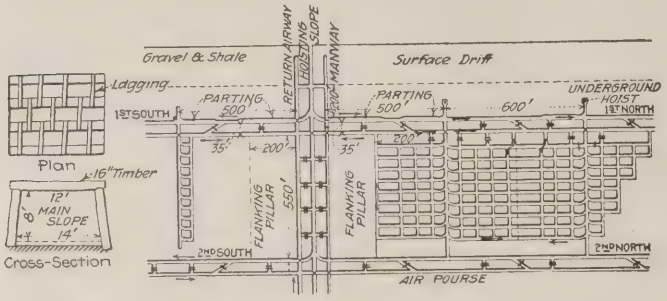
Working 10-Ft. Inclined Seam

Letter No. 6—An experience of a number of years, in pitching and flat seams, both in the United States and Canada, caused me to be deeply interested in the several letters published in *Coal Age*, in reply to the inquiry of "Superintendent," Mar. 23 p. 561. The proposition presented, namely, the working of a 10-ft. seam pitching from 10 to 15 deg., will appeal to most practical mining men as involving many important features in coal mining.

The plan I would suggest in the development of this seam is shown in the accompanying figure. The main slopes should be driven three abreast, on the full dip

of the seam, and cross-entries turned to the right and left, at distances of 200 yd. apart, center to center. These three main slopes consist of a hoistway or haulage road, a main return airway and a manway. Each pair of cross-entries is composed of a haulage road and air-course. As shown in the detail sketch, in the figure, the main slope is 14 ft. wide, in the clear, at the bottom of the road, and 12 ft. between notches on the collar, and has a headroom of 8 ft. The timber frames are set 4 ft., center to center, and the lagging above the collar is staggered, as shown in the sketch. This will afford a good support for the soft, sandy, shale roof.

The general plan of working is to drive butt headings to the dip or the rise of the cross-entries and turn rooms to the right and left of each pair of butts. The



SHOWING PLAN OF WORKING AND DETAIL OF TIMBERING THE AIRWAYS

butt headings are driven 600 ft. apart, so as to provide for rooms 300 ft. in length, which are turned on 50-ft. centers and driven to meet each other. In the figure, I have shown the butt headings as driven to the dip, the purpose being to yield quicker returns in the extraction of the coal, although this will require installing a compressed-air hoist at the head of each butt, to haul the coal up to the level.

Storage-battery locomotives should be employed on the levels and rope haulage on the main slope. Many will prefer to drive the butt headings to the rise, so that the coal from the rooms can be lowered to the level, which plan will also take care of the drainage from the rooms. In any case, the first pair of cross-entries must be turned at such a distance from the mouth of the slope as to provide a solid barrier of coal, 15 ft. in width, above the workings. This will prevent any undue inflow of water from the surface into the mine, during a rainy period.

Method of Working and Ventilating the Mine

As shown in the figure, the first pair of butt headings should be driven at a distance of 500 ft. from the main slope, which will provide a solid pillar of coal, 200 ft. wide, flanking the main slope and allow for rooms, 300 ft. deep, to be driven off the first butt heading. The general plan of the ventilation is indicated by the arrows in the figure, the main slope and haulage roads being made the intake.

In driving the rooms, I would use a shearing machine to shear the coal 6 or 7 ft. deep on the low side, which would give a loose end to shoot and materially increase the percentage of lump coal. The same method should be used in driving the cross-entries, but in driving the slopes or butts to the dip, the shearing cut should be made in the center of the breast and the coal shot from each side toward the center.

The slope track should be laid with 45-lb. rails and the same should be used in the cross-entries, while 30-lb. rails can be used on the butt headings driven to the rise or dip and 20-lb. rails in the rooms. The track ties on the main roads should have at least a 6-in. face and be spaced not more than 2 ft. apart, center to center. In the rooms, smaller ties can be used, spaced 3 ft. apart, center to center. All rail joints should be provided with fishplates. I much prefer the use of the "tumble switch" or ground-throw type, which reduces the chance of men falling over switch stands. When properly installed, the tumble switch is just as efficient and handled as easily as any other type. For drainage, good ditches should be provided on the low side of the road, as the condition of the track will depend much on its being kept dry and well ballasted.

Guarding Against Surface Disturbances

The inquiry states that the surface is traversed by numerous large streams and that the seam is subject to many irregularities and faults or "pitchouts," To avoid trouble, on this account, large pillars should be left to protect the surface at such points and only entries and air-courses driven through them. These should be strongly timbered or concreted where water seeps through the roof. My experience suggests that it would be well to prospect such places by drillholes, to ascertain the actual thickness of the rock overlying the coal.

When mining in Alberta, some years ago, we ran into the bed of the "Old Man River," although the entry we were driving was supposed to be 500 ft. below the surface. We had kept drillholes ahead in the coal, and the face of the entry was 200 ft. ahead of where the water broke in. It was found, later, that the strata had been eroded to within 18 in. of the coal, at the point where the break occurred. The hole was not more than 2 ft. in diameter and must have been the bottom of a pothole, which extended to the river bed on the surface. Such occurrences cannot be said to be uncommon in coal mining, and every precaution should be taken to avoid disaster when working under such conditions.

Cassidy, B. C., Canada. J. W. Powell.

Hindrances to Coal Production

Letter No. 2—With increasing interest I have read the numerous articles, appearing from time to time in *Coal Age*, relating to the production of coal and its hindrances. The subject is of vital importance, particularly at this time when the nation is facing the necessity of supplying the abnormal demand growing out of war-time manufacturing and the increased activities of the Navy.

England is now facing a coal shortage and hundreds of her ships that, in former years, sailed for South America laden with coal, now sail in ballast. The result is that our sister country, lying to the south, is looking to us for fuel. In our own ports, a multitude of bottoms used in the export of coal are idly waiting for their cargo.

Let me ask, What are the factors that hinder the production of coal? Is it a single factor; is it the miner; or is the operator to blame? Volumes have

been written on the car shortage and hundreds of complaints have been hurled at the railroads; but the situation in that respect has greatly improved and, today, observation in the coal regions shows that the car supply at the mines is now rarely to blame for the mine not running to its full capacity. My belief is that a large percentage of mines fail to load their allotment of cars, day after day.

Reasons for Low Tonnage Production

Look now at the miner, and we find that the weigh-sheet on any tipple shows that while some men load 15, 18 and even 20 tons of coal a day, the same sheet records but 6, 8 and 10 tons for other men. Following up these numbers, it is seen that their low tonnage is nothing unusual but a daily occurrence. Practical mining men know that there are many reasons for this great variation in tonnage among the men. There are, of course, some slackers who spend their time visiting other places and talking instead of working. There are others that are working under unfavorable conditions, bad roof, water at the face, or the coal is not cut regularly, etc.

A more important reason for low tonnage, however, is one for which the miner is not to blame, but the company who often fail to provide adequate equipment. There is an insufficient supply of mine cars, mules or gathering motors; or the haulage system is not sufficient to haul all the coal to the tipple as it is mined. In some cases, preference is given, in car distribution, to places that the company is desirous of developing more rapidly, with the result that the miners in other places are short of cars and must wait.

It is true there is a labor shortage at many mines, but it cannot be denied that days when the car supply is ample many mines fail to produce a fair average tonnage for the men that are actually on the job. There are notable exceptions to this, but failures are sufficiently numerous to establish the rule.

Summarizing the Situation

By way of summing up the situation, let me say that there are, to my mind, three factors to be considered, each of which must be brought to the highest point of efficiency, in order to secure a maximum coal production. There is no question that the large majority of coal operators are most loyal to American principles and ideals. The same is true of the large majority of miners who are among the most loyal of American citizens.

However, among the operators and the miners, alike, there are some who are not loyal. There are operators who fail to provide the most up-to-date or even adequate equipment for the working of their mines to full capacity. There are miners who do not devote the entire working day to the getting out of coal.

Of the railroads, it may be said that, notwithstanding the immeasurable improvements made under the Railroad Administration, the work can still be speeded up and the car supply made better and more constant. The Administration will, I believe, put forth every effort to do this. By accelerating the movement of coal trains, both loaded and empty, and equalizing the distribution of cars, the railroads will put the responsibility for coal production up to the operators. Again, by improving their equipment and systematizing the work underground, the operators will shift the burden of responsibility onto the miners, who must see to it that there are no 6- or 8-ton days to their credit when the conditions are such that a man can load 12, 15 or 20 tons in a single shift.

In closing, permit me to say, let there be less of "passing the buck." Let the operator, the miner and the railroads look to their own share of the work, shoulder their own responsibilities and be less disposed to lay the blame on the other fellow when the fault is their own. The carrying out of this program would result in a production of coal that would far surpass the wildest dreams, and our boys "over there" would know that their comrades "over here" are behind them, while the world would look to us with joy, as coal producers and not buck passers, and there would be no coal shortage the coming winter. Observer.

Huntington, W. Va.

The Miner and His Pleasure

Letter No. 3—I read with much pleasure the two letters on this subject, written by Thomas Hogarth and Joseph R. Thomas, which appeared in *Coal Age*, Aug. 15, p. 329, and Sept. 5, p. 463, respectively. Like them, I feel that if any man living is entitled to pleasure, it is the coal miner. He is the only workman under the sun who must perform his work in darkness shut out from the light of day. For this reason alone, he should be permitted to enjoy himself in his spare hours.

For the past seven years, I have been foreman of mines and have seen many of the difficulties connected with mining. Like Mr. Thomas, who compares conditions in two mining camps that are as different from each other as light from darkness, I would like to draw a similar comparison between two thriving mining towns or camps in Indiana County, Pennsylvania.

In the first of these towns, the miners were privileged to own their own homes where they lived and brought up their children. The company who employed them gave them every encouragement in this direction. They supplied everything in the way of sports and recreation that the miner could ask. There were baseball, football and basketball teams. There were also provided a good theater, dance hall and lodge rooms. The town was kept clean and healthy; there were good roads well drained, and sidewalks. This place never knew what scarcity of labor was, because it got skilled workmen; and when these moved in, they stayed, some of them for life.

A Striking Contrast

As a contrast to this condition so favorable to the miner, let me describe another town in the same county. This was a company town. Everything was owned and operated by the company wholly in their own interests. No one could buy enough ground to erect a chicken coop. The miners worked early and late and there were no sports or pastimes to while away the idle hours. It is not surprising that a lower grade of men were attracted to this mine, and that the saloon was the chief resort when the men were out of the mine. When labor became scarce, this place was the hardest

hit of any town in Indiana County and it is easy to imagine why.

Before closing, I want to mention another town where everything is provided in the line of amusement and recreation that could be desired, and yet men are very scarce. Even those who are there do not work steadily, for some reason or other; perhaps someone can tell. The men have every convenience at home, fairly good working conditions and everything to make life worth the living. Still, few of the men work steadily.

For the purpose of showing the loss to this place and to the coal industry, owing to unsteady work, I will quote a few figures showing the number of days worked and the number of days idle during the months of June and July, in one of Johnstown's largest mines.

	Days Worked	Days Idle
Section 1	5,410	590
" 2	2,100	200
" 3	3,775	327
" 4	6,235	735
" 5	3,972	403
	21,492	2,255

The table shows a loss of 2255 working days out of a total of 23,747 possible workdays, which is one idle day out of every 10½ days that the men should have been at work. As these men average 4½ tons of coal per man, the idle time means a loss of 10,147 tons of coal in two months. I hope that someone will be able to suggest how to overcome such conditions, which are a menace to the safe prosecution of the war.

Johnstown, Penn. FAIRPLAY.

Americanizing the Foreigner

Letter No. 4—I read with interest the observations of "Experience," on the subject of Americanizing the foreigner, *Coal Age*, Aug. 8, p. 286. He sizes the situation up as a hopeless one; but it is my belief that, in the last few years, much progress has been made in raising the social standard of the foreigner employed in this country. Why should it be a hopeless task to engender American ideas into these foreign workers. The same might be claimed in respect to a large number of our own people who need to be Americanized as much, in some cases, as the foreigner.

Of course, nearly all of us are prone to resent any radical change in our lives and habits, and we refuse the guiding hand that would assume to bring about such changes. Nevertheless, every day makes it more and more evident that the foreign classes employed in our mining districts are slowly but surely becoming Americanized and possessed of higher ideals than were theirs in the old country.

What Are American Standards?

Before going further, let me ask, What constitutes Americanizing the foreigner. It may be impossible for him to speak our language fluently. The foreign-born American, even though bred in England, can hardly assume to give the same inflection and speak with the same fluency as the American born.

What then? Is the standard to be set by the number of automobiles, player pianos, talking machines or similar evidences of wealth on the part of their owners? In this respect, the foreigner is certainly keeping pace with the Americans.

Again, in respect to patriotism and loyalty, we find that the foreigner is a heavy investor in Liberty Bonds and War Savings Stamps, which is an evidence of their thrift; while it cannot be said that thrift is the characteristic of the majority of Americans. But, no one will deny that, at the present time, the most American and patriotic thing to do is to exercise thrift, notwithstanding so many Americans are failing in this respect.

Mention has been made of the foreigner's habit of raising hogs in the cellar, stabling cows under the house or keeping chickens in the same house in which the family lives. It should not be a difficult matter for the management of a company to set their foot firmly down on these sort of practices and segregate the human from that which is purely animal. There are, moreover, instances where the American born have been found just as lax in the sanitation of his dwelling as the foreigner.

The Foreigner and the Liquor Question

In my opinion, booze and the overcrowding of boarding houses are as responsible as anything else for the slow social progress of the foreigner. Where his appetite for intoxicating drinks is allowed to run unchecked, he has neither time, money or inclination for improving his social condition. Prohibition and bone-dry laws do not frighten him; for where he is able to procure sugar there are a thousand and one ways in which he can brew his drink and the result is just as effective and potent as the alcoholic drinks that prohibition has outlawed.

The foreigner is very resourceful in manufacturing his own drinks and some of these are brewed and fermented in an incredibly short time. Those people are known to brew a beverage from raisins, sugar, cornmeal and rain water, which is allowed to ferment nine days and the result is what is called by them "Old Hen," because of the short time it is required to "set."

Use of Sugar To Make Intoxicating Drink

So long as unscrupulous and unpatriotic merchants are permitted to sell these foreigners large quantities of sugar, they will continue to make their own drinks. Whether sugar necessarily enters the composition of all intoxicating drinks matters not, but it is a quick ferment and this misuse of sugar by the foreigner works an unnecessary hardship on the American who is restricted to two pounds a month for his individual use.

Another un-American mode of life is the typical foreign boarding house. A dwelling intended to wholesomely accommodate a family of four, five or six, is sometimes assumed to have double or even treble that capacity to hold foreign boarders. Such an overcrowded condition cannot fail to breed sickness, drunkenness and discontent.

It would seem that such a condition, also, could be remedied by the establishment of club boarding houses. It might not be possible for a boarding house boss to realize the same profit, and let me say here that the boarding boss in most instances is a very important personage of leisure and will compare well with the feudal landlord of the old country. But, the establishment of a club boarding house operated and controlled by the company would develop better citizenship.

Thomas, W. Va. W. H. NOONE.

INQUIRIES OF GENERAL INTEREST

Estimating Power in Haulage

I am anxious to ascertain the general method of determining the horsepower of a mine motor capable of hauling trips of 25 cars under the following conditions: Length of haul from inside parting to tipple, 3000 ft.; maximum grade, 2 per cent., against the loads; weight of empty car 1200 lb.; capacity, 3200 lb. of coal. The required output is 1000 tons a day of 8 hr. All supplies, rock and refuse to be handled on the night shift.

———, Ill. MINE ENGINEER.

It is necessary to first estimate the weight of loaded trip, track and grade resistance, required weight of motor, assuming a tractive effort of, say one-sixth of the weight on the drivers and the efficiency of motors as 90 per cent. The required power is then determined by the product of the tractive effort, speed of hauling and efficiency of the motors. Thus,

Weight of loaded trip

$$25\ (3200 + 1200) \div 2000 = 40 \text{ tons.}$$

Assume roller-bearing cars, track resistance 20 lb. per ton, grade resistance for 2 per cent. grade being 40 lb. per ton, total resistance of moving trip is 20 + 40 = 60 lb. per ton.

Now, call weight of locomotive resting on drivers W_m, in tons, the tractive effort is $\frac{1}{16}$ $(2000\ W_m)$ = say 320 W_m. The weight of trip and motor is $(W_m + 40)$, in tons. Then, since the tractive effort of the locomotive must, at least, be equal to the entire resistance of moving trip and motor

$$320\ W_m = 60\ (W_m + 40); \text{ and } W_m = \frac{60 \times 40}{320 - 60}$$

$$= 9 +, \text{ say } 10 \text{ tons.}$$

Number of round trips, in 8-hr. day, $1000 \div 40 = 25$; time required per trip $(8 \times 60) \div 25 = 19.2$ min. Allowing time for change of trip, assume actual time of hauling is 12 min., which gives for speed of hauling $(2 \times 3000) \div 12 = 500$ ft. per min.

$$\text{Power required } \frac{10 \times 320 \times 500}{0.90 \times 33{,}000} = 53.87, \text{ say } 60 \text{ hp.}$$

Iron vs. Wood Mine Cars

I very much desire to learn the general opinion of practical mining men in regard to the relative advantages of iron and wood for the construction of mine cars, and to ascertain which of these two types of cars is generally preferable.

In mining, as in other industries, the use of iron is rapidly superseding that of wood for many purposes; but, for some reason, iron mine cars have not been generally adopted. The reason for this must lie in the fact that they have not been found wholly adapted to the haulage of coal underground. It cannot be assumed that mining engineers, who have been so quick to recognize the great advantage in the use of cement in mining work, prefer to build wood mine cars instead of iron, without having good reasons for their choice.

It is true that wood is cheaper than iron, but it should be remembered that when worn with use what remains must be thrown aside as having no value. On the other hand, old iron thrown on the scrap heap still has a value, as it can be smelted and used again. Thus, the value of scrap iron helps to balance the increased cost of the original material over wood.

Notwithstanding the fact that iron is stronger than wood, in the ratio of about 10: 1, the weight of iron cars is much greater than that of wooden ones of equal capacity; and it cannot be denied that this feature, alone, is an important item in the handling of cars in the mine, both at the working face and on steep grades on haulage roads. A derailed iron car is far more difficult to replace on the tracks than a wooden one. Also, the ratio of dead to live loads is greater when hauling a trip of iron cars than where the cars are made of wood.

To balance these disadvantages, let me suggest that the longer life of iron cars will go far to offset the expense of maintenance of wooden ones. Also, manufacturers of iron mine cars are giving much attention to improve their designs and reduce the weight, for the same capacity of car, so that the question of greater weight is not now as important a feature as formerly. The fact that it will cost more to restore a badly damaged iron car than to repair a wooden one is a matter requiring the attention of mine officials, since the damage to cars is largely the result of unnecessarily rough usage; failure to maintain good tracks; and the employment of incompetent motormen.

I hope to see this question thoroughly discussed, with a view to ascertain what has been the experience of mine officials who have used iron cars in their mines. In stating the results in practice, we should be careful to name the conditions existing in the mines and affecting the haulage of coal, in order to arrive at an intelligent comparison that will be of value.

Wylam, Ala. GEORGE HUSBAND.

Coal Age is glad to second the suggestion of this correspondent and to ask for an expression of views, from its practical readers, in regard to the relative utility of iron and wood cars, in coal-mining practice. As shown in this inquiry, there are arguments for and against the use of iron cars in coal mining. There are mines operating with iron cars and getting good results from their use; and no one understands better the resulting advantages and disadvantages than the mine foreman who has had to overcome the difficulties presented, in order to benefit by the change.

The suggestion of our correspondent that the conditions surrounding the use of cars in the mine should always be described is an important one. Iron cars may prove advantageous in one mine and an utter failure in another.

EXAMINATION QUESTIONS

West Virginia Examination (1918), Mine Foremen and Firebosses

(Selected Questions)

Ques.—What is ventilation, and why is it necessary in coal mines?

Ans.—The ventilation of a mine requires the maintaining of a sufficient quantity of air, in circulation throughout the workings, to keep them in a healthful and safe condition. For that purpose, the air current must be conducted through the several passages of the mine, and made to sweep the working faces and all void and abandoned places where gas will accumulate. The ventilation of a mine is necessary in order to insure the safety and health of the workmen employed underground, and prevent the damage or destruction that would result if gases were allowed to accumulate and an explosion should take place.

Ques.—Explain the safest and most effective way of circulating air through mines.

Ans.—The means employed to circulate air currents in mines should be independent of natural conditions in the atmosphere. In other words, reliance should not be placed on natural ventilation, which is dependent on the difference of temperature in the upcast and downcast shafts, or the pressure of surface winds, or the fall of water in a shaft. Likewise, dependence should not be placed on furnace ventilation, which would be unsafe should the generation of gas in the mine develop. The safest and most effective means of ventilation, in mining practice, is a centrifugal fan of sufficient capacity to pass a required quantity of air, against a water gage not exceeding 2 inches.

Ques.—Is it safe to pass a current of intake air through the abandoned portions of a mine and then conduct it to the faces of the workings? State your reasons.

Ans.—Such a practice would be very unsafe. An air current that has passed through abandoned workings should be conducted directly into the return airway and carried out of the mine, without being permitted to enter any of the workings, because of the danger that it has absorbed poisonous or inflammable or explosive gases, which would render the working places either unhealthy or unsafe for work. The men might be overcome by breathing noxious gases, or an explosion might occur from gas being ignited on any one of their lamps.

Ques.—What are the legal requirements regarding old and abandoned workings, mine maps and second openings?

Ans.—The mining law of West Virginia (Sec. 27) requires all abandoned parts of mines to be safeguarded in a manner that will prevent, as far as practicable, the accumulation of gas therein and the entrance of persons unwarned.

Sec. 15 requires the operator or agent of every coal mine to provide an accurate map of the mine, drawn to a scale of 100, 200 or 300 ft. to the inch. The map must show all openings, shafts, slopes, entries and airways, and the direction of the air currents must be indicated by arrows. All rooms, pillars and abandoned workings must be accurately shown on the map, together with the property lines and outcroppings of the coal, within a thousand feet of any part of the workings of the mine.

A true copy of the map must be sent to the mine inspector of the district, to be kept in his office for reference, but not to be copied by anyone without the consent of the owner or operator of the mine. A copy of the map must also be kept at the office of the mine and available, at all reasonable times, for the examination of the inspector. The law requires the surveying of the mine twice each year and the extension of the map in accordance with such surveys. The map must contain the certificate of the engineer, acknowledged by a notary or justice of the peace.

Sec. 31 forbids anyone to work in a mine, unless it has at least two openings or outlets in each seam, such openings to be not less than 300 ft. apart, in the case of shafts, and not less than 50 ft. apart, in the case of slopes or drifts. This law applies to all shaft openings made subsequent to the passage of the act. Each opening must be reached by an available roadway that is well drained and kept free of any obstruction that would prevent the travel of men, in case of necessity. Each opening must be fitted with stairs or hoisting machinery, which must be kept in order ready for immediate use when required. In addition to the regular hoisting apparatus, the hoisting shaft must be equipped with an emergency windlass or other hoisting device of ample strength for hoisting men, as aproved by the Department of Mines.

Ques.—What would be the minimum amount of air required in a split where 60 persons and 10 mules are employed?

Ans.—The state mining law (Sec. 17) requires the circulation of at least 100 cu.ft. of air per min., for each person employed in the mine, and as much more as the district mine inspector may require. No mention is made of the amount of air required for the mules; but the inspector may follow the practice in other states, which requires 500 or 600 cu.ft. per min., for each mule underground. In that case, assuming that the mine is generating no gas, the quantity of air required for 60 persons and 10 mules would be $60 \times 100 + 10 \times 500 = 11{,}000$ cu.ft. per minute.

Sec. 26 of the law requires the circulation of 150 cu.ft. per min., for each man employed in a mine generating gas or where gas may be expected in the future development of the mine. In that case, the quantity of air required, in the same instance, would be $60 \times 150 + 10 \times 600 = 15{,}000$ cu.ft. per minute.

COAL AND COKE NEWS

Harrisburg, Penn.

The production in the Pittsburgh district of a considerable quantity of dirty coal is causing the Fuel Administration to condemn several carloads of such coal weekly. When condemned the fuel must be sold at 50c. per ton less than the prices fixed by the Government. Much of the dirty coal, it is said, is being produced from wagon mines and stripping operations. The coal from the stripping mine, it is claimed, has been taken from too close to the surface to be of much heat value, and it is contended it is useless to waste freight cars in hauling it.

Fuel administrators are urging upon operators, dealers and consumers of coal the necessity of unloading coal from cars promptly. Operators are urged to place upon coal cars at the time of loading such warnings as the following: "Unload this car of coal promptly if you want it returned to you promptly." "The miners are waiting for this car. Unload it quickly." The notices state that it is not so much the shortage of cars that is causing a shortage of coal as it is the tying up of cars by receivers of coal failing to unload the coal from the cars promptly.

T. Ellsworth Davies, consulting mining engineer of Lackawanna County, has been employed by the County Commissioners to make a survey of coal lands in Dauphin County. He will do this with a view of establishing more just assessments for taxation purposes. Mr. Davies will begin the survey with a corps of assistants and an office force and will make monthly reports to the commissioners. The survey will include a physical examination of the coal deposits and Mr. Davies expects to produce data which will warrant a great increase over the present assessment rates in the upper part of the county.

Uniontown, Penn.

By direction of Fuel Administrator H. A. Garfield, the salvaging of coke screenings from abandoned ash dumps was discontinued Monday, Sept. 16. While the order sets forth that the action was taken because "there is a shortage of labor in the beehive coke district and that the labor employed in reclaiming old breeze dumps at beehive coke plants can be more effectively employed in the production of coke needed in the war industries, and that the elimination of this work will appreciably relieve the over-burdened railroad transportation facilities," local operators see in the order another result of the recent coke inspection system established with R. C. Glazier as its chief.

The coke breeze industry in the Connellsville region had reached such proportions that it demanded an average of 15 cars daily. It has grown so rapidly since the present fuel emergency that some time ago it was recognized by the fuel administration as a byproduct of the coke region with the fixing of basic prices ranging from $7.30 for the highest quality down to $3 per ton for ordinary coke breeze.

With the official banning order it became known that for some time past an investigation has been in progress to determine the facts as regards the quality of the breeze shipped from the region. Operators who from the start did not favor the working over of the ash dumps claimed that its theory of conservation and turning a liability into an asset was its principal argument. They claim that it has not met the acid test of practical application for the reason that it may be assumed that coke operators conduct some supervision over their dumps to cut down the fuel wastage.

Charleston, W. Va.

Cars in the Fairmont district were somewhat more plentiful this week and last week than was the case at the beginning of September, but it is still contended by operators that much of the supply exists principally on paper and that figures given out do not really represent the actual supply. In fact production committees assert that the supply is still insufficient insofar as enabling the mines to make any record in loading coal. However, it is so much better on the average than it has been that coal men are hopeful that within a few weeks the highwater mark of July may be reached. As indicated in last week's correspondence, no difficulty was experienced by the mines in Randolph County which are supplied by the Western Maryland, but much of the fuel shipped on that road is for railroad use. Late placing of cars continues to restrict the output in the Fairmont region.

Little complaint is heard from the Guyan and Kenova-Thacker districts, where the transportation facilities are nearly up to the requirements of the mines, a 100 per cent. car supply having been promised by the railroads. Mines in the Guyan region are supplied principally by the Chesapeake & Ohio Ry., and that road has succeeded in improving its supply for the New River and Winding Gulf regions as well as in the Guyan region.

There has been a material increase in the total net tons of coal produced in the Pocohontas and Tug River districts during the past week over the week previous. The number of hours lost owing to car shortage was reduced from 678 to 110. The tons lost because of car shortage amount to only 10,469. Last week the car shortage caused operators to feel apprehensive, but the improvement has brought a good deal of encouragement. With more cars on hand and with the number of hours worked increased by 246, production went forward and at the same time the total tonnage lost was reduced by 37,264 tons. The total tonnage produced was 438,524, requiring 7217 working hours. From all causes 55,573 tons were lost due to all causes. Labor shortage was responsible for the loss of 39,858 tons. Production committees in the Tug River and Pocahontas districts feel that the output can be materially increased and every effort is being directed to that end. Coke output in the districts named shows an upward trend, the production being 49,129 tons.

In the Kanawha coal fields there has been a steady increase in production since the close of August. A large gain was made even with Labor Day lost, or virtually lost, and since that date there has been a steady increase in production, made possible by approximately a 100 per cent. car supply. Like conditions prevail in the New River and Winding Gulf Districts, where with improved transportation facilities the mines have been able to produce much more coal. Results have also been achieved in these two districts through an elaborate production organization. As car supply and increased effort on the part of the miners go hand in hand, and as this has been pretty well worked out in the New River and Winding Gulf sections, the increase in output has been most marked.

Birmingham, Ala.

Lagging output is still reported by the coal mines of the Birmingham District, caused mainly by the inability of the railroads to give all the service asked for. Labor is not so efficient as it might be, as many employees of the mines do not apply as much time as they might to their tasks. There is belief, however, that when the Warrior River barge line is placed in operation, which is promised by M. J. Sanders, director of the transportation system, within two weeks some relief will be afforded the railroads in the coal-mining sections, especially in the western part of Jefferson County, and near the edge of Walker. The cars released by the placing in operation of the Warrior barge line will be used in other directions.

Coal production in Alabama for the week ending Sept. 7 showed some improvement over the previous week, the output being 382,939 tons compared with 390,412 tons for the last week in August. For the week ending Sept. 14, figures for which are not yet complete, it is believed the 400,000 mark has been passed, on the face of available reports, though the loss of production at Lewisburg is being felt, and rail service has not been normal during the past week. To bring production up to last year's figures it will be necessary for the mines to record an output of 420,000 tons or more per week.

Victoria, B. C.

Sixteen miners lost their lives on the morning of Tuesday, Sept. 10, when the cage in which they were descending the Protection Island shaft of the Canadian Western Fuel Co.'s mine, at Nanaimo, B. C., became detached from its cable and fell a distance of approximately 300 ft. The cage had raised all the men of the night shift to the surface and carried six loads of 16 down when the accident happened. It had scarcely left on its seventh trip when the cable parted, the miners still waiting their turn being informed of what had taken place by seeing the parted cable, released of its load, swinging loose in the shaft. Subsequently it developed that the safety locks had failed to act and that the cage had struck the loading landing, constructed of 12-in. timbers, with such force that it went through, finally resting 50 ft. lower on an abandoned level not used since the upper seam was opened some years ago. This is the most serious coal mine disaster that has occurred in British Columbia since early in the month of April, 1917, when 34 miners lost their lives in an explosion at the Coal Creek Mines, Crows Nest Pass Colliery, Fernie, B. C. Hon. William Sloan, minister of mines, has promised that the fullest investigation will be made in order that the responsibility may be fixed.

Elmonton, Alta.

An active campaign is in progress to induce coal dealers and consumers to use Alberta coal instead of withholding orders in the expectation of being able to procure anthracite. A statement is published by John T. Stirling, chief inspector of mines for Alberta, showing that the demands of the Western Provinces could easily be supplied by Alberta provided the orders were forthcoming. The amount of coal produced in that province in 1917 was 4,863,414 tons, exceeding the output of 1916 by 214,810 tons, notwithstanding labor troubles and lack of transportation facilities. If the mines had worked steadily throughout the year, with the present labor employed, the amount produced would have been approximately 8,000,000 tons, or more than 3,000,000 tons more than the amount actually produced. Over 3,000,000 tons imported from the United States are annually consumed in Manitoba and Saskatchewan, which should be entirely supplied from the production of Alberta mines, which could also supply a portion of the United States immediately south of the border.

The statement has been made that Alberta coal will not store, which while it may be true to a certain extent as regards 25 or 30 per cent. of the output, is not true of the other 70 or 75 per cent. Mr. Stirling says it is not reasonable to expect that while the United States is shutting down her industries to a minimum she will continue to supply coal to Western Canada when there is a supply at hand more than sufficient to cover all demands. It is not to be expected that American manufacturers will submit quietly to coal being exported to Canada, while their own industries are idle for days at a time for lack of fuel. The greatest demand comes in the fall and winter, at a time when the difficulties of operation are greatest owing to scarcity of labor and lack of railway facilities. In January, 1917, 8550 men were employed in connection with mining in Alberta. While in June the number was reduced to 3091 and again increased to 9812 in December, while overhead charges ran on just the same, causing a considerable loss. No industry can be built up in this manner on a permanent basis and it remains for some authority to institute some system to utilize the enormous force now going to waste.

PENNSYLVANIA

Anthracite

Mahanoy City—Officials of the Lehigh Valley Railroad Co. have received orders to make a canvass of every industrial plant in the region and urge owners to store coal for next winter as a matter of self-protection.

Hazleton—Under the increased demand for coal, and with prospects of receiving another wage advance, more men are applying for certificates as qualified miners than has been the case in many years. The examiners report a large increase in the number taking tests.

Georgetown—Carpenters of the Lehigh & Wilkes-Barre Coal Co., under the direction of Harry Mason, are contributing several hundred dollars' worth of work necessary to alterations of cupboards and equipment of the Red Cross workrooms. Several lumber firms have donated the lumber and the coal company men are doing this work at night after completing their day's work in the mines.

Wilkes Barre—In order to increase the output of coal and to stop illegal selling of liquor on Sunday, which, he contends is keeping miners from reporting for work on Monday mornings, A. C. Campbell, fuel administrator for Luzerne County, has filed proceedings in court to have the licenses of saloon dealers in Wilkes-Barre, West Wyoming, Plymouth and Exeter revoked. In all nine saloons have been attacked.

Upper Lehigh—M. S. Kemmerer, president of the Sandy Run Coal Co. and Upper Lehigh Coal Co., has offered the Government his mansion and the large Upper Lehigh Hotel for a hospital for wounded and convalescent soldiers. The Kemmerer property has probably the most elaborate gardens of any dwelling in the coal region. Thousands of dollars are spent annually in keeping them in shape and expensive shrubbery was imported from China, Japan and the Himalayas. Years ago Upper Lehigh's hotel was a health resort and was the scene of many social fetes.

Hazleton—Copies of the proclamation of President Wilson calling upon miners to accept deferred classification and maintain coal production were posted at all the Lehigh Valley Coal Co. collieries on Sept. 16. The loss due to enlistments in coal-mining towns was shown when Andrew Skurko was called to the colors from Beaver Brook, making the fiftieth boy who has been called out of a population of 650 persons. This is one out of every 13 residents. Sandy Run miners who tied up the mines there when their demands for transportation was refused are moving to other anthracite operations, but the colliery is working shorthanded.

Pittston—The court has sustained the claim of Dora A. Coleman and others against the Reliance Coal Co., and a rule for judgment on ejectment proceedings was sustained. The suit arose over a coal lease made by the late Isaac B. Felts to Theodore Hogan in 1906. The latter assigned his interest to the Reliance Coal Co. The lease provided for a minimum monthly royalty of $700 and the plaintiffs allege that no rent or royalty was ever paid since May, 1907. The defense was that faults were found which prevented mining, and Mr. Felts, before his death, had agreed to provide a suitable surface area from which the coal could be removed, but this was never done. The court holds that the coal company was lax in not endeavoring to remove the coal within a period of 11 years.

Bituminous

Pittsburgh—On Sept. 12 the portion of the tipple of the Ella mine of the United Coal Corporation spanning the two main tracks of the Pittsburgh & Lake Erie R. R. collapsed and fell, putting the mine out of business. A new tipple had already been planned parallel to the old one, most of the material was on the ground and part of the foundations built. A large force was immediately assembled and the erection of the new tipple started, and by Sept. 19 the railroad loading portion was sufficiently near completion to begin loading coal. The structure and conveyor for loading on the Monongahela River will be completed in about 45 days. The conveying machinery will be furnished and installed by the Roberts & Shaefer Co. of Chicago, Ill. No one was seriously injured in the collapse, though three of the tipple men fell with the span. The checkweighman had a narrow escape, however, and it took an hour and a half to dig him out of the wreckage; and then it was necessary to amputate his two wooden legs to extricate him.

WEST VIRGINIA

Morgantown—The plant and holdings of the Quality Cement Co. have been purchased by the Consumers' Coal Co., of Pittsburgh. The capacity of the plant is about 2500 tons a day. Charles Hout is the superintendent in charge.

The Sarepi Coal Co., which operates in the Red Stone seam, has completed construction work on a new tipple, new houses for miners and has just installed new equipment. F. J. Ice is the superintendent in charge.

By Nov. 1 the Clinton Coal Co., of whose plant J. S. Griffiths is general manager, expects to begin the shipment of coal. Construction work on a modern tipple has just been completed.

The Randall Coal Co., which has been operating a wagon mine, has converted its plant and with the installation of up-to-date machinery and the construction of a tipple has materially increased its capacity, now loading direct into cars. The company has also built a number of miners' houses. H. J. Elkridge is the superintendent of the company's plant.

The large Empire, or Davis, tract of coal in Monongalia County will be developed through the construction of 30 miles of railroad, to be known as the Indian Creek & Northern R.R., in the Indian Creek district of the county. The railroad will run from a point at the mouth of Indian Creek, connecting with Monongahela Ry., extending eastward along Indian Creek to Jake's Run, from that point to Dunkirk Creek and to Blacksville, Penn. The first mile of railroad will reach the first opening of the New England Fuel & Transportation Co. in the Empire tract, where the company will ship upon the completion of the plant there about 40 cars a day. According to present plans the first mile of railroad will be ready for operation by Dec. 1, construction work already having been begun.

Elkins—Since last March the Davis-Copen Coal Co., formerly the McCaa Coal Co., which has a large operation at Gilmer on the Coal & Coke Ry., has been engaged in trying to get its mines in shape for operation. At that time the Elk River rose 40 ft., completely flooding the mines and making the production of coal impossible during the summer. Pumps have been at work, therefore, for six months, clearing the mines of water. The mines are in workable shape now and about 65 men are at work. The company could use more men, but is unable to obtain them. As a precautionary measure and in order to guard against a recurrence of what happened last spring, the Davis-Copen Coal Co. has arranged for water locks so that there will be no further flooding of the mines. This company is headed by John T. Davis, of Elkins.

Madison—The shipment of coal from the plant of Mordue Collieries Co. has been begun. The opening of this operation represents nine months of construction work, ground for the plant having been broken early in December, 1917. The plant now in operation represents an expenditure of approximately $400,000. Since construction work was started six miles of railroad have been built, together with two miles of tramroad, and 100 miners' dwellings have been made ready for occupancy. Coal at the present time is being taken from two gas coal veins, one 5 ft. thick and the other 6 ft. thick. The company, however, expects to have its largest operation in the Dorothy vein, which runs from 10 to 14 ft. in thickness. When the plant is in full operation coal will be taken from seven different mines, giving the company a capacity eventually of 3500 tons a day.

OHIO

Straitsville—The new tipple at the Central mine of the Hocking Valley Products Co., replacing the one destroyed by fire July 13, has been completed and operations have been resumed. The mine is operated by the Hocking Block Coal Co.

ILLINOIS

Carlinville—Articles of incorporation for the Carlinville Coal Co. have been filed in the recorder's office. The company is composed of local men. A shaft is being sunk to supply the local trade. It has reached a depth of 60 ft. It is planned to have the mine in operation by Thanksgiving Day.

Belleville—The Executive Committee of the Twelfth Illinois District, United Mine Workers, has directed Secretary-Treasurer Walter Nesbit to purchase $500,000 worth of Fourth Liberty Loan bonds. The district organization already owns $500,000 of the previous issues. All of the locals in the district have bought and more than 90 per cent. of the individual miners have become bondholders.

Duquoin—What is said to be the largest mine tipple in the world is being constructed over the main shaft of the new mine of the Union Colliery Co., of St. Louis, at the new town of Dowell, five miles south of here. Coal is already being mined and sent to St. Louis for the use of the Union Electric Light and Power Co., of which the Union Colliery Co. is a subsidiary company. The mine has been christened the Kathleen Colliery, in honor of Kathleen McAuliffe, daughter of Eugene McAuliffe, president of the colliery company.

Edwardsville—The coal production of Madison County for the past twelve months, according to the report of John J. Fletcher, of Collinsville, County Mine Inspector, was 5,184,525 tons, an increase of 140,802 tons over the preceding year. Production at the largest mines in the county decreased, as follows: New Staunton Coal Co., 110,688; Mt. Olive and Staunton Coal Co., 131,907; Donk Bros. No. 1, 48,196; Donk Bros. No. 2, 135,050. Mine No. 1 of the Mt. Olive and Staunton Coal Co., however, made an increase of 170,240 tons, which was the largest in the county. There are 4653 men and boys employed in the industry, an increase of 410. There were 14 fatal accidents and 177 non-fatal accidents in the county during the year.

KENTUCKY

Madisonville—After raging for several days, a bad fire in the Circle City Coal Co.'s mine at Circle City was finally placed under control, it becoming necessary to seal up the mine.

St. Charles—The St. Charles plant of the St. Bernard Coal Mining Co. was put out of commission for three days as a result of a break in the machinery. Heavy rains and cold weather have resulted in a falling off in the labor supply in the Madisonville district.

Wolf Coal—The Ruthanne Coal Co., a Kentucky corporation, has taken over 1580 acres from the Wolf Creek Coal Co. at this place. The company is loading three cars a day, and output will be increased. J. M. Moore, of Charleston, is president, and B. J. Hener, of Huntington, W. Va., is secretary.

Pikeville—After being imprisoned behind burning mine supports for several hours, seven miners in the Big Hollow Coal Co.'s plant were finally reached by a rescue party, some of the men being unconscious when found. The fire started 50 ft. from the ground, from a gasoline fan engine exhaust, communicating to wooden supports, while the trapped miners were 800 ft. back, and couldn't be reached. They had just fired a ten shot charge and had the smoke from these shots also to contend with. The fire was put out without much loss.

WASHINGTON

Spokane—Development work has been started at Valley, 48 miles from here, by the Colville Valley Coal Co. The deposit is a sub-bituminous coal in a vein 6½ ft. wide, well defined and continuous. A shaft is now down 165 ft. and the company expects to be making shipments in a short while. F. Weatherwax is president of the company and A. N. Cantril, of Spokane, is secretary-treasurer.

Foreign News

Vancouver, B. C.—Stefansson, the Arctic explorer, states that the expedition from which he has just returned found several new islands and made scientific explorations of the country around Coronation Gulf. He confirmed the reports that copper and coal were found by him in the North, stating that coal was discovered on nearly every island touched by the expedition and predicting that these deposits would some day be found of great value.

Ottawa, Can.—Charles A. Magrath, Canadian Fuel Controller, has been appointed director of coal operations for Nova Scotia and New Brunswick with wide powers. He is given authority to make all necessary investigation respecting wages, holidays, hours of labor, utilization of labor to the best advantage and all other matters connected with the cost and production of coal during the war and for three months after the end of the war. The price to be paid for coal and coke produced in Nova Scotia and New Brunswick is to be subject to his approval and he is empowered to take possession of any mine or mining plant in those provinces and carry on operations.

Personals

I. C. Irwin has resigned his position as sales manager of the Rutledge & Taylor Coal Co., of Chicago, Ill. The position of office sales manager of the company has been abolished.

W. E. Brandt, formerly with the Thompson Coal Co., of Chicago, Ill., and recently with the district representative of the Federal Fuel Administration, has joined the Rutledge & Taylor Co.'s forces in Chicago.

Joseph C. Trevonow, of Elizabeth, Penn., mine inspector for the United Coal Corporation, has been appointed to the superintendency of the Jerome mines. Mr. Trevonow's successor has not yet been named.

Frank B. Collins, of Columbia, Ohio, formerly with the General Hocking Fuel Co., has accepted the position of sales manager for the H. W. Jenkins Coal Co. He is a brother of T. C. Collins, secretary of the Ajax Block Coal Co.

John F. Reynolds, general inside foreman of the Twinn Colliery of the Lehigh Valley Coal Co., near Pittston, Penn., a mining man of repute, has taken a position with the Associated Companies of Pittsburgh, a compensation insurance corporation.

W. J. Armstrong, manager of the crushing and pulverizing sales department of the Jeffrey Manufacturing Co., Columbus, Ohio, has recently received an appointment as Captain in the United States Army and has been assigned to the Ordnance Department in Washington, D. C.

R. Horne Smith, a leading financier of Toronto and a member of the Toronto Harbor Commission, has been appointed Fuel Administrator for Ontario, succeeding R. C. Harris. He refused to accept any salary. E. L. Cousins, engineer of the Toronto Harbor Commission, will act as his deputy.

William H. Brown, of Jerome, Somerset County, Pennsylvania, superintendent of the Jerome mines of the United Coal Corporation, has resigned, effective Oct. 1, to accept the position of general superintendent of the twelve Sunday Creek mines of the George M. Jones Co., with headquarters at Glouster, Ohio.

Payne G. West has been appointed as assistant manager of field sales for the Lakewood Engineering Co., of Cleveland, Ohio. Mr. West is a graduate of Carroll College, class of 1901. He later studied civil engineering for two years at the University of Wisconsin. In 1907 he became associated with the T. L. Smith Co., of Milwaukee. During 12 years with this firm—most of which he was assistant sales manager—Mr. West thoroughly familiarized himself with all branches of the machinery field as well as with factory production methods.

Industrial News

Binghamton, N. Y.—The C. H. Peters Coal Co. has recently filed notice of the dissolution of the company.

Syracuse, N. Y.—Due to the recommendation of E. N. Trump, engineer for the Federal Fuel administration, a total of approximately 60,000 tons of coal will be saved by thirty plants in this section.

Montour Falls, N. Y.—A. J. Barnes has been appointed export manager of the Shepard Electric Crane and Hoist Co., with headquarters at Montour Falls, N. Y. Mr. Barnes will also continue to be director of publicity.

Birmingham, Ala.—The production of coal in the Birmingham district showed a slight increase for the week of Sept. 9 over the preceding week, a total of 392,939 tons being mined as against 390,413 of the former week.

Philadelphia, Penn.—The Pennsylvania Railroad Co. has awarded a contract to the Roberts & Schaefer Co., Chicago, Ill., for the construction of a new 1000-ton capacity reinforced-concrete automatic electric locomotive coaling station at Perryville, Md.

Baltimore, Md.—A recent report from Pittsburgh announcing that the Baltimore & Ohio R. R. would devote its entire freight traffic to the transportation of coal has been denied by officials of the company. It was added, however, that coal would be the heaviest tonnage transported.

McAlester, Okla.—The Oklahoma Coal Operators' Association at its regular annual meeting at McAlester reëlected officers as follows: R. T. Price, Muskogee, Okla., president; D. J. Jordan, Oklahoma City, vice-president; F. F. McGrave, McAlester, secretary and treasurer; J. B. Kerr, McAlester, commissioner.

Connellsville, Penn.—The Western Maryland Railway Co., Baltimore, Md., has awarded a contract to the Price Construction Co., Maryland Trust Building, Baltimore, for the erection of a new local coaling station at Powest Junction, near Connellsville. H. R. Pratt is engineer for the company.

San Francisco, Cal.—B. H. Tripp, special representative of the Chicago Pneumatic Tool Co. on the Pacific Coast, has succeeded M. W. Priseler as district manager of sales for the Pacific Coast territory. His headquarters are at 627 Howard St., San Francisco. The Los Angeles branch of the company at 521 Title Insurance Building comes under Mr. Tripp's jurisdiction.

Joplin, Mo.—The Lightning Creek Coal Co. was incorporated under the state laws of Missouri and articles filed in Carthage, Jasper County, on Sept. 9, with a capital stock of $12,000. The incorporators are John R. Griggs, Pittsburg, Kan.; P. E. Tabor, Joplin; Mabel M. Bash, Joplin, and M. R. Lively, Webb City, Mo. A plant will be erected on the property at Pittsburg in the near future.

Chicago, Ill.—In order to provide increased facilities for manufacturing the Pneumatic rotary dump and other mining specialties, the Wood Equipment Co. has recently purchased and equipped commodious shops at Grand Crossing, Chicago. The main offices will be located at that plant and the company will continue to maintain city offices in the McCormick Building, as well as branch offices in New York, Pittsburgh, Knoxville and Denver.

Pittsburgh, Penn.—Three hundred steel coal cars, which secret service officials say were built by the Orenstein-Arthur Koppel Co. for secret shipment to Germany by way of Mexico, will be sent to France for use in coal fields recaptured by the Allies. The Orenstein-Arthur Koppel Co.'s plant near here was sold at auction recently by A. Mitchell Palmer, alien enemy property custodian, to the Pressed Steel Car Co., which will build 2000 more cars for the Allies.

Buffalo, N. Y.—It is announced that the local manager of the mine of the new Buffalo-Kanawha Coal Corporation will be James T. Lightner, an engineer and stockholder, who lives at Charleston, W. Va., a short distance from the mine, which is located in the Campbell Creek valley. The coal will be taken by the Campbell Creek Coal Co. Shipment has begun with an output of nearly 200 tons daily. George A. Corson, elected manager, will not leave Buffalo.

Cincinnati, Ohio—Receipt of 40,000 tons of coal at this market was accomplished by the arrival on an artificial wave of the Ohio of sixteen tows of coal, with a total of 90 barges, all loaded to capacity. All this fuel was allotted to Cincinnati concerns and will be distributed on the local market. The Campbell's Creek Coal Co., the Hickey Transportation Co., the Otto Marmet Coal and Mining Co. and the Pittsburg Coal Co. were interested in the shipments received.

Toledo, Ohio—Increased activity at the docks of Toledo was shown during the week ending Sept. 14, indicating a better movement of coal to the Northwest. The Hocking Valley docks during the week loaded 207,166 tons as compared with 227,253 tons for the previous week, making a total of 3,297,000 tons for the season. The Toledo & Ohio Central docks during the same week loaded 92,000 tons as compared with 66,000 tons the previous week, making a total of 1,449,000 tons for the season.

New York, N. Y.—H. W. McMaster, general manager of the Wheeling & Lake Erie R. R. at Cleveland, has reported to A. H. Smith, Regional Director of Eastern Railroads in New York, that the steamer "Colonel J. M. Schoonmaker" was cleared from the docks of that railroad last Friday (Sept. 20) with a cargo of 14,767 tons of Pittsburgh No. 8 coal in addition to its own fuel, amounting to 406 tons. According to the Coal and Ore Exchange this is the largest cargo of coal loaded on the Great Lakes.

Henryetta, Okla.—S. M. Barrett, secretary of the State Vocational Education Board of Oklahoma, will immediately arrange for resuming summer school work in the mining districts of the state. Under the supervision of the State and Federal vocational boards, night schools will be reopened in the mining districts, particularly in the coal-mining districts. Instruction will be given in various branches, but special attention will be paid to instruction in mining. Such schools will be opened at Coalgate, Henryetta and McAlester.

Harrisburg, Penn.—Is a workman an industrial accident victim if the ankle of his right foot has been broken while at work—if that right foot was part of an artificial leg? A regularly executed accident report has been received at the State Compensation headquarters from the Boland Coal Co., mine operators at Dunmore, setting forth that James McGarry, an employee, turned on his foot and broke his ankle while at work Sept. 4. The accident report further states: "This is an artificial leg, however, but he had to have same repaired."

St. Louis, Mo.—St. Louis and Mississippi Valley shippers, at a conference Tuesday, Sept. 17, at the St. Louis Chamber of Commerce, voted to ask a 20 per cent. reduction in the river rate as compared to the rail rate. The position was taken that it would be unfair to charge full rates, as is done on the great lakes, until the service is equal to that on the lakes. Theodore Brent, traffic manager of the Mississippi and Warrior Waterways section of the Federal Railroad administration, announced that the operation of the barges would begin Sept. 28. He announced that coal rates will not warrant two handlings, one by water and the other by rail.

Clarksburg, W. Va.—Impetus was given to the production of coal from wagon mines by the operators of wagon coal mines in Harrison County this week when a number of such operators formed a temporary organization by electing L. E. Dorsey chairman and E. W. Bell, secretary. Mr. Dorsey is one of the incorporators of the Clarksburg Domestic Coal Co. The meeting was called for specific purpose of organizing the owners and operators of small mines not only that there might be more regularity in submitting reports to the Fuel Administrator, but also to demonstrate to the Fuel Administration that these same mines, looked down upon by so many, are producing a large quantity of coal when it is considered in bulk, even though such mines are operated for the most part by farmers and other persons.

New York, N. Y.—M. F. Burns, president of Burns Brothers, has again been appointed chairman of the special Liberty Loan Committee of the Coal Trade for the Fourth Liberty Loan campaign which opens on Sept. 28. The vice chairman is Harry Peters, of Williams & Peters, and the Wholesale Committee consists of J. F. Bermingham, president, Delaware, Lackawanna & Western Coal Co.; Gardner Pattison, of Pattison & Bowns; J. W. Whiteley, of Whitney & Kemmerer; James A. Hill, Knickerbocker Fuel Co.; George M. Dexter, Dexter & Carpenter, LeBaron S. Willard, Willard, Sutherland & Co., and Robert B. Baker, of Sterling Coal Co. Committees representing the retail trade have been appointed in each of the five boroughs. Charles S. Allen, secretary of the Wholesale Coal Trade Association, is the publicity manager.

Charleston, W. Va.—Accidents in West Virginia mines during the month of August resulted in the death of 41 men engaged in the industry. The largest number of deaths in any county or counties was nine, Logan and Raleigh counties each having that many. McDowell County was next with eight. As has nearly always been the case, falling coal, slate and roof was responsible for more deaths than any other cause, the number of such deaths for August having been 17. Mine cars caused the death of eight men within the mines, powder explosions killing two, electricity four, motors two and mining machine one, all of such deaths being within the mines. Outside the mines one man was killed under a mine car, three were killed in a powder explosion, one was electrocuted and two were killed from miscellaneous causes.

Sunbury, Penn.—The immense value of the millions of tons of coal deposited in Shamokin Creek as waste in years gone by was never better illustrated than in a law suit brought in the Northumberland County court in which a car of this anthracite is at issue. The claimants put its worth at $100, which makes the coal worth $2 a ton. Much of this coal is little larger than a pinhead, and smaller than a grain of rice. Thousands of tons are being taken from this stream daily, and 50 or more concerns are operating with a total of a half million dollars worth of equipment between Sunbury and Shamokin, a distance of 20 miles. Some of these "water miners" have cleared as high as $5000 on a single leasehold on abutting lands. Not more than ten years ago farmers were paid big sums for damages because coal was washed over their lands making it worthless for farming.

MARKET DEPARTMENT

Weekly Review

Coal Situation Dependent on Many Factors—An Increase in the Daily Coal Production Would Materially Aid War Program—Soft-Coal Output Improving—Demands for Fuel Increasing—Need for Conservation Emphasized—Trouble in Anthracite Region

CONJECTURES as to the outcome of the fuel situation are many, but only one gifted with infinite knowledge could prophesy with any degree of accuracy how the country will fare this winter with regard to its coal supply. The optimist points out that revised storage rules, modifications of zone restrictions, large stocks in the hands of consumers and an improved car supply at the mines are all happy auguries, while the pessimist shakes his head sadly as he compares the weekly tonnage figures with the estimated requirements. He heaves a sigh at the news of curtailments and labor troubles, and argues that the stress laid upon the need for rigid conservation is a certain indication of a stressful winter.

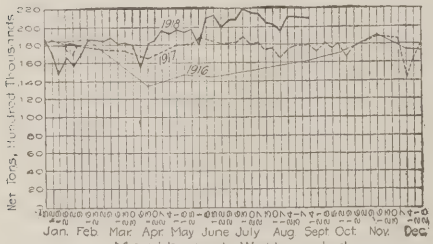
However, there is a happy medium—a middle course, as it were, between these two extremes. In spite of obstacles the output of soft coal has been maintained at the rate of 1,982,000 net tons a day for the period from Apr. 1 to Sept. 14. For the week ended Sept. 14 the tonnage mined reached 12,692,000 net tons, or 133,000 net tons greater than the daily average for the April to September period. An increase in the daily production for the rest of the coal year sufficient to wipe out the deficit of 13,624,000 net tons now existing would place the country at ease, so far as its soft coal supply is concerned. Conceding that this output is not possible—that transportation, inadequate man power and inclement weather will militate against maximum production—the soft coal mines should at least be able to maintain an average rate of production that would enable the successful carrying out of our war program.

The bituminous mines are indeed confronted with a stupendous task. Orders for munitions are piling up—and munitions mean coal. Translated into popular terms, one ton of coal is consumed in the manufacture of 27 three-inch shells. In the recent American drive at St. Mihiel alone approximately 1,500,000 shells were fired. Steel is only one of the many war industries dependent on coal, and when the demands of other war plants are totalled it can readily be seen why the line is being drawn more tightly around non-war industries, why production committees at the mines are doing all that is humanly possible to stimulate the miner to more regular working time and greater production, and why the Fuel Administration insists on the strictest sort of coal conservation.

During the week ended Sept. 14 the anthracite mines produced 2,088,000 net tons of coal, which brings the total output of hard coal for the coal year to date up to 46,566,736 net tons. After maintaining an enviable record for patriotism and production for months, the germ of discontent, fostered somewhat by union politics and Hun propaganda, infected about 30,000 hard-coal miners. These men struck for higher wages in the face of an existing agreement and the country's need, and as a consequence 26 collieries were forced to suspend operations. At this writing the critical aspects of the situation have passed, as the majority of those out on strike have returned to work while awaiting the decision of Fuel Administrator Garfield in regard to their plea for an increase in wage.

WEEKLY COAL PRODUCTION

Production of bituminous coal during the week ended Sept. 14, while considerably in excess of the week ended Sept. 7, due to the loss of time during that week on account of Labor Day, equaled the production during the week ended Aug. 31. Preliminary estimates place production during this week at 12,692,000 net tons, an increase over the week preceding of 13.2 per cent. and over the corresponding week of last year of 15.7 per cent. The average



daily production during the week ended Sept. 14 is estimated at 2,115,000 net tons, approximately the same as the daily average during the preceding week and considerably in excess of the daily average of 1,827,000 net tons during the week ended Sept. 14, 1917. The shortage for the coal year to date now amounts to 13,624,000 net tons and makes necessary an average daily production during the balance of the coal year of 2,379,000 net tons, or 2 per cent. in excess of the average daily production for the coal year to date.

Production of anthracite during the week of Sept. 14 is estimated at 2,088,000 net tons, 29.1 per cent. above the production of the preceding week, and 4 per cent. above the corresponding week of 1917. The daily average for the week of the 14th is estimated at 348,000 net tons against a daily average of 338,531 net tons for the coal year to date, and 334,290 net tons, the daily average for the corresponding period of 1917. Total production for the coal year to date is estimated at 47,733,000 net tons, an increase of 2.5 per cent. over the same period of 1917.

Shipments of bituminous coal during the week ended Sept. 14 from all producing districts not only exceeded the week of Sept. 7 but also the corresponding week of 1917. Material increases occurred in central Pennsylvania, where shipments amounted to 36,884 carloads as against 31,216 carloads during the week ended Sept. 7, in Ohio where shipments amounted to 28,216 carloads as against 22,455 carloads, and the district including Illinois, Indiana and western Kentucky where shipments amounted to 48,694 carloads as against 42,471 carloads.

A considerable increase occurred in dumping at the Lake ports during the week ending Sept. 14. Total tonnage (including vessel fuel) dumped at the Lake ports this week is estimated at 1,159,296 net tons, an increase of 14.5 per cent. compared with the week previous, and of 9.9 per cent. compared with the weekly average of July, August and September.

Beehive Coke—The production of beehive coke in the United States during the week ended Sept. 14 is estimated at 632,000 net tons as against 615,000 net tons during Sept. 7, or an increase of 3 per cent. The daily average during the current week is estimated at 105,000 net tons as compared with 103,000 net tons during the week preceding. The operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania report production during the week ended Sept. 14 at 397,047 net tons and the operation of their plants at 77.8 per cent. of present capacity as against 76.2 per cent. during the week of Sept. 7. Yard labor conditions improved slightly during the week.

Byproduct Coke—The production of byproduct coke in the United States was further limited during the week ended Sept. 14 by shortage of labor in Pennsylvania. The operators of the country report production at 89.3 per cent. of their present capacity, as against 90.5 per cent. during the week ended Sept. 7. Of the total losses, shortage of coal amounted to 2.5 per cent., labor trouble to 1.9 per cent, repairs to plant 4.5 per cent., and all other causes, 1.8 per cent.

Maryland was the only state reporting material improvement during the week such improvement being attributed to better labor conditions. Operators in Illinois, Kentucky, Pennsylvania and Tennessee report decreased production. Operators in the states mentioned, with the exception of Pennsylvania, attribute the falling off in production to repairs to plants, while the decline in Pennsylvania was entirely due to shortage of labor.

CARLOADS OF COAL ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended			
	Aug. 24	Aug. 31	Sept. 7	Sept. 14
Bituminous shipments, 123 roads	223,117	223,966	195,367*	222,519†
Anthracite shipments, 9 roads	40,865	41,281	32,234	40,699

* Revised from last report. † Subject to revision.

BUSINESS OPINIONS

Marshall Field & Co.—Current shipments for the week were well ahead of the same period a year ago. Road sales for immediate and also for spring delivery show a very good increase compared with the current week of 1917. The number of customers in the house was about the same. Collections continue good.

The Iron Age—Manufacturers of barbed wire were called to Washington to plan for quickly increasing output, after many weeks of restricted production. The en-

tire capacity, which is 50,000 tons a month, may soon be engaged. Besides American requirements a new call has come for 60,000 tons for Italy and 65,000 tons for Great Britain, and the latter amount may be increased to 90,000 tons. One Pittsburgh mill, on an urgent order for 80-lb. rails for France received on Wednesday, Sept. 11, rolled 20,000 tons before the end of the week. There is an entirely unprecedented volume of shell steel orders; sheets are wanted in large quantities for trench shelters and rolling kitchens, and in all ways the needs of the American army have been pressed upon the steel mills, until for one week the incessant call for ship plates has become an undertone.

Bradstreet's—Indeed, the movement of grain is of enormous proportions, the fixed price of wheat having superinduced heavy marketings and obviated fears of a receding market, heretofore a concomitant of large shipments. Bank clearings run to high figures in the zone outside of New York, more especially at centers where payments for grain and cattle have been heavy. Collections as a whole are good, though some complaint is heard about government payments being rather tardy, and, of course, the heretofore drought-stricken parts of the southwest are backward in making remittances. While the stock market continues dull, prices are relatively firm, and as extensive preparations are being made for the Fourth Liberty Loan, money for speculation is not available, which fact prevents noteworthy response to the very favorable war news received from all fighting fronts.

Dry Goods Economist—"Will the Government fix the price of raw cotton?" This question is being asked in all branches of the dry goods trade, manufacturing, wholesaling and retailing. Because of fear that some such action may be taken in an effort to stabilize the cost of cottons to the Government, to our Allies and to our own people, sales of raw cotton have decreased substantially and quotations have fallen off sharply. The wool situation is perhaps most tersely described in the announcement made early in the week that "There may be a supply of wool for civilian use next year." The explanation of the lack of wool is found in the announcement from Washington that 313,000 soldiers were started on their journey across the Atlantic during the month of August. It must be recognized that this great number of men could not have been transported had the vessels used in carrying them been allowed time for the shipment of west-bound cargoes. As a matter of fact, many of these vessels were unloaded and started back within 24 hours of their arrival on the other side.

American Wool and Cotton Reporter—The mill supply of wool has been conserved by the policy which many plants have adopted of using no more than was a necessity for ordinary cloth production. Although the outlook for manipulated fabrics is brighter, there are still many concerns which will not consider any large production of such fabrics. They believe that it will be safer to produce uniform fabrics at a moderate or small profit, and to hold the reputations which they have built up for over a period of years. Price-fixing is the principal topic of discussion before the cotton trade today. It is regarded by one manufacturer as perfectly feasible to fix the price of the staple, and he estimates that at least 95 per cent. of the trade would favor fixing differentials. It is felt by some that it would not be such a stupendous task as it is regarded by others, and is argued that if wheat can be regulated with its various grades that cotton can likewise be regulated. A price of cotton should be fixed sufficiently high to satisfy the South, and then the price of goods should be fixed so as to make it a reasonably profitable business.

Atlantic Seaboard

BOSTON

Falling off in receipts is more marked. Further embargoes issued in Central Pennsylvania. New car rating expected to be a benefit. Movement all-rail sags at the rate of 800 to 1000 cars weekly. Box cars come forward, but in diminished volume. Dispatch continues slow at Hampton Roads and obviously New England clearances are to be fewer the balance of the season. Baltimore shipments much reduced. New permissible reserve limits have little or no effect, the stocks in this territory having generally exceeded the former limits. Railroad fuel coming forward freely, but certain New England roads seem inclined to push off receipts. Effort made to increase flow of commercial coal via New York piers. Connecticut ports and those along Maine coast need emergency shipments. Anthracite receipts also fall off. "Independents" apparently do less than their share. Rumored that Storrow will distribute a given number of cars per day.

Bituminous—It is evident that receipts in New England will not again this season come up to the level reached in August. The discontinuance of shipments all-rail to a large number of steam-users and the release of steamers and tugs to other Government uses were bound to have their effect upon shipments in this direction, and there will probably not be another opportunity before next season for consumers promiscuously to get coal forward in liberal tonnages. At tidewater the change is particularly marked. Instead of steamers waiting in the stream to discharge there is a decided spot demand for cargoes and again occasionally there are idle berths waiting for steamers to arrive.

Embargo Notice No. 2 has been issued by the District Representative of Central Pennsylvania, of date Sept. 18. The pamphlet has 27 pages with names of consignees to whom shipments must be discontinued. How much this will reduce the all-rail movement to New England is difficult to estimate, for there are other factors in the equation. A large power plant, for instance, may not be embargoed, but yet the entire output of the mine ordinarily its source of supply may be commandeered for byproduct plants or other Government use important to the war program.

Inequalities in car distribution, it is felt, will soon be corrected to quite an extent in Central Pennsylvania. For years the rating for each mine has been figured according to the number of places in a mine rather than being guided by actual output over a given period. In other words, car rating has been apportioned on a basis of 100 per cent. labor supply and labor efficiency. In many cases this has resulted in some mines having empty cars regularly left over after a day's work and in others a deficit in car supply. This subject has now been carefully studied and after raising the question through railroad channels the district representative and the Central Pennsylvania Producers' Association were asked to submit a more equitable arrangement. This has now been done, based on the way operators have handled such cars as were furnished them. It is expected a much fairer distribution will be the result.

All-rail movement from the Central Pennsylvania district has sagged off from 4200 cars or so per week during August to less than 3200 cars during the week ended Sept. 14. Embargoes by the fuel authorities and the diversion of considerable tonnages of byproduct coal contributed to this slackened movement. Wagon coal has also decreased in volume, partly because most of the larger consumers now have satisfactory reserves and partly because of a strong demand from other territory. At one time the number of box cars weekly reached 1100, of which nearly 700 were absorbed by New England. Just now the movement from Central Pennsylvania in box cars is about 400 cars weekly. It is probable this will decrease rapidly now because of the demand to move other freight for which equipment has been lacking.

Hampton Roads dispatch shows no improvement, except as the number of steamers is reduced. Receipts from that quarter will show a decided falling off as compared with July and August, although official figures are not yet available. Certainly the peak for 1918 has been passed and consumers in this territory may regard themselves as very fortunate if they get more than a modicum on their contracts from now out. The volume of coal via the Curtis Bay piers at Baltimore has also been reduced, so that cargoes of "Storrow" coal from that port are much fewer in number.

Railroad fuel continues coming forward in good volume, especially all-rail. There is a disposition, however, on the part of certain of the roads to postpone full receipts, doubtless with the expectation that shipments will be as easy to get later as now. All the roads have been under a strain to get labor to unload coal and there have been such mixtures of quality as to make fuel agents most anxious about coal already in storage. There have been numerous cases of hot coal where plans to receive further volume deliveries have been more or less upset.

There is now a decided effort to get increased tonnages over the New York piers, particularly for Long Island Sound destination. There are also emergency requests from eastern points along the coast where delivery has to be made in small schooners or barges from New York. These are the areas in New England now most deserving of attention from coal distributors.

Anthracite—It is obvious also that receipts of domestic sizes are in the aggregate showing a decline. This is not so noticeable with the larger companies who are distributing along usual lines, but it is perfectly plain that "independent" shippers as a class are not making good their part of the program. They are having an eye to future business rather than to present obligations and here and there is a tendency not to ship the less desirable trade to whom they were eager to make deliveries a few years back. It is largely to fill in these holes that the larger shippers are now being asked to make emergency shipments of coal that would and should go to their own regular trade. It is now rumored that the New England Fuel Administrator is to have a given number of cars per day of "free coal" for distribution. This, of course, will not increase the movement for New England and it must be that Mr. Storrow feels his office can make better distribution than is now being made through trade channels. It should be remembered, however, that this coal is furnished by shippers of whom less complaint can be made in order to make up the deficiencies of shippers who are justly complained of. If this "free coal" could come from the latter it would be of distinct advantage.

NEW YORK

Suspension of mining appears to have had little effect on the New York market, although the companies affected report a falling off in receipts. Market getting down to a winter basis and receipts will assume a general average. Local conditions are encouraging and dealers look for better conditions than existed last winter. Demands for bituminous continue heavy, but there is little complaint heard.

Anthracite—The suspension of operations in many collieries in the lower anthracite regions last week had apparently little effect on local conditions, judging from the report of cars dumped here for the seven-day period ending Sept. 20, 6796 cars having been emptied as compared with 6635 the previous week, an increase of 161 cars. Receipts of coal by the companies whose mines were idle were reduced because of the failure of the men to work, but there was no complaining on the part of the trade.

Receipts each week now average about the same and as the cold weather approaches they are expected to settle down. There is not so much complaining of slow shipments and the trade appears to be in the same frame of mind concerning conditions that will exist here next winter, and that is that there will not be the shortage of coal that existed unless unforeseen circumstances occur.

Reports of production are not as encouraging as they might be. Lack of labor and petty labor difficulties in some of the mines are responsible for a falling off in shipments, which for the week ending Sept. 7 was reported as 1,617,579 net tons, a decrease of 642,137 tons from the previous week.

The Anthracite Committee has announced the lifting of embargoes on various towns in New England and has discontinued the sending of domestic sizes including pea coal, to 80 towns in Maine.

Local conditions are encouraging. Coal is moving freely and the trade is optimistic. None of the shippers have any domestic coal to offer to spot buyers, but there is plenty to meet the necessary demands of regular customers.

The steam coals are in good shape. Buckwheat No. 1 is reported plentiful by some shippers while others have nothing to offer. Most shippers have difficulty to find a ready market for their rice and barley supplies, but they are large enough to force a cut in quotations. Rice is in fair supply, while there is more than enough barley to go around.

Promises of increased allotment of coal for the Bronx have been reported, but warnings have been issued that the consumers there must conserve every pound of coal possible. Similar promises have been made to the consumers of Brooklyn and larger shipments are expected to begin to these two boroughs shortly.

Current quotations, per gross ton, f.o.b., tidewater, at the lower ports are as follows:

Circular	Individual	Circular	Individual
Broken..$6.75	$7.50	Buck...$5.10	$5.90
Egg.... 6.65	7.40	Rice.... 4.65	5.10
Stove... 6.90	7.65	Barley.. 4.15	4.30
Chestnut 7.00	7.75	Boiler.. 4.60	
Pea..... 5.50	6.25		

Bituminous—With receipts far too small to meet the demand conditions are favorable and there is no urgency for coal that goes unanswered. Everybody entitled to it has some coal and many consumers are reported to have good stocks on hand.

The revision of storage regulations announced last week enables many manufacturers to carry larger winter stocks. Consumers in southern New York and New Jersey on the preference list recently defined by the War Industries Board are now permitted to accumulate 60 days storage instead of 30 days. Those in Class 2 may carry 50 days storage; Class 3, 40 days; Class 4, 30 days, and those consumers not on the preference list are limited to 20 days storage.

Production figures are not encouraging. With the labor situation as it now is, and as it is likely to exist for the balance of the war, there is not much hope held out to the consumer. Local dumpings show a falling off of 353 cars for the week ending Sept. 20, as compared with the previous week 7277 cars having been dumped.

State Fuel Administrator Cooke has let it be known that replies received to the questionnaire sent out by him from 21 steam plants which consumed 628,315 tons of coal last year, show that with the improvements and repairs being made by their owners that 68,023 tons of coal will be saved a year, or 11 per cent. of last year's consumption. Altogether Mr. Cooke has received replies from 237 boiler plants in the nine southern counties of New York State, which include Greater New York, and says that if other consumers can do as well the supply of coal will be adequate, providing labor troubles do not suspend operations at the mines.

The car supply is not so good as it was a couple of months ago, but there is not much complaint because of the lack of labor. Some producers might find it hard to load a larger number of cars. Heavy stocks are being taken by the railroads but some shippers complain of the neglect of the companies to pay their bills. Demand for bunker coals continues heavy on account of the large number of vessels constantly coming into the harbor.

Current quotations, based on Government prices at the mines, net ton, f.o.b., tidewater, at the lower ports, are as follows:

	Mine Gross	F. o. b. N. Y. Gross
Central Pennsylvania:		
Mine-Run, prepared or slack	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of-Mine	3.08	5.23
Prepared	3.36	5.51
Slack	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite suspension creates anxiety. Public still much concerned. Higher retail prices seem likely. Further local regulations by fuel authorities. Orders not to be completed before Jan. 1. All orders to get some coal at once. City's allotment slightly increased. Steam trade extra active. All sizes sold up but culm. Bituminous unchanged. Car supply only fair. Coal well distributed under new plan.

Anthracite—The strike in the anthracite region hit this district particularly hard, as most of the mines concerned were those supplying a heavy proportion of tonnage to this city. The anxiety was by no means confined to the shipping and dealing interests, but the general public at the first sign of trouble flocked in on their dealers in droves and demanded the filling of their orders. As a result of this the few sizes that showed an inclination to lag were soon cleaned out, particularly egg, and the people forgot all about their preference as to sizes which they so tenaciously clung to all summer long.

In order to make every car of coal reach just as far as possible, the retailers have received instructions that in every case where two-thirds of a customer's order has been delivered they are not to try to make up the final one-third prior to Jan. 1 of the coming year. Of course, exceptions are made in the case of hospitals and the various charitable institutions. The dealers were not exactly surprised at this order, as they have felt for some time that it was the authorities intention that those people who have really received two-thirds of their allotment would be expected to try to make this reach over the entire coal burning season, which will not be so difficult if ordinary winter weather is experienced. All of the orders when entered were based upon the consumption for last winter, one of the worst on record, and there is a suspicion that in addition many of them were padded despite the efforts of the administration to check this evil.

To correct the confusion caused by the dealers receiving stop-orders from the order department of the fuel administration the dealers have been advised that they must not notify the customer that their order has been held until at least three days after the notice has been received. Previously such stop orders have often been withdrawn by the bureau and much confusion caused.

In order to prevent the accumulation of egg and pea coal in the dealers' yards the fuel administrator came out with the suggestion to the public that they accept a mixture of these sizes. It is claimed that while each size by itself is unfitted for use in both range and heater, by combining the two the result is very satisfactory. However, the suggestion came just at the time of the miners' strike and the dealers moved what little surplus they had without the least bit of trouble.

The city was in receipt of a cheering piece of news this week when the authorities announced that the quota for this territory had been further increased over the 18 per cent. allotment to 19.20 per cent. Shippers were notified that this increase was first to take effect in sections where deliveries are hardest in winter, such as Manayunk, Germantown, Chestnut Hill, Wissahickon, Olney and the northeast, and the increased tonnages for these sections are to be delivered to the dealers in September and October.

Following the mine suspension there was quite a flurry in the steam trade. Of course, there never was much of a slackening in buckwheat all summer long, but for several weeks past there was a tendency for rice and the smaller sizes to sag just the least bit among the larger producers. Coincident with the men stopping work inquiries for these sizes multiplied and at this time all sizes are in most active demand. Managers of industrial plants realize that the wage problem is not settled and as a consequence they are finding room for every car of almost any size of steam coal. Even culm shared in the demand to a moderate extent. The price asked for this fuel is generally held by the big shippers around $1.25, but we know of individual shippers in order to move large blocks are willing to shade this figure, although on single car lots are occasionally getting a little more.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.25	Buckwheat	$3.40	$4.45
Egg	4.80	6.15	Rice	2.90	3.80
Stove	5.05	6.40	Boiler	2.70	3.70
Nut	5.15	6.50	Barley	2.40	3.30
Pea	3.75	5.00	Culm	1.25	2.15

Bituminous—With the war industries on the new preferred distribution basis of a 30-day supply, all coal reaching this territory is being made to reach a wider area than ever. If it were not for the fact that the production is below expectations the situation could be considered satisfactory. There is really no definite improvement in the car supply, this phase of the situation being about as it has been for the past two or three weeks—probably an average supply running from 60 to 70 per cent. With heavy shipments going to lake ports, as well as New England, no appreciable increase in tonnage to this territory can be expected for many weeks yet.

The heavy fine recently imposed on a local shipping company for violation of the price order has created the greatest interest. The one query asked by many is why the purchasers of the coal at prices in excess of the Government figure have escaped punishment. There are also persistent rumors that other concerns are to be given an opportunity to explain apparent violations of the same kind.

BALTIMORE

Diversions of a better grade coal in box-cars noted. Supply continues liberal in regard to soft coal. Anthracite situation causing real worry, and retail organization issues an appeal to the public.

Bituminous—The rerouting branch of the fuel administration as it applies to this territory has made good on its promise to give some better grade coal to Baltimore to offset the almost unbroken run of dirty fuel that had been coming through to the dismay and discouragement of industries. The heavy proportion of box-car coal continues to come through, but business here does not complain so much of the extra cost thus involved when the coal runs of anything like fair grade. The better kind of wagon-haul coal in box cars has been diverted at the gateway scales from the Somerset region. The process of stocking up for short periods by industries here continues under the plan of holding down even the essential plants to a limited supply of fuel. The liberal run of coal here as to quantity is making the situation here easier day by day.

Anthracite—In the hard coal business there is real worry, however. As the weeks roll by, and the deficiency in the anthracite supply for domestic use grows more pronounced instead of being cleaned up by extra tonnage movement, both the fuel administration as represented locally and the coal trade sound warnings to the public. With the coal trade it is a mere reiteration of a warning that it has been giving for weeks to the fuel administration and the general consuming public. The fuel administration here the past week for the first time publicly admitted that its plan to have two-thirds of all orders in cellars here before winter was doomed to failure. At the same time an order was sent out by the chairman of the city committee of the local fuel administration directing that all consumers be given a little coal and that the two-thirds distribution move be discontinued. Word was passed to the trade that a limit of two tons should be placed on the deliveries now. This plan has not met the approval of the coal trade, where it is pointed out that it would not be fair to those with orders on the books for months to cut them off, after the fuel administration has allowed probably half the homes of the city the full two-thirds delivery. In an appeal to the public the Baltimore Coal Exchange shows that it has not abandoned the two-thirds plan. At the same time every effort will be made to give those absolutely out of coal enough to heat their homes during the first days of real cold weather, with the hope that better receipts here will enable further deliveries later.

Lake Markets

PITTSBURGH

Car supplies fairly satisfactory. Essential industries and byproduct coke plants well served. Dirty coal matter receives attention.

Car supplies to coal mines in the district are fairly satisfactory and on the whole reflect an improvement. Labor performance is fairly good, but could certainly be improved. R. W. Gardiner, production manager for the district under the Fuel Administration, is increasing his force for the inspection of coal. He states that complaints of dirty coal are chiefly in connection with wagon mines and stripping operations. Cases are being freely penalized 50c. a ton and decided improvement is expected.

The Pittsburgh district has just emerged from a period of rather drastic curtailment in the use of electric current from 7.30 to 10 a. m., necessitated by shortage of generating power on the part of the public service corporation, not on account of scarcity of coal. Officials of the Fuel Administration are elated over the prompt and full coöperation of the public and the experience indicates that if emergencies arise this winter requiring coal conservation there will be no slacking on the part of the public.

No definite time is yet assigned for the completion of lake shipments from the district, but it is practically certain that shipments will have to extend beyond Oct. 15. Essential industries are being fully served, including the byproduct coke plants, the only difficulty as to the latter being that stocks are not being accumulated to the extent desired. There are scarcely any open market transactions. The market remains quotable at the set limits: Slack, $2.10; mine-run, $2.35; screened, $2.60, per net ton at mine, Pittsburgh district, with 15c. extra allowed to be charged by brokers to consumers and retail dealers.

TORONTO

Cool weather finds many consumers without fuel. Plan for relief adopted by dealers and large deliveries suspended until all are supplied. Public advised to burn wood or other substitutes.

There is no marked change in the coal situation except that with the setting in of cool weather the demands of consumers who have not been able to lay in supplies have become more urgent. Many of the dealers are still refusing new orders. As

the result of a conference between the coal dealers, the city fuel controller and the Board of Control the dealers have agreed to suspend deliveries of large orders in hand until those consumers who are absolutely without fuel have been supplied. Those having no coal must forward applications in writing before Sept. 25, when they will be furnished with small quantities. A large number of applications have been received. The regulation allowing consumers to receive 70 per cent of their regular supply has been cancelled and the people are asked by the city fuel controller to burn wood or other substitutes so long as the weather continues mild.

Quotations for best grades per short ton are as follows: Retail anthracite, egg, stove, nut and grate, $11 to $11.50; pea, $10 to $10.50; bituminous steam, $9.25; slack, $8.25; domestic lump, $10.50; cannel, $13. Wholesale f.o.b. cars at destination, three quarter lump $7, slack $5.82.

BUFFALO

Quiet in bituminous, not active in anthracite, but much complaint of slow anthracite deliveries. Retailers refuse to take more orders.

Bituminous—The situation does not change materially, but it is plain that the authorities are not going to allow any surplus to accumulate anywhere, for the order goes out again directing curtailments in various directions. All jobbers report that they could sell more coal if they had it, but the supply is fairly good and the outlying territory appears to be accumulating some coal. If the war needs are not too great the supply will go around in some fashion, though it is plain that the coal will all be needed somewhere. If it is fairly distributed no distress should be experienced, though the concerns adjudged unnecessary will not get much.

Bituminous prices are still mostly made to consumers at the mines, but the delivered prices with all charges paid, are as follows: Thin-vein Allegheny Valley, all sizes, $4.65; Pittsburgh lump, $4.45; Pittsburgh mine-run and slack, $4.20; smithing and smokeless, $5.85; cannel, $5.60 to $6.10, all per net ton, f.o.b. Buffalo.

Anthracite—The situation is becoming quite strained. In spite of the promises of the fuel authorities and the fairly liberal allotment the supply has steadily run down, till the consumers are becoming alarmed. The retailers are refusing to book any more orders, saying that they cannot fill what they have. It is estimated, though, that about 95 per cent. of the coal needed is already ordered and the fuel authorities continue to say that the delivery will be made in good time. As it looks now it will mostly wait till the lakes close in December. If the daily lake movement of 100,000 tons is then turned over to the city the shortage will be made up in a week, and perhaps that is the plan, but the consumers see in the delay a prospect of continued shortage.

CLEVELAND

Bituminous is moving to the Northwest in record-breaking style, each succeeding week seeing the movement up the Great Lakes heavier. Suspension of shipments of Ohio and western Pennsylvania coal to the Michigan peninsula has served to increase both the tonnages available for the lake trade and industrial and retail consumers.

Bituminous—The heavy inroad Labor Day made upon coal production in the No. 8 district of southern Ohio is shown by the latest report of the Pittsburgh Vein Operators' Association of Ohio, which is for the week ended Sept. 7. In that week operators belonging to the association shipped 4408 cars, divided as follows: 2571 to the lake trade, 896 to Ohio, 661 for railroad fuel, 174 for Michigan and Indiana, and 106 for Canada. In the week ended Aug. 31 the carloads of coal shipped totaled 8876, which shows the loss Labor Day week was close to 50 per cent. Some Indiana and Illinois coal is coming into the state for railroad fuel, operators say, which is increasing the tonnage for the lake trade. The Pittsburgh Vein Association's most recent car supply report is dated for the week ended Sept. 14, and it shows the shortage for the week averaged 15.47 per cent. The shortage of 1298 cars in the week resulted in a loss of 64,900 tons. The railroad rating of the operators reporting is 8391 cars and the number of cars supplied was 7093. On the whole, recently, car supply has been good, much better, in fact, than labor. Registration day was almost wholly lost in many southern Ohio mines, and now county fairs are a diversion. Shipments to retail dealers have increased somewhat, though dealers' needs are by no means being met. Householders seem over-eager to store for the winter. Industrial plants are in the market for all the bituminous they can obtain, but operators are hewing close to the storage-limit line.

Lake Trade—Beyond all shadow of doubt the movement of bituminous to the Northwest via the Great Lakes is at its best so far this season. In the week ended Sept. 14 the lake fleet loaded 1,114,923 tons, not including bunker coal, at lower lake ports. In the first 15 days of September, which includes Labor Day, three Sundays and registration day, the fleet loaded 44,305 cars, which is about 2,000,000 tons. Coal is coming forward to the lower lake ports rapidly and the lake tonnage to take it aboard is immediately available. The prospects for moving the Northwest's quota grow brighter steadily. Detailed figures just put out by the Coal and Ore Exchange, Cleveland, which is conducting the lake traffic pool this season, show that up to Sept. 1 a total of 16,833,638.04 tons of bituminous was loaded at the lower lake ports, of which 16,089,511.94 tons represented cargo fuel and 744,126.10 bunker fuel. For the various months to date the loading of cargo and bunker fuel combined has been: April, 868,852.64; May, 3,194,198.10; June, 3,539,352.30; July, 4,234,305.05, and August, 4,996,929.95. The August loading was divided into 4,805,710 tons of cargo coal and 191,219.95 tons of bunker.

DETROIT

Need of larger supply of domestic coal becomes more evident. Steam coal users object to Illinois and Indiana stock. Lake movement active.

Bituminous—Continuance of cold rains and chill weather makes more impressive the insufficiency of Detroit's supply of domestic fuel. Homes are being made uncomfortable by weather conditions and in many instances the householders are deterred from warming their homes, either because they have no coal or because the scanty supply at hand renders them apprehensive that were they to consume part of it now, they may find themselves without fuel when even colder weather comes.

Stocks of bituminous coal suitable for household use are not being increased to any marked degree. Some retail dealers say they are unable to fill orders, unless customers will take mine-run, which is not adapted to use in hot air furnaces. Shipments from the Ohio, West Virginia and Kentucky districts which are now restricted for retailers, and to use of gas and byproduct plants and railroads are said to show a somewhat larger proportion of prepared sizes than earlier in the season, though as a whole the movement is described as of lesser volume, due to the limited market for slack and mine-run and to the continued operation of the priority order relative to lake coal.

Consumers of steam coal show much reluctance to stock up with the coal from Illinois and Indiana mines to which they are restricted by the order of the Federal Fuel Administration. Jobbers say the coal coming from those districts is of an inferior quality and that the more desirable product of the mines is being retained for home consumption.

Anthracite—Receipts of anthracite coal in Detroit to Sept. 19 approximate 25,000 tons, contracting with about 31,000 tons for the entire month of August. Retailers have practically no stocks on hand and in filling orders from owners of base-burners, which have priority over all others, are dependent for the most part on day-to-day shipments. Baseburner owners are allotted a maximum of three tons and until all have been supplied whose orders have been placed with dealers or the fuel administration, the other consumers must wait.

Lake Trade—During the week ending Sept. 14 a new high record was made for the season in loading bituminous coal for lake movement, the docks having dumped 1,114,832 tons, exclusive of bunker coal. The volume of shipments is being fairly well maintained through the present week.

COLUMBUS

Still a softness in the market for small sizes, due to the continued embargo against shipping screenings into Michigan. Domestic sizes are in good demand and a heavy tonnage is moving to the lakes for shipment to the Northwest.

The principal feature of the coal trade in Ohio is the continued softness in screenings, which has caused the Ohio Administration to modify its orders concerning storing on the part of large steam users. The prohibition against about 700 concerns in Ohio has been removed temporarily in order to absorb the larger amount of screenings on the market. Domestic and lake trade are both active. The domestic situation is generally considered satisfactory.

The lake trade is being pushed as much as possible in order to secure the required quota for the Northwest before the close of navigation. As a result special pains are being taken to move vessels and the movement is generally efficient. Reports from the Northwest show that there is no congestion on the docks and the interior movement is active. Lake prices continue firm.

The domestic trade is now attracting considerable attention. Retailers have a good run of orders and are making deliveries rapidly. They are receiving a fair proportion of the tonnage required. Reports in Columbus show that fully 65 per cent. of coal for private use has been stored by consumers.

Production is rather good although labor shortage is curtailing the output at many of the mines. Car shortage is also having its effect and on the whole the outlook is not encouraging. It is estimated that the output in the Hocking Valley and Pomeroy Bend districts has been about 70 per cent. during the past week. Eastern Ohio produced about 65 per cent. and the same figures are reported from Crooksville and Cambridge.

CINCINNATI

Cool weather has stimulated demand, while modified storage regulations have also helped movement. Car supply remains fairly good, and shipments continue heavy.

Frosty weather, following a period of cold and rain coming unusually early for this section, resulted in more active demand for coal for heating, domestic consumers, office buildings and others requiring fuel for this purpose for the first time during the season. At the same time the industrial demand received a direct stimulus in the shape of a removal of the restrictions formerly placed on the storage of coal by Washington, an increased supply being allowed under the regulations announced. This change enables industrial consumers to use more coal than they were at first allotted, as far as a reserve supply is concerned, and large dealers and operators at once received rush orders indicating the intention of these consumers to take advantage of the Government's permission.

While there has at no time been any difficulty on the part of the trade in placing all available coal, the increased demand resulting from the regulations referred to is gratifying, making it certain that business will continue steadily at its present high level. Nothing has occurred, however, to change the practical certainty that demand will run ahead of supply as the season advances, especially in view of the limited ability of the railroads to forward coal. In spite of the protestations of transportation officials, there is little doubt that the principal reason for the prospective shortage of fuel, as compared with consuming requirements, is the apparent inability of the railroads to place and move a sufficient number of cars to take care of the maximum production of the mines. The car supply is fair, but nothing like 100 per cent.

LOUISVILLE

Domestic demand lighter and dealers making first surplus accumulations of season. Steam demand good, but checked by fuel administrator. Better movement of eastern Kentucky coal to Louisville. Production about the same.

While there has been some improvement in the number of domestic orders handled during the past week, the heavy stocking appears to be over with except on orders held up for eastern Kentucky coal. At present the domestic demand is largely for one and two ton lots. A better supply of eastern Kentucky mine-run, as well as lump and screenings, is coming on this market, several retailers being able to secure a little of the grade.

The Fuel Administration is beginning to hold back deliveries to steam consumers, regulating them to the supplies as announced some weeks ago. Mining companies and jobbers have been forced to hold up numerous orders placed some time ago, and upon which only partial deliveries have been made. Present stocks must be reduced before further deliveries can be made. However as a whole the steam demand is active, although no heavy stocking can be done.

For the first time in many months some of the local retailers have been receiving

more coal than consumption is taking care of, with the result that yard stocks are improving and a few concerns have a slight surplus. Yards have been empty all season, and at the present time a number of dealers are more anxious to lay in surplus stocks than to make deliveries.

Conditions at the mines show little change. Eastern Kentucky is getting an erratic supply of cars, but about 50 to 75 per cent. regularly. Much better care is being taken of eastern Kentucky mines than those in western Kentucky, in an effort to move coal to the Northwest and Lakes. Western Kentucky is getting a 33 to 40 per cent. supply. However, labor is generally so scarce that the small car supply isn't making the customary difference. Considering the number of men employed production is holding up remarkably well.

BIRMINGHAM

Steam trade easy. Domestic demand brisk. Production lagging, and little improvement, if any, over previous week. Labor shortage, and in some instances lack of adequate car supply holding production far below normal.

Inquiries in trade circles elicit the information that the steam coal market is in a much easier condition now than for several months past, some rail lines having accumulated a 30-day stock, and consumers generally are in a more comfortable position as regards fuel. There is ample business being offered and in hand to prevent the accumulation of any surplus at the mines, however, and the daily output is being moved promptly when cars are in hand.

The foregoing is not true in the domestic channel, however, and there is a persistent and unabated call from the dealer, and in turn from the consumer. Receipts are fair considering operating conditions and transportation facilities, but there is no accumulation worth mentioning in the yards.

A number of mines on and immediately adjacent to the Warrior River are being badly handicapped in operation by the temporary suspension of the barge lines to New Orleans, Mobile and other port markets pending the transfer of the equipment to government control and operation. The Bamford mines, located on a branch of the Southern Ry. near Bessemer, have resumed operation after an idleness of many years.

Coke

CONNELLSVILLE

Slightly heavier production. Probable effect of new draft. Efforts to improve coke quality.

The Connellsville region is doing a shade better, both in making coke and in shipping coal for byproduct purposes. Labor performance is a trifle more satisfactory, but fears are entertained as to the effect of the new draft. Apparently this will effect some realignment in labor conditions. It ought to insure better performance on the part of miners and such oven labor as may be held to occupy "key positions," as they will lose their industrial exemption if they do not work faithfully, while on the other hand the ranks of common labor may be reduced.

Following the Fuel Administration's order effective Sept. 16, prohibiting the screening of old dumps at beehive coke works to regain coke for household use, the matter was taken up by interested parties with the Fuel Administration, resulting in an agreement whereby the operation will be placed under closer surveillance, waste of labor will be avoided and the price limit will be reduced to $5.50, the screen being reduced from ⅞ in. to ½ in. Tailings, if entirely free from dust and dirt, will be salable at $3, but it is probable that some contracts will not attempt to prepare the tailings at all. Box cars are to be used exclusively.

The Fuel Administration continues its efforts to bring about the production of better quality coke. Furnaces insist it is quality of coke, not quantity, that is interfering with full production of pig iron. Some comparisons made indicate that the furnaces in blast are producing about 3,000,000 tons a year less pig iron, or 7 or 8 per cent. less pig iron than their capacity, as indicated by past records when fewer furnaces were in blast, and the major portion of the loss is attributed to the quality of the coke available. The prevailing opinion seems to be that operators and coal miners are about equally to blame. The least increase in the amount of slate, etc., mined, decreases the output of pig iron by increasing the ash in the coke. There is practically no open market, except for foundry coke. We quote: Furnace $6; foundry, 72-hour selected, $7; crushed, over ⅞-in., $7.30; clean screenings from old dumps, over ½-in., $5.50, per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended Sept. 14 at 348,130 tons, an increase of 3110 tons, and raw coal shipments at 216,185 tons, an increase of 12,467 tons.

Buffalo—The trade is steady and sufficient with the combined output of local byproduct and ordinary beehive ovens. Local jobbers sell quite an amount of the low end of the byproduct coke at regulation prices, mainly for fuel, which run at $4.34 to $7.68 for various sizes. Most jobbers do not go into the trade, as they cannot get the foundry and furnace coke. The movement of iron ore is still heavy, being to Buffalo 1,561,149 gross tons for August and 5,434,980 tons for the season to September. The entire amount received by the nine Lake Erie ports was 7,736,791 tons for the month and 29,633,200 tons for the season.

Birmingham—The demand for coke in the local market is strong for both furnace and foundry grades, but the supply is woefully short. Production at the ovens has been far below normal for several weeks past, labor troubles, and in some instances shortage of coal, crippling the output. The closing down of the Mary Lee mines of the Alabama Company account of accidental flooding Sept. 3, has caused a heavy loss in the output of furnace coke by this company and the diversion of the output of Brookwood ovens for furnace use, this coke going largely to the foundry trade heretofore. The Fuel Administration has announced the following prices f.o.b. ovens for Alabama beehive coke, based on a net ton of 2000 pounds:

	Furnace	Foundry
Big Seam	7.00	8.00
Yolande, Cahaba, Black Creek, Jefferson	8.75	9.75
New Castle (Big Seam) Pratt, Brookwood, Nickel Plate	7.85	8.85
Empire Coal Co. (Black Creek)	....	10.50
Big Seam (Upper Bench)	8.50	9.50

Middle Western

GENERAL REVIEW

The present coal situation, in the Middle West, so far as market conditions are concerned, is peculiar. Coal that has been hard to get throughout the season is now being offered freely. In fact, practically the only coal which is sold without difficulty, and at full Government prices, is the higher grade products from the southern Illinois fields.

As a rule, except in some isolated localities, the domestic dealers have on hand all the bituminous coal their sheds and bins can hold. Generally speaking, this puts the retailer in a position to pick and choose, and naturally, he is now going to purchase only the best he can get.

The steam market is weak, especially for screenings, for two reasons—first because the average manufacturer has a substantial storage pile, and second, because numerous fires, caused by spontaneous combustion, have broken out in a great many storage piles. These fires have naturally caused the steam users to issue instructions, holding up the balance of their respective unfilled orders and, as a result, the market has been actually glutted with both mine run and screenings.

MILWAUKEE

Coke advanced 75c. per ton, despite the Fuel Administration's order making a cut of 30c. Byproduct companies hold that they are within their rights. Coal receipts continue heavy.

There have been no price changes in either hard or soft coal since last week's report. Retail dealers are taking no new orders for anthracite, as a rule, as they are barely allotted enough by the dock men to enable them to fill orders now on hand. Coke is also practically out of the retail market.

Coke is now selling at $11.50, an advance of 75c. The increase in price caused considerable comment, in view of the fact that the Federal Fuel Administration recently announced a cut of 30c. per ton in coke, except in the States of Alabama and Washington. Milwaukee coke producers claim, however, that they are really selling at 75c. less than the official schedule, and that they are entitled to $12.50 per ton. They hold that the base price of coke at Connellsville, Penn., is $6.20 per ton f.o.b. cars, after deducting the 30c. ordered by the Fuel Administration. Adding the freight rate from Connellsville, or $3.75, brings the total cost of coke landed in Milwaukee up to $9.95 per ton. These figures are increased by the addition of $2.25 per ton, the margin allowed coal men from vessel to cars or delivery wagons, making the total $12.20 per ton. These figures are held to be specious in a way, inasmuch as the freight rate on the soft coal used by the byproduct companies is 55c. per ton, and the $2.25 margin from vessel to cars and wagons is designed for yards handling coal solely as fuel. The cost of handling the coal from vessel to the ovens is in reality a byproduct expense. The leading byproduct company here claims to be 75,000 tons short in its coal supply, with no prospect that the shortage can be made up before winter sets in.

Coal receipts by lake thus far in September aggregate 61,228 tons of anthracite and 348,510 tons of bituminous, making 426,205 tons of the former and 2,494,922 tons of the latter thus far this season. As there are close to three months of navigation left, these figures are capable of being greatly increased.

ST. LOUIS

A continued quiet easy market with no demand for anything and steam sizes heavy. Country demand easing up. Domestic business almost at a standstill. Cars more plentiful and transportation better.

The market continues quiet, with nothing to indicate that there will be any change. The steam market is unusually inactive and screenings, mine-run and other steam sizes are heavy. The tonnage of this coal that formerly moved to Chicago is not going in that direction on account of storage piles being afire. Locally there is very little steam storage. The domestic demand is easy everywhere and the expected heavy demand from the country has not materialized.

In the Carterville field cars are a trifle more plentiful and transportation has shown improvement; the bulk of this coal still goes to the railroads and the rest is moving north on account of the zone restrictions, which will prohibit it moving into Minnesota after the 30th of this month. As a result little is going into the southern and St. Louis market. The past week was an unusually poor one in that field on account of the Illinois registration and primary, and the county fairs.

Similar conditions exist in the Duquoin field, with little of this coal moving in this way. There has been an usually heavy surplus of domestic coal and other sizes in the Mt. Olive field. Some companies have had a hard time keeping their mines going on account of no orders. A good tonnage of this is moving to the north, but not in sufficient quantity to relieve the local conditions.

In the Standard field the surplus continues, but to a greater extent, and many operators have had trouble keeping their plants running on account of having no place to ship their coal, and this is likely to continue for some time. The car supply in this field has shown considerable improvement the last week and transportation is better. The prospects are good for a rather quiet four or five weeks for the mines in this district unless something unusual occurs that will bring the coal into the northern market.

A little Arkansas moved in the past week. The St. Louis Fuel Committee held a hearing on byproduct coke and asked the producers to agree to a reduction of from $9.90 to $9. This will make the retail price on domestic coke $12.50, which would be the price of anthracite at this time. Gas house coke, prepared sizes, is $11.75, and lump $11.25.

The prevailing market is per net ton f.o.b. mines:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.55@2.75	$2.55@2.75	$2.40@2.70
3x6-in. egg	2.55@2.75	2.55@2.75	2.40@2.70
2x3-in. nut	2.55@2.75	2.55@2.75	2.40@2.70
Washed:			
No. 1	3.05@3.20	3.05@3.20	.....
No. 2	3.05@3.20	3.05@3.20	.....
No. 3	3.05@3.20	3.05@3.20	.....
Mine Run	2.35@2.50	2.35@2.50	2.20@2.30
Screenings	2.17@2.32	2.17@2.32	1.50@1.60

Special preparation on Carterville is 10 cents extra.
Williamson & Franklin Co. rate is $1.10.
Other fields 95 cents.

COAL AGE

Volume 14 — New York, October 3, 1918 — Number 14



Every scoop means a beltful of bullets — Every carful of coal means a shell

Straight Stuff

Written Expressly for Coal Age

By Berton Braley

Every scoop means a beltful of bullets,
  Every carful of coal means a shell
That'll shoot from our guns to abolish the Huns
  And set 'em to running pell-mell.
My drill barks a lot like machine guns,
  Re-echoing here in the room,
And the dynamite's sound when I set off a round
  Is the heavy artillery's boom!

So I think of myself as a soldier
  That's working down here in a mine,
And I toil heart and soul to be bringing up coal
  For the sake of my brothers in line.

And whenever I'm feeling like loafing,
  I say to myself, "You big slob,
While the boys over there all are doing their share,
  I guess *you* can stick to *your* job!"

Yes, we're all either helping or hurting,
  According to which way we act,
When you slack or you quit you're not doing your bit
  And you can't get away from that fact.
Remember you're part of the army,
  And your record in tonnage will tell,
Every scoop means a beltful of bullets,
  Every carful of coal means a shell!

IDEAS AND SUGGESTIONS

Salvaging Buried Rails

BY ISAAC HYDE
Drumheller, Alta.

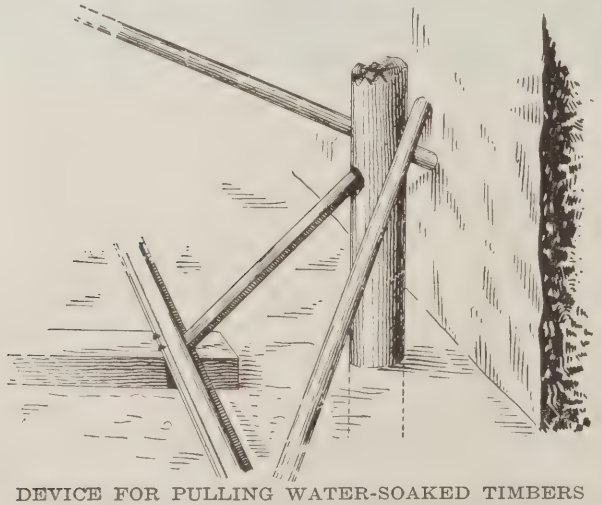
I was sent to pull out the turn rails from a pillar working which had caved, burying the rails (15 ft. long) to within 6 in. of their outer ends. I cleared the ends of the rails and fastened to each end a strong chain. I then used a Sylvester prop puller and with the aid of two men sprung the rails slightly from the spikes.

When the rails were somewhat loose, in order to facilitate getting the rails from under the cave I attached the chain to a loaded car. Starting the car as near the cave as possible, three men gave it such momentum that when the slack was taken up the pull was sufficient to draw the rail from under the cave. This saved much time over the slow process of using the Sylvester puller for the whole operation.

Pulling Heavy Timbers

BY WILLIAM LAWTON
Seattle, Wash.

While there is nothing new in the idea here described and illustrated, of a device used in removing heavy water-soaked timber sunk deep in the bottom, it may be of interest to some readers. Miners and others who have had experience in taking out old posts from the side of roadways in mines where the



DEVICE FOR PULLING WATER-SOAKED TIMBERS

ground is wet and sticky know how difficult the task is when the timber has been forced some distance into the bottom.

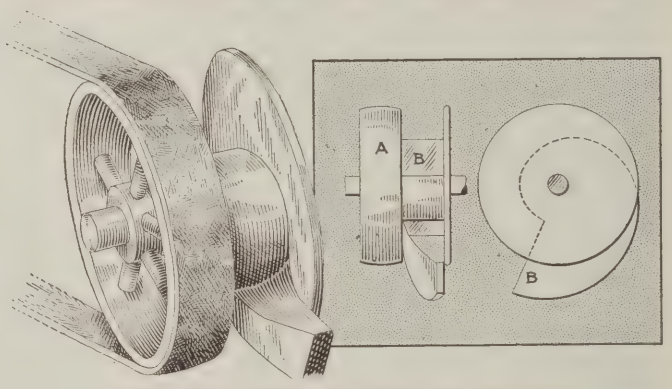
In the method here described a short brace or shore is placed against the timber that is to be removed and is prevented from slipping by the top being inserted in a notch cut in the timber for that purpose. The bottom of this brace should be secured against the rail or any other object that will give it a firm hold. Care must be taken that the brace or lifting device engages the timber at the proper angle to secure the maximum lift.

Suitable levers are now applied between the side or wall and the timber to be removed, and if the post is sunk deep the dirt in front of it should be loosened or removed to allow free movement when leverage is applied. This method is satisfactory in saving time and labor if no better means is at hand.

Replacing a Belt

BY J. A. CAHEN
Brooklyn, N. Y.

The accompanying illustration shows a device for replacing a belt that has slipped off a pulley. *A* is the pulley and *B* the device for replacing the belt. This device has a curved projection extending the full width of the face and at one end comes even with the perimeter



SCHEME TO REPLACE BELT ON PULLEY

of the pulley *A*. It then tapers laterally toward the outside edge of the device.

As a result the belt will quickly pull upon the broad end and cause the device to rotate. The belt runs up the curved projection and lifts clear of the pulley *A*, but on account of the taper of the projection the belt finally has contact with the projection on the edge only, tips over to the other side, and as a result comes in contact with the face of the pulley. Because it is under tension and adjusts itself so as to be in line with the pulley at its other end, the belt now naturally and smoothly runs onto the face of the pulley.

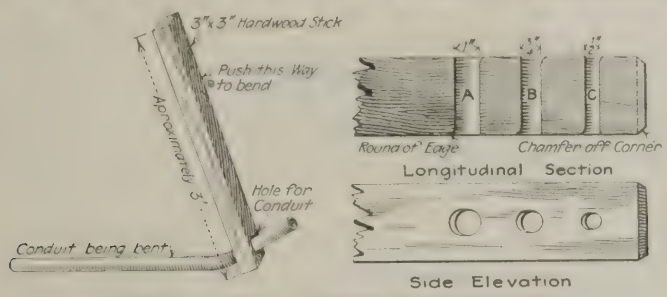
"Hickey" for Bending Pipe or Conduit

A pipe or conduit bender of a simple type is shown in the accompanying illustration. This hand bender (which is known as a "hickey") is really a sort of lever. A tool of this design is not to be compared with a metal one for continuous operation but can, particularly for ½-in. or ¾-in. pipe, be made to do good duty, especially in an emergency.

The bender consists of a 3 x 3-in. hardwood stick (hickory is excellent) about 3 ft. or 3 ft. 6 in. long, having holes or slots bored in one end wherein the

tube to be bent may be engaged. In using this device a portion of the tube is held to the floor by the operator, who stands on it, and then by using the hickey as a lever the conduit which is engaged in its lower end is bent by main force into the required form.

If only ½-in. conduit is to be bent, only one hole and that only slightly larger than enough to accommodate



DETAILS OF A SIMPLE PIPE BENDER

the ½-in. pipe is necessary. If more than one size of tube is to be bent, holes of different diameters should be bored, as suggested. It is well to round off the opposite sides of the holes on opposite faces as shown, to prevent kinking of the pipe being bent.

Heavy Towing with Motor Truck

The use of the motor truck has reached almost every industry. Some coal operators have been somewhat skeptical of its utility, but nevertheless many of these machines are being employed for heavy hauling in connection with coal mines.

The accompanying illustration shows a heavy four-wheel-drive motor truck, owned and operated by the Lehigh Coal and Navigation Co., towing an ordinary 12-ton locomotive upon a specially constructed wagon. The locomotive was transferred from one colliery to another about 5 miles away. It was necessary to climb and descend several fairly steep grades, yet the trip was accomplished without mishap.

In order to prevent the trailer or wagon with its load from running backward down hill should it break away on a grade, the method of automatic chocking shown in the illustration was employed. For this purpose a railroad tie was chained so as to drag crosswise of the road immediately behind the rear trailer wheels. So long as the trailer moved forward the tie interfered with nothing; but as soon as a retrograde movement started the tie was in position to immediately block or chock the wheels.

An Emergency Ventilator

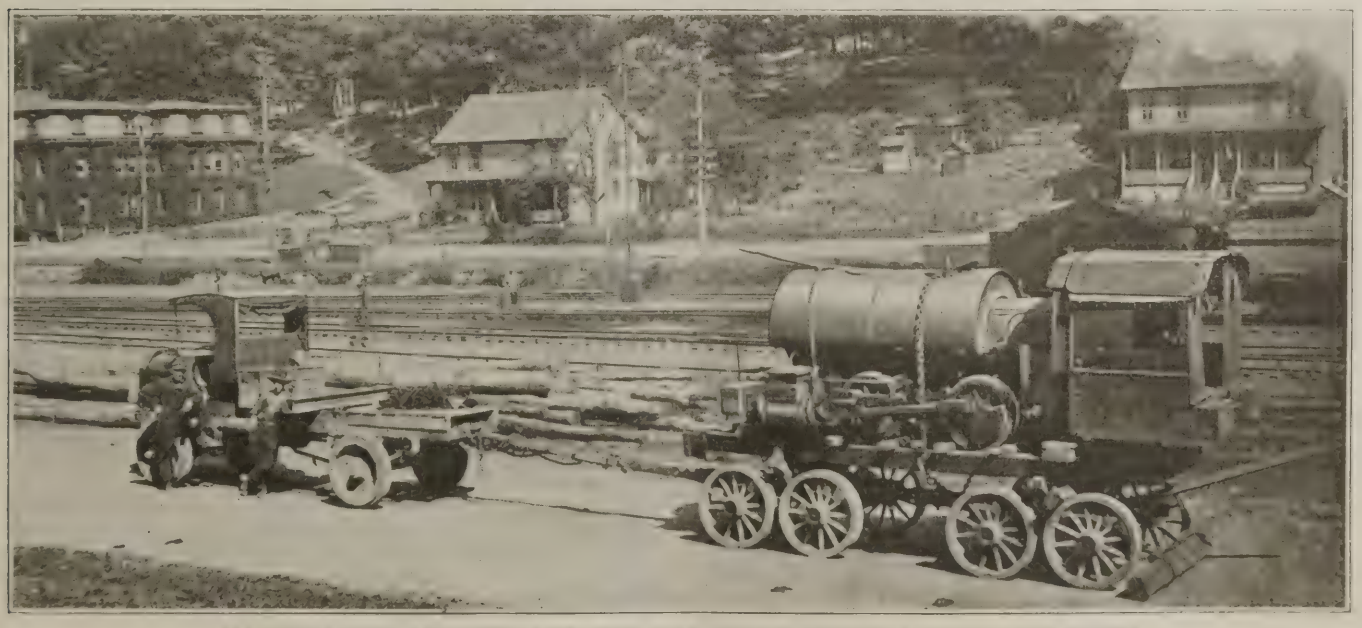
By J. W. Jemison
Nanaimo, B. C.

The accompanying photograph shows some workmen about to enter the Chase River slope of the Canadian-Western Fuel Co., of Nanaimo, B. C., which is situated about 2 miles from the company's No. 1 shaft. This slope has been closed for over 30 years. It is believed, however, that much recoverable coal exists in these old workings, and the present owners are sufficiently enterprising to attempt its recovery. It will be noticed that



BLACKSMITH'S BELLOWS SUPPLIES AIR TO WORKINGS

an ordinary blacksmith's bellows is being pressed into service to supply air to the men down the slope. This bellows is connected to a 4-in. wood pipe, which extends down the slope to the face. This scheme, crude though it may seem, filled the requirements adequately. It will doubtless be replaced whenever it becomes necessary with a multiblade fan or other modern mine ventilator.



ILLUSTRATING ANOTHER USE FOR THE MOTOR TRUCK AROUND THE MINES

Concrete Coal Barges

By J. F. SPRINGER
New York City

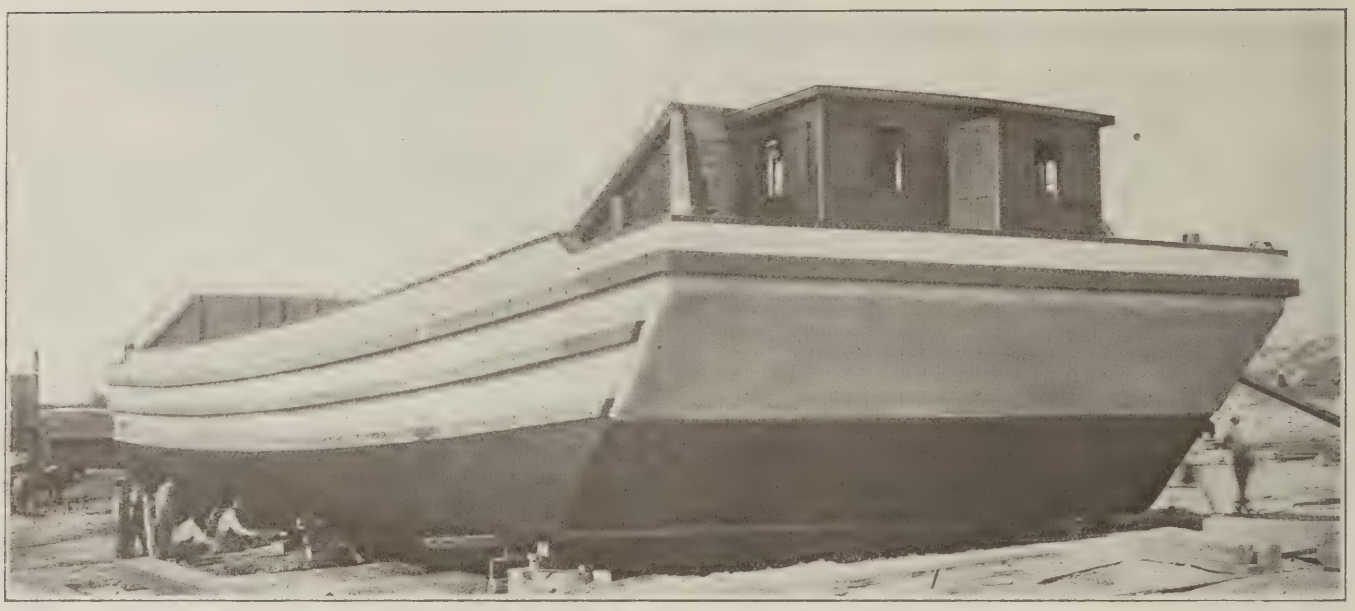


FIG. 1. A CONCRETE BARGE ON THE RIVER BANK READY FOR LAUNCHING

THE concrete boat has come. And, I rather think, it has come to stay. The great war has made it difficult and expensive to secure steel plate and timber. Thus it is no wonder that men have turned to reinforced concrete as a possible construction material, from which they might build both big and little vessels. The Norwegians, the French, the Italians, the Spanish, the English, the Canadians have all given expression to their belief in this material. So also have Americans.

As early as 1849 a reinforced-concrete boat was constructed at Miravel in France. It was nothing more than a modest rowboat. In 1917—nearly three-score-and-ten years later—this boat was said to be still in good condition. The builder was M. Lambot. Another French instance is of uncertain date, but occurred probably soon after the Spanish-American War of 1898 This was the construction of a barge 50 ft. long and 13 ft. wide. It was built for use in dredging builders' ballast, so that curved lines were unnecessary. The depth was made about 3 ft. 4 in. and a slope given fore and aft. Aside from these slopes, it appears to have been almost a simple box. "The initial cost was much less than for a steel or wooden vessel, and the expenditure for upkeep has been practically nil."

I understand that the Italians have been using reinforced concrete in coal barge or similar construction and that their experience goes back quite a number of years. An example of Italy's faith in reinforced concrete for boat construction is a coal barge built in 1906. Its capacity is 150 tons. The length is 52 ft. 6 in., the width 24 ft. 3 in., and the depth 9 ft. 10 in. In 1917, this barge was said to have given good satisfaction and that it had been constantly in service.

The Norwegians have a 200-ton motor-driven reinforced-concrete vessel in coastwise traffic. Her power unit is an 80-hp. oil engine, sufficient to drive her at 7½ knots per hour. This is the "Namsenfjord." The concern which built this boat has constructed many reinforced-concrete vessels, one at least being a lightship for the Norwegian Government. The "Namsenfjord" is 84 ft. long, 20 ft. wide and 11 ft. 6 in. deep. Her builders have contracted for an ore-carrying vessel to have a capacity of 4000 tons.

The French are going in heavily for the construction of the smaller-sized vessels of reinforced concrete. These are for coastwise and inland service. But the chief example of solid confidence in reinforced concrete for vessel construction is to be found at home. The "Faith," launched this year at San Francisco, is a 5000-ton vessel. She has already had her trial trip in San Francisco Bay over a measured course and developed a speed of 10⅓ knots per hour. The trial trip was about 40 miles in length, and made it clear that the "Faith" was going to be a manageable ship and that but little vibration was to be expected. The United States Government, since her launching and try-out, has contracted for forty 7500-ton concrete vessels.

It looks as though reinforced concrete were about to secure enormous recognition as a suitable shipbuilding material. And yet, objections have been raised to it. This is, of course, nothing more than history repeating itself. It would seem as if no considerable deviation from a beaten track could be made without an accompaniment of dead marches and dirges. In the February issue of *International Marine Engineering*, Prof. B. A. Everett, who is understood to hold the chair of Marine Engineering in the Post-Graduate Department of the U. S. Naval Academy, expresses himself doubtfully as to vessels of more than 250 ft. in length. He says:

> To sum up briefly, we are justified in expecting success for reinforced-concrete construction for barges, still-water craft and perhaps small ocean-going craft of simple form, but are entirely unjustified at the present time in expecting large ocean-going craft to be successful, and should not be led astray by undue optimism.

Professor Everett seems to fear that water, particularly salt water, will reach the reinforcement and effect corrosion and that this expanding will rupture the enveloping concrete. This is really a vital matter and not to be dealt with in a trivial manner—it is not easy to see, however, why it should not be a fatal objection to "small ocean-going craft," the "simple form" affording no protection against the penetration of sea water.

The question itself is a real one, especially in connection with coal-carrying craft used along the coast and in tidewater harbors. Concrete boats and barges for carrying coal on such inland waterways as the Great Lakes, the New York Barge Canal, the Ohio-Mississippi route, the Warrior-Tombigbee-Alabama route, etc., will doubtless come into use. We are also to expect them in service along the Atlantic coast between such southern harbors as Hampton Roads and Baltimore and such northern destinations as Providence and Boston, also on the Pacific coast between San Francisco and points to the north. Cuba and the Panama Canal may represent other points to which coal may be sent by means of the concrete vessel.

If salt water is going to penetrate to and corrode the reinforcement and thus bring about physical rupture, this should be known. But I am afraid, however, that an unfortunate error has been made in this connection. Profound differences can be made in reinforced concrete by variations in the character of the constituent materials and by variations in the proportions used. Naturally, some concretes are bad and subject to almost anything. That there are many examples of disintegrated and ruptured concrete, the disintegration and rupture being due directly or indirectly to salt water, might perhaps be acquiesced in pretty generally by concrete experts.

The unreliability of external waterproofing is admitted. This has no reference, however, to integral waterproofing—that is, to waterproofing which is incorporated into the concrete when it is mixed and in this way made an integral part of its mass.

But let us look at the matter broadly. There are thousands and thousands of linear feet of reinforced-concrete piling, struts and the like standing in salt water. Some of this has been so situated for years.

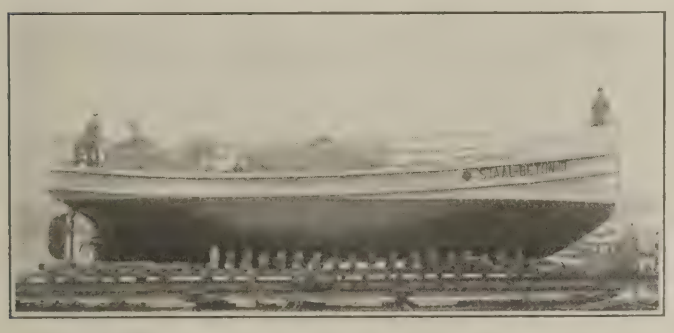


FIG. 2. CONCRETE MOTOR BOAT ON THE WAYS

Hard-headed people have been responsible for a good deal of this construction.

Many such piles were put down not so long ago in the harbor of Halifax. A similar statement may be made in connection with the harbor of Havana. These piles were put in place with the expectation of perpetual exposure to the action of sea water. If salt water is going to penetrate to the reinforcement and the reinforcement is going to corrode, then such construction should soon manifest vertical cracks and this condition should soon be followed by disintegration and collapse. A considerable proportion of the tidewater harbors all over the world contain reinforced-concrete construction of some type or other, and some of it has been in place a good while.

In Europe concrete has been successfully employed for half a century in the construction of structures

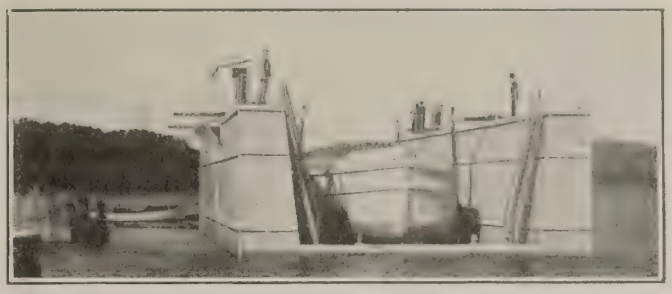


FIG. 3. A CONCRETE VESSEL IN DRY DOCK

exposed to the action of sea water. English engineers for a score of years have been building reinforced-concrete docks. At Liverpool, there has been concrete used in connection with dock construction since 1872. William Cleaver, writing of the concrete docks of the Port Talbot Dock Co., has been quoted as saying: "While reinforced concrete requires extreme care, both in the choice of material and in the supervision of the workmanship, the results justify the extensive adoption of the material for dock work."

In Holland, V. de Blocq van Kuffeler has, it seems, been responsible for reinforced-concrete construction destined for exposure to salt-water action. He is quoted as explaining in the following manner how to get satisfactory results: "A suitable mixture, very carefully manufactured, the use of a good brand of cement with trass, and setting in a moist atmosphere, are the most efficient means of insuring the preservation of reinforced concrete in sea water."

Here the integral waterproofing is trass. This is a variety of volcanic tufa found on the banks of the Rhine as it nears the sea.

C. S. Meik, a British concrete engineer, is cited by Mr. Taft as stating that the deterioration of the reinforcement in reinforced concrete by the action of salt water is negligible. In fact, Mr. Meik refers to an instance at Southampton, England. "The exposed steelwork on a pile end that had been in the sea for eight years was much corroded," but the bars in the body of the concrete were found, when the pile was opened up, to be entirely free from rust. They were pronounced to be as fresh as the day they were put in. Mr. Taft continues: "In connection with the building of some of the earlier concrete dock structures at Southampton, it appears that parts or the whole of piles not used were allowed to remain on the beach or shore, exposed to sea water, for some seven years. At the end of this period, the exposed steel had been badly rusted and deteriorated, whereas the part which was imbedded in concrete was found to be in fine condition, practically as good as the day it was placed in the concrete."

Enough instances of the permanence of waterproofed reinforced concrete can be found to warrant the expectation that it is possible to construct a reinforced-concrete

hull in which the reinforcement will be adequately protected from the action of sea water. It is to be borne in mind, however, that just any concrete will not do. The salient consideration in such construction might be enumerated as follows: (1) It must be rich in some high-grade Portland cement or its equivalent; (2) the coarse aggregate must be practically impervious; (3) it must be free from particles of clay, loam and the like; (4) the proportions of the several ingredients must be such as to insure their utmost consolidation; (5) the highest class of integral waterproofing should be incorporated into the mixture; (6) the mixing and placing should be absolutely controlled by experts.

I may illustrate the point as to the richness of the concrete by citing the material used in the hull of the "Faith." This concrete was specified to conform to the formula, 1 : 1½ : 2. Here we have a total of only 3½ parts of aggregate to 1 part of cement. This means a concrete that is not merely rich—it is one that is extraordinarily rich.

Item 4, as mentioned above, may also be illustrated by this specification. It is essential to an impervious concrete that all voids be filled. The only thing to fill the voids in the sand is the cement (or cement and water). Naturally, then, the ratio must be such that there will be no interstices. It is not enough to ascertain the volume of the sand voids and then provide just that much neat cement. For this to bring about success, the mixing would have to be perfect. There must be a generous excess to make good the imperfections in mixing. In the present case, the ratio was taken as 1 : 1½. This means that the sand was given cement to the extent of 67 per cent. of its own volume. Probably, the actual voids were not in excess of 40 to 50 per cent. If so, cement enough, and at least one-third over, was made available.

Similarly, with the voids in the rock aggregate. The only thing available to fill them is the cement mortar. Assuming—what is not quite the exact truth—that the relative amount of cement mortar is given by adding the first two figures in the formula, we have the ratio 2½ : 2 as expressive of the relation between cement mortar and rock aggregate. Probably, here again, the voids in the rock were not in excess of 50 per cent. of its own gross bulk. The specification required, nevertheless, that mortar be supplied in amount equal to 2.5 times the probable volume of voids.

As to item 2, it is fairly evident, upon a little consideration, that absolutely solid concrete cannot be made with course aggregate that lacks solidity. Item 3 requires the absence of all foreign material itself incapable of consolidation into a mass of high cohesiveness.

The integral waterproofing required by item 5 may be an artificial compound or a natural one. It must, however, fill all minute voids, and effect an impervious consolidation. Trass has already been mentioned for this purpose.



FIG. 4. MOTOR-DRIVEN REINFORCED CONCRETE LIGHTER

Item 6 has its place, not merely to round out the list, but because of its vital relation to success. All the requisite materials may be employed and yet success be perfected, because of some deviation from the best technique.

Let us now leave imperviousness and consider the question of shocks. Some may be apprehensive as to what will take place when, for example, a reinforced-concrete vessel bumps into or rams a pier. If the pier is not a good one, we may expect it to be damaged. At the worst, the injury to the vessel will probably be rather sharply localized. Naturally, there is but little information available from actual experience with concrete vessels. There is, however, a pretty good equivalent in the shape of experience with other concrete structures that have been subjected to shocks.

Shocks are of two kinds: The cushioned impact of a heavy bulk; and the rapid, projectile-like blow of a swiftly moving object.

As to cushioned impacts, a good example may be found

in the regular practice of driving reinforced-concrete piles with a pile driver. Practically the only difference between driving reinforced-concrete piles and ordinary wooden ones is that with the former the blow may perhaps be cushioned more carefully by a more elaborate system of blocks between pile and ram. The driving of reinforced-concrete piles by means of a cushioned blow is no unusual thing. It is the regulation practice. Thousands and thousands of such piles have been driven in this way. This consideration, by itself, is fairly convincing.

That reinforced concrete readjusts itself when subjected to slow-acting stresses would seem to be indicated by the case of a British monolithic reinforced-concrete building, which was in 1909 erected on 20 piers in a location subject to subsidence. In the course of six years actual subsidence took place. An inspection was made, revealing that 12 out of the 20 piles had lost contact and that there were only eight actually supporting the building.

This means that an extraordinary readjustment of stresses had taken place. Nevertheless, the investigation of the whole structure "failed to reveal any trace of weakness or strain," although the investigators paid "special attention to main beams, secondary beams and ceilings."

Another instance may be cited. A reinforced-concrete boat 64 ft. long between perpendiculars and having a weight of 58 tons was, when the deck was 50 days old and the sides 30, put under the stress of being supported at the two ends and of having the unsupported intermediate section 40 ft. in length weighted with 16 tons of evenly distributed load. The maximum shear was estimated at 26½ tons at the inner edges of the supports and the maximum bending moment at the center of the span at 419 foot-tons. A deflection of $\frac{1}{16}$ in. was observed. "There were no signs of surface cracking, flows or weakness of any kind."

A slow-acting blow was, in another instance, delivered to a reinforced-concrete pier by a vessel (of other material) rated at 8000 tons. Some damage was done, but it was confined to a few piles and some 20 sq.ft. of the decking of the pier. So much for the effects of slowly acting and cushioned blows.

The sudden blow is not an experience unknown to reinforced-concrete construction. A big explosion occurred at a British port, resulting among other things in the hurling into the air of a large steel girder. This came down endwise upon a reinforced-concrete wharf. It pierced the decking, but the damage was all localized in a section about 1 x 2 ft. in area. It is said that the adjoining beams suffered no damage at all.

No claim is made for reinforced concrete that it will resist any and all quick blows. Steel does not do this—as witness the piercing of heavy armor plate by projectiles—neither does wood. A strong, swift blow, sufficiently concentrated, must necessarily perforate any material, but reinforced concrete in such a case behaves admirably and receives only localized damage.

Another case illustrating this is as follows: On the Western Front opposite the British lines stood at one time a concrete water tank on trestlework at an elevation of some 50 ft. The Germans in retreating from the position dynamited the trestle legs, thus bringing the tank to the ground, "but according to written statements the shells which had struck the tank merely made circular holes through the sides and bottom."

From the foregoing it would appear that we may expect good behavior from a concrete boat or ship in a great range of accidents which befall both fresh and salt water craft.

A still further objection appears to have been brought against concrete boats. It is claimed that they are heavier than steel craft of equal cargo capacity. The validity of this objection will be at once admitted—at least up to vessels of considerable size. But this excess weight is not a serious objection, and has certain compensations. Perhaps the excess is sufficient to keep concrete craft out of the class of swift passenger vessels. The reason that a concrete boat is heavier than a steel vessel of equal tonnage centers largely upon the fact that it requires a relatively thick-walled hull to take care of tensional stresses. The specific gravity of reinforced concrete is moderate, being not more than, say, 2.75; while steel is heavy, having a specific gravity of, say, 7.85. Steel is, in fact, bulk for bulk, nearly three times as heavy as reinforced concrete. Consequently, the few inches of thickness required in the

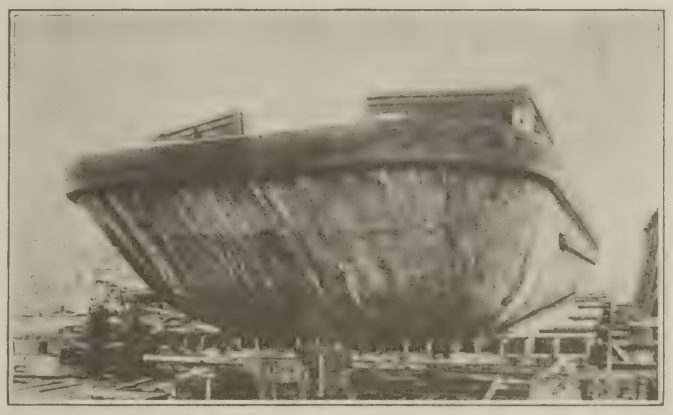


FIG. 5. A LARGE CONCRETE COAL BARGE

hull of a concrete boat do not mean such an extraordinary weight, after all.

There have been elaborate calculations showing the comparative weights of concrete and of steel vessels. These figures go up to the 6000-ton size, which is about the largest sized vessel designed for the coastwise coal-carrying business. First, we have the figures for unequipped vessels, then for vessels equipped. The latter are the more important figures, since the vessels must of course have their equipment on board. These data as given by T. J. Guerrite, are substantially as follows:

UNEQUIPPED VESSELS—EXCESS WEIGHTS OF CONCRETE CRAFT

	Deadweight Carrying Capacities in Tons			
	1000	2000	4000	6000
Excess percentages	39	25.8	16.5	11.8

EQUIPPED VESSELS—EXCESS WEIGHTS OF CONCRETE CRAFT

	Deadweight Carrying Capacities in Tons			
	1000	2000	4000	6000
Excess percentages	104	84	58	43

It is clear in both cases that while the relative excess is considerable for small vessels, this decreases rapidly as the size increases. The accompanying curves apply to decked cargo-carrying vessels in general and not to coal vessels primarily. They, however, give us the trend of the facts.

Fig. 7 exhibits the case, roughly, of concrete barges that are to be towed, while Fig. 6 shows the situation broadly governing self-propelled concrete barges.

While the former curve does not descend with the same rapidity as the latter, it is to be noted that it begins at a much lower point.

The standard size of coal boats towed from Pittsburgh to New Orleans is about 1000 tons. The curve (Fig. 7) shows that the concrete barge would be about 40 per cent. heavier than a corresponding steel barge. But, so far as I am aware, there are but few steel boats in this business, or none at all. At least the vast majority of the barges employed are of wood. This means that they are probably heavier than if they were of steel. In short, 40 per cent. is probably too large a figure for the excess weight of the reinforced-concrete towed barge over the wooden towed barge now in use.

This question of comparative weight is probably not particularly important in connection with the Ohio-Mississippi traffic, for the reason that the towboats

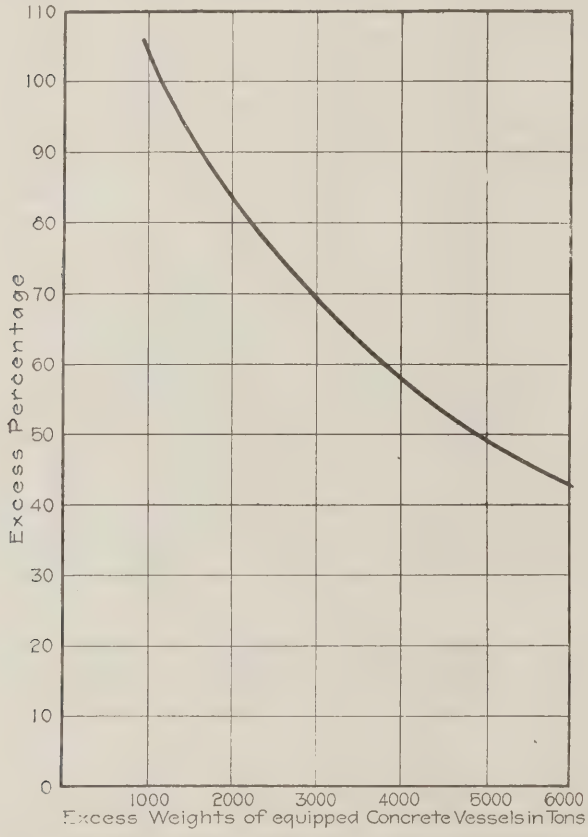


FIG. 6. COMPARATIVE WEIGHTS OF EQUIPPED VESSELS

consume relatively small amounts of fuel in their power plants as compared with the tonnage transported. Thus, the "Sprague" is one of the largest of the towboats running below Louisville (that is, from below the Falls of the Ohio), and yet its horsepower is rated at only 2175. The tonnage towed by this boat varies; but she has handled up to 56,000 tons loaded on 56 boats. The "Kaiserin Auguste Victoria" had, I understand, a cargo capacity of only about half this amount and yet her horsepower was 17,200.

Evidently, then, the handling of tonnage is an enormously different matter when done on inland rivers from what it is when done on the high seas. Thus even if reinforced-concrete towboats are 40 per cent. heavier than wooden ones, this difference will not play any big part in the operating costs.

As to coastwise coal traffic, we have both types of boats, the towed and the self-propelled, to consider. Offhand, one would say, after looking at the curve of Fig. 6, that it would seem that it would be mainly the bigger boats that would be profitable. Towed boats, it would appear, might well be larger than 1000 tons and thus secure the advantage of lesser weight.

As to the comparative costs of reinforced-concrete vessels and steel ones, it has been estimated abroad that on a pre-war basis the concrete hull would cost about 30 per cent. less than a steel hull of the same deadweight carrying capacity. The equipment for power-driven concrete vessels would be, however, about 5 per cent. greater.

One condition that we have now to reckon with is the possibility that it may soon become not merely difficult but impossible to secure steel plate for the purposes of barge construction. After the war, we may expect a continuing difficulty and also a stiff price because of the demand for steel that will be needed for reconstruction in Europe. Likewise, wood will probably continue expensive and more or less difficult to procure.

A further economic argument for concrete relates to the maintenance expense. This is an important point.

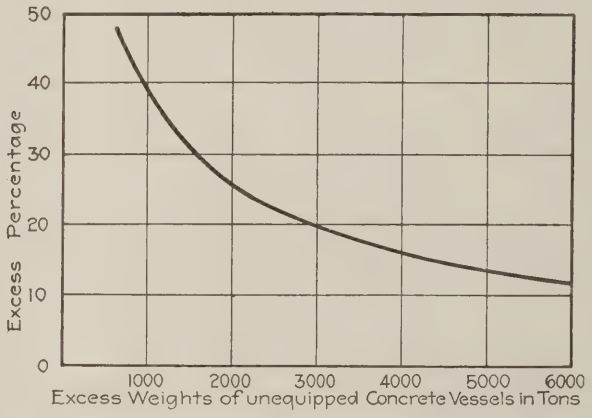


FIG. 7. COMPARATIVE WEIGHTS OF STEEL AND CONCRETE VESSELS

We have, perhaps, but little actual experience with concrete boats to fall back upon, although we have some, but we do have a big experience with other forms of reinforced-concrete construction. The 50-ft. barge previously mentioned is understood to have necessitated no expense whatever for its maintenance. We have knowledge of the ease, rapidity and inexpensiveness of ordinary concrete repairs, and would naturally expect the same to apply to boat repairs as well. Probably, nearly all repairs will be susceptible of execution as the boat floats in the water. This includes repairs to submerged portions of the hull.

For quick and efficient work after a mine disaster has occurred, a map of the mine is indispensable. Blueprint copies of the mine map should be furnished the captains of the rescue crews, the shift bosses and the official in charge of the recovery work. If a supply of maps is not available one map should be posted near the mine entrance for the convenience of all concerned. A line sketch of a map can be quickly made by an engineer and will be of much advantage to the rescue and recovery crews. Experience has proved that at least a dozen blueprints of the mine map should be kept at all times in close proximity to the mine.—*Rescue and Recovery Operations in Mines.*

Rocky Mountain Coal Men Meet

THE summer meeting of the Rocky Mountain Coal Mining Institute was a joint convention with the American Institute of Mining Engineers and was held in Colorado Springs, Colo., Sept. 3 to 6 inclusive. About sixty coal-mining men were there, while more than 300 metal miners were in attendance. A number of side trips were indulged in by those present. One day was spent at Pueblo, Colo., investigating the new byproduct plant of the Colorado Fuel and Iron Co. One of the most modern coke plants in America has been erected by the Colorado Fuel and Iron Co. A. C. Watts, chief engineer of the Utah Fuel Co., who has been serving as president of the Rocky Mountain Coal Mining Institute, was again tendered the office, but requested that the institute relieve him of the responsibilities. Thereupon John McNeil, one of the pioneer coal men of Colorado, was elected president. F. W. Whiteside was reëlected secretary-treasurer. All of the meetings conformed to the spirit of the times and bore a war flavor. The discussions as well as the papers that were read dealt primarily with safety and efficiency in mining. Practically all of the "regulars" were on hand, except a few of the familiar faces from Wyoming, and although Colorado is now in the "dry" column of states the crowd managed to shed its war worries and renew the ties of goodfellowship after a year of suspended activity due to the war. Following are some of the papers read.

Wartime Economies

By George B. Pryde
Cheyenne, Wyo.

IT WAS suggested to me when I was asked to write this paper that on account of the war activities affecting every phase of our industrial life the subject should be along war lines. I have therefore chosen war economies as a subject particularly applicable. There are many kinds of war economy that might be reviewed, but I shall consider only those things that apply to the mining of coal, as this more directly concerns us. At a time such as this, when priority orders are necessary to obtain supplies that are absolutely essential to the production of coal, it seems it is obligatory for us to practice the most rigid supervision in the handling of material of all kinds so that none may be wasted; indeed, this is a national necessity as well as a duty that devolves upon us.

Allow me to call attention to one phase of mining in which there is considerable waste; that of lubrication. This is a subject, I am afraid, that is often given but little attention. When we consider the large amount of machinery that is necessary to operate a modern coal mine, and that all the bearings must be properly lubricated to insure smooth working and normal life, as well as to prevent serious breakdowns, you will readily understand how necessary it is to provide for and insure proper lubrication.

Much good can be done in this direction by the large oil companies, who have trained men in the field and are always glad to be of assistance. The proper kind of lubricants for certain kinds of machinery should be given careful and serious consideration. It may not always be a question of providing the most expensive lubricant and relying upon this to be sufficient. Great care must be exercised in studying the conditions under which the machinery must operate, and then applying a suitable lubricant thereto.

The condition of mine machinery in regard to lubrication is so familiar that it would seem to be unnecessary for me to call attention to it. In fact, this might be classed as one of the subjects that become stale by repetition. Too often the person who is charged with the care and operation of machinery seems to think that the machinery itself will operate more smoothly if covered with oil and grease, forgetting that the proper and only places to lubricate are the bearings and rubbing surfaces. I believe I am safe in stating that if proper attention were given to this subject at least 15 per cent. of our bills for oil and oil products could be saved. At a time when these products are in strong demand for the prosecution of the war—for the ultimate triumph of humanity—it would seem to me that this is a subject that is of national importance and one that demands of us the most serious and earnest consideration looking toward eliminating waste and making for greater economy.

The subject of blasting and blasting material is one which also plays an important part in our mining operations. On account of the large amount of explosives that are being used today in the world war, and the increasing cost of our mine explosives and supplies, frequent inspection of the methods of storing, distributing and using should be made to prevent either waste in handling or the overcharging of holes. Many of our best blasters have gone into the service of the United States and into other occupations, and the new employees at these jobs are more or less unskilled. Thus the necessity for this inspection is immediately apparent.

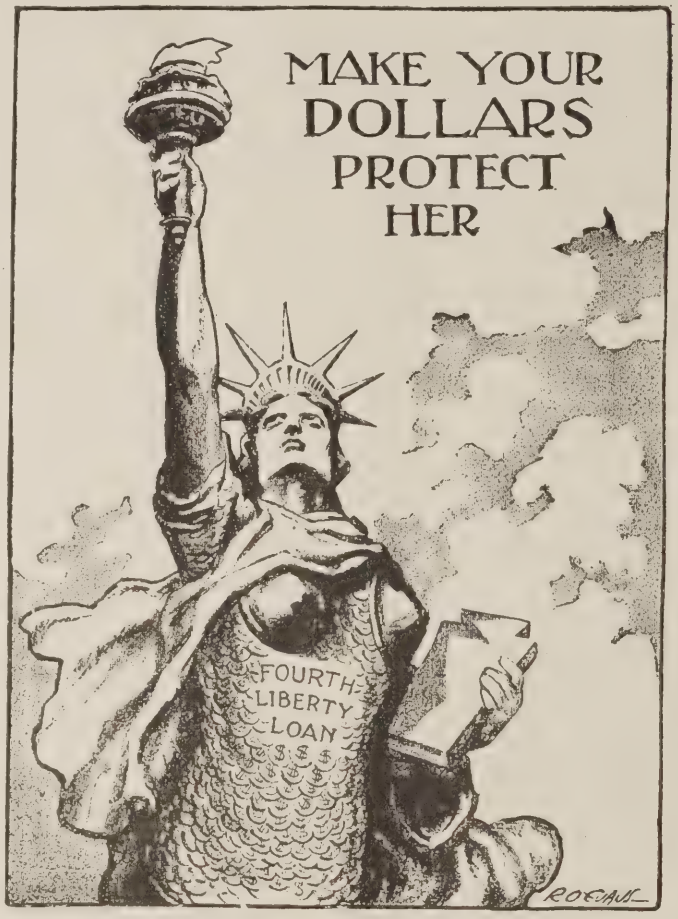
The substitution of duplex iron wire for copper wire in blasting will be found to produce a considerable saving. The wire is used in connection with No. 6 dry cell batteries, and when electric cap lamps are used in the mines the lamp batteries are employed for blasting purposes. The foregoing may seem a small item, but when the high cost of copper is considered, the annual saving, especially in large operations, will be considerable.

In pillar work, where motors are used for haulage, it has been found a good system to use galvanized iron wire in the vicinity of the workings. In this kind of operation sudden caving frequently occurs burying and losing the trolley wire. Since galvanized iron is cheaper than the copper wire, the saving is evident.

For distances up to 2500 ft., on motor roads where 16-lb. rails are employed, it has been found economical to use old wire rope for a return. The rope used is generally from $\frac{3}{8}$ to $\frac{7}{8}$ in. in diameter, and is laid alongside of the rail together with a No. 6 bare copper wire. The rope and copper wire are tied together every

60 ft. and cross bonds to the rail are put in every 150 ft. This provides a good return, saves the labor of drilling and bonding the track, which is quite an item in these times of labor stringency, when it is necessary to conserve every man possible for the actual production of coal.

In erecting a high-tension power line recently, it was found that good results were obtained by putting the cross arms and insulators on the poles before raising them. To do the raising required considerably more men; but as unskilled laborers were more plentiful than skilled linemen, and time was an important consideration, the experiment was tried with good results. This may not be in accordance with common practice, but on account of the prevailing labor conditions the method worked out satisfactorily, and the line was completed in fairly good time; certainly in a much shorter time than if it had been found necessary to wait for a sufficient number of trained linemen to complete the work. While the figures are not yet available as to the cost, I am sure that it will compare favorably with erecting the poles and then putting on the cross arms and insulators, even though more unskilled laborers were required. In connection with the stubbing of pole lines, it has been found that the reinforcing with concrete at the bottom of the poles has worked out satisfactorily. This system is nothing new, as it has been followed for several years, but as between stubbing and concreting I consider the latter preferable as a war economy, because the work can be done with common labor, whereas the stubbing requires that more or less of the work be performed by skilled linemen. The concreting is much more durable and has the merit of saving skilled labor, and anything that does this may be classed as a war economy.



The use of steel ties has been experimented with to some extent for several years, and these experiments have reached the stage where the use of such ties is recommended, especially in low seams. They are particularly adapted for this kind of work, for they provide a good rigid track and give greater headroom than the ordinary wooden tie, thus cutting down the taking up of bottom to provide sufficient height for haulage purposes. They are easily and quickly laid, and while they will cost about twice as much as a wooden tie, their longer life and adaptability as a labor saver recommend their more general use in mining low seams.

The war has made a heavy demand upon our timber resources, not only in this country, but in all of the countries at war. In France many of the finest forests have been destroyed by fire and shell, and it will take years to replace that which has been destroyed and grow timber to take its place. On account of these conditions in Europe there will continue to be a heavy demand upon our timber resources for many years to come, both for use in our manufacturing industries and for shipment abroad. The conservation of mine timber is something that should demand our serious consideration. Timber is one of the most essential materials which we use in mining work, and before many years substitutes of steel and concrete or both will be required, and the cost of these will be much greater than that of timber. There are two ways by which timber can be conserved; namely, treating the timber that is to be used in permanent work, such as for timbering haulageways, main air courses and the ties for the main haulageways, and the recovery of timber in rooms and pillars. When it is considered that an 8-ft. prop at the working face costs about 50c., it will be understood that it does not require much effort for a man to recover enough timber to make his work attractive from an economical standpoint. The objection may be made that this is dangerous work, likely to increase the casualties; but with the different kinds of mechanical prop pullers on the market today this work can be made fairly safe; in fact, as safe as any other operation, if men of good sound judgment are used to do this work. In the mines of Europe for a great many years the subject of recovering mine timber has been given close attention, on account of the high cost of this material, and these conditions are rapidly approaching in this country. It is safe to assert, I am sure, that not more than 5 per cent. of the mine timber put into American mines is ever recovered; but more and more this question will demand our serious and careful consideration, from the standpoint of conservation and national economy.

Previous to the war, all mine supplies could be purchased at a very reasonable price; in fact a good deal of machinery was scrapped because it was nearly as cheap to buy new machinery or new parts as to repair the old. Now this condition is changed, and with the high prevailing prices of all machinery and supplies, and the slow delivery, I am sure it would be a good idea to give the scrap piles at the mines close

scrutiny. No doubt we shall find much material that can be used over again, thus saving new supplies. It may not be just what is wanted, but with minor changes it may be possible to substitute and adapt it to requirements. Care should be exercised in scrapping material these days, and old material should be used and worked over as much as possible because labor is a scarce commodity today, and anything that will save a man's labor and relieve him for some necessary work is worth our greatest efforts. We will be doing our bit toward winning the war, just as much in this way as in any other.

Of course, I do not wish to be misunderstood, or to be taken to mean that in advocating the use of scrap that new material should not be ordered, as a certain amount of new material is necessary; but I certainly would watch carefully indiscriminate scrapping.

On the other hand, material that has been definitely scrapped should be removed as rapidly as possible, not only from the standpoint of cleaning up the plant, but more particularly because the nation needs it in the prosecution of its war work. It can be rapidly converted into new material with a minimum of labor, and so we owe it to ourselves, as well as to the nation, to see that this material is used as a national asset.

Much guessing is being done today as to what will happen after the war. More particularly the probable effect of the after-war conditions on our labor supply is being closely studied and forecasts made. One guess is just as good as another these days, because events from a social and economic standpoint are changing so swiftly as to make our views and beliefs of yesterday past history tomorrow.

Some people tell us that on account of the heavy taxes that will be necessary for the restoration of the countries at war the laboring men of these countries will flock to the United States to escape taxation; others tell us that there will be so many opportunities for business of all kinds after the war that many of our foreign-born citizens will return to their own countries in preference to continuing their residence here. Regardless of these different views, I believe it is reasonable to suppose that on account of the rapid depletion of their man power by the ravages of war, stringent laws will be passed by the present belligerents against emigration; in fact, I believe that inducements will be made for those of other nationalities to settle in these countries.

On account of the vast work of restoring those nations which have been at war, much of the material for this work will have to be furnished by the United States. It looks, therefore, as if we will have a labor shortage for years to come, particularly in coal mining. Many of the mines of Great Britain have been shut down during the period of the great war, and it will take years to put them on a producing basis. Some of the most productive mines in France and Belgium are in the hands of the Germans, and when these are returned, they will be so badly wrecked that it will require years of patient effort to put them in operation again, while some it may not be wise to reopen at all.

All this would indicate that the United States must supply the coal deficit of these nations for years. This will mean that we will have to improve our methods of production, and the only way to do this is by a greater use of machinery in the mines—increasing the number of haulage motors, the cutting of a large percentage of coal with mining machines, the greater use of electric drills and loading the coal mechanically. Probably the item that appeals to us most is the last one mentioned, for while many loading machines have been tried out in the last few years, few have been successful. In the high coal beds, where the roof is good, the loading of coal by electrically operated shovels does not present many difficulties. What is wanted today is a loader that will operate successfully in beds from 6 to 12 ft. high.

I am in hopes that after the war, when so many men will return to civil life with good mechanical training, someone will work out a shovel with few moving parts—one that can be operated by one man. A shovel of this kind that could load 50 tons per day, and could be put on the market at a low cost, would be much better than one that could load 150 tons per day where the cost and maintenance are high and where several men are required to operate it. For coal under 6 ft., conveyors will come into more general use through a system of longwall or modified longwall operation.

Increased Production in Wartime

By R. M. Magraw
Hiawatha, Utah

In This paper I will not attempt to show the relationship of coal to war, but will endeavor to indicate, by a few suggestions, methods which appeal to me as being worthy of consideration. Some of these, if followed, might lead to increased production.

Everyone should be thoroughly familiar with the importance of coal in the present crisis. The daily papers, technical publications and other periodicals have from time to time contained articles dealing with some phase of the situation. And among other commodities which it has been stated would win the war, coal, I believe, occupies a commanding, if not an impregnable, position.

This has been called a "war of science," and certainly more than ever before have scientific appliances and methods been called upon as an aid to man power by all of the belligerents. Brute strength without scientific backing would be impotent. Had it not been for the perfection and precision of the French field pieces at the first battle of the Marne, we would probably now be fighting the Huns on our own territory.

The coal industry was formerly held in low esteem by the public. Persons employed in it were looked upon with commiseration and pity by the average citizen, whose knowledge of coal mining and its importance to the industrial life of the nation was slight. At the present time, however, it is doubtful if there is a man in the United States who questions the importance of the coal mines. There seems to be also a much greater respect shown for the industry, and for its employees. But, lest we merit a return of the public to the first mentioned attitude toward us, we should utilize every scientific method known, not only to increase the output of our mines but to so prepare our product that the greatest number of heat units can be transported and stored in the smallest possible space.

Proof has been adduced that the coal shortage was and is due more to lack of adequate transportation facilities than to inability on the part of the coal mines to rise to a situation, which is acknowledged to be serious in the extreme. Notwithstanding the patriotic efforts of a majority of the mine operators and their loyal employees, the situation grows more acute and we are falling behind the schedule set by the Fuel Administrator as being necessary to maintain if we are to avoid a serious shortage in the near future. Placing the blame on the transportation lines, however, does not absolve the coal mines from all responsibility, neither does it utterly condemn the railroads, as the fault is not entirely theirs. They have been hampered and heckled by Federal, state and local legislation, and so-called regulation for years. And while it is true that the "public-be-damned" policy, inaugurated by some of the earlier railroad magnates and followed by others at an even later date, was responsible for the spirit of antagonism and lack of sympathy to all transportation companies, shown by both press and public, it is also true that the attempted regulation was carried to an extreme, with the result that all incentive on the part of the railroads to expand and prepare for the future was removed. Furthermore, the herculean task suddenly imposed upon the transportation lines, as a direct result of the entrance of the United States into the war, was so far in excess of anything that could have been anticipated in peace times that some allowance should be made for their temporary inability to meet it. The blame, if any, seems to rest with the American people as a whole and not with any single industry or class of individuals.



Government ownership may solve transportation difficulties, but it will be found necessary, before the problem can be classed as one of those which we have met and answered, to furnish the railroads with a much greater supply of rolling stock and motive power than they have had at any time, past or present. Judging from orders placed for new equipment this year, however, the end is not yet in sight.

As stated above, it is conceded that the entire responsibility for the coal shortage does not rest with the railroads, although the tonnage lost today through lack of cars is just as impossible of recovery as that lost through mine disability or failure of men to report for work.

It has been proved conclusively that nothwithstanding the inroads of the draft, voluntary enlistments and loss of men to munition plants, ship yards and other establishments offering special inducements, the men remaining in the industry can, if certain factors entering into the equation be given proper consideration, produce all of the coal which seems necessary at this time. The problem before us is, however, to so coördinate the various factors that the result may be obtained before it is too late. Since at least one of these factors is an unknown quantity—namely, the personal equation—any preliminary figures are apt to be subject to correction. Petty strikes and malingering by individuals who either refuse to do an honest day's work when under ground or who persistently lay off one or more days per week, are responsible for the next greatest inroad on production after lack of transportation. The first mentioned cause is difficult to control, and unless the men can be made to see that the success of our armies abroad is more vital than some paltry victory of their own over an operator, who in all probability would have gladly mediated the affair with them in the first place and thus avoided a shutdown, it may grow to be a menace to our very existence. Laying off without a justifiable excuse is also difficult to handle, although it appears to me that a stiff fine, payable to the Red Cross or some other recognized association, would in a large measure curtail the evil.

The very human desire on the part of the miner to better his condition and to try the unknown is responsible for a continuous movement from camp to camp and from field to field, with a resultant loss of man power. This, while hard to calculate, must entail a great potential loss of tonnage to the industry as a whole.

With the company with which I am connected the labor turnover amounts to from 15 to 20 per cent. per month, and I feel safe in saying that these figures will hold good for the entire State of Utah. It thus readily can be seen that if only one or two days are lost by each

individual between the jobs the aggregate loss of tonnage is considerable, even in a small producing district, such as Utah.

A system of registration under the "work-or-fight" ruling, whereby the employee would be given a card each month upon which would appear a statement from his employer showing the number of shifts worked, actual efficiency of the individual and time lost without just cause, which card would have to be submitted to someone in authority and the miner assessed a penalty for failure to work, before another card could be issued, would in a large measure eliminate this source of loss.

Drunkenness, of course, contributes to a certain extent as a cause for loss of time. However, I do not believe that the coal miners, as a class, are any more prone to drunkenness than any other like number of men in other industries. The active solicitation of men by unscrupulous operators should be prohibited. This situation could be handled efficaciously by the Federal Administrator and another leak thus stopped.

Payment of so-called bonuses by operators, whose mines are either deficient through natural causes, by lack of knowledge on the part of officials, or insufficient capital wherewith to properly equip them, should be prohibited and these mines, except in rare cases where they constitute a sole source of supply, should be closed down and the men there employed transferred to other mines where greater efficiency could be secured. Undoubtedly there are mines working thin coal beds where the output per man per day may be high under the circumstances, but it is possible that by shutting down some of these operations and concentrating the men in mines where thicker seams prevail that a much higher tonnage per man per day could be secured.

The operation of so-called wagon mines, where shipment is made by rail, should also be discouraged, except in certain instances where it might be proved that the mine was efficiently operated and did not add to the scarcity of railroad equipment by tying up cars unnecessarily. The opening of new mines indiscriminately, especially by inexperienced people, should be prevented, except in cases deemed expedient after due examination and favorable report by competent investigators.

Several new mines have been opened in the State of Utah during recent months, but I do not believe that they will add one ton to the production of the state for the current year, as the entire tonnage could have been produced by the older and better equipped properties if they had had ample man power. In some instances I believe that the new mines will result in a decrease in possible production. I judge that like conditions exist in other sections. Many old mines could be shut down for the duration of the war, and, if their employees were concentrated at more efficient properties, an increase in output would result.

The foregoing are only a few of the ways in which efficiency can be raised. However, lacking authority to put any of the suggestions into effect, it seems that we must go deeper into the subject and endeavor to find some means by which we can meet the present urgent demands. But before accepting any panacea as being the one most suited to our ills, we should be doubly sure that we are prepared to assimilate it.

We may, by friendly coöperation and admonition, so imbue our men with a spirit of patriotism that they will voluntarily enlist for the campaign, as it were, and thus furnish the additional coal necessary, so that intermittent railroad service can be obviated to a certain degree.

A plentiful supply of cars does not relieve the situation if the mine is unable to load them. Likewise plenty of men, all willing to do their bit, cannot produce any more coal than the company is prepared to take away from the face. The operator should therefore see that his house is in order before he places the blame elsewhere.

No excuse should be furnished the miner for failing to perform a maximum day's loading. The operator should see that all places are properly cut and shot in time to insure an ample supply of coal; that the tracks throughout the mine are in good shape so that the coal may be hauled with the least possible delay; that the ventilation of the mine is of the best so that the men can work without discomfort; that material usually furnished by the company, such as ties, rails, spikes, etc., are kept within easy reach of the working faces where they can be secured by the contract miners and others with a minimum of delay. The safety of the mine as a whole, as well as that of each individual, should be given constant attention, as even minor accidents tend to curtail production.

Breakdowns of machinery should be eliminated as far as possible. This can be done to a large extent by making frequent inspections and having repairs made as they become necessary. Duplicate repair parts for essential equipment should be carried in stock wherever possible, and all large mines or companies operating several mines should have facilities for making repairs on the job. These should cover everything but the largest and most complicated parts.

Mechanical devices used in connection with coal production should be of the latest and most efficient types. Inefficient equipment should be scrapped wherever pos-

Our Industrial Part

SOME observers think that the most characteristic thing about the American soldiers in France, something which astounds the enemy and excites the admiration of our allies, is the capacity of the American soldiers to do individual thinking and fighting. The German fights successfully only in mass formation, in organized bodies, while every American soldier has an initiative and independence of action which gives him remarkable efficiency in open fighting. They are not senseless cogs, but each is an individual working unit in a great fighting machine. Every American at home should feel an individual responsibility and do his or her individual part in winning the war. There is not an American citizen who can not help win the war. The Fourth Liberty Loan drive, which began on September 28, offers a great opportunity for concerted action and for individual action, and the loan will be a tremendous success if each American will do his or her individual part as each American soldier in France does his part. Our soldiers deserve such support from the people at home.

sible. Mine development should be kept in advance of reasonable production needs. Where possible, modern methods of working should be adopted. It is believed that, if all the mines in the country where such a method of operation is practicable, were worked on the retreating panel system, that the efficiency would be so increased that there would be no possibility of a shortage in production.

Almost every mine can, by the expenditure of a little money, increase the tonnage per man appreciably, and in many instances such increase could be made to run as high as 25 per cent. or greater. Such an increase in efficiency would not only go a long way toward solving the fuel problem, but would repay the operator many times over for the expenditure.

Employees and their families should be shown every consideration. Decent housing should be furnished and where possible the camps and surroundings beautified by lawns, trees and flowers. The employees should be encouraged to plant gardens and otherwise show an interest in their homes. This can only be satisfactorily accomplished by coöperation between employer and employee. Some little expense is connected with all sociological work, but the results are worth it.

A variety of colors should be used when painting dwellings, as the miner is entitled to as much individuality as any other small town dweller, and a camp painted all one color makes a poor showing as compared with one where taste has been exercised in selecting a diversified color scheme. As a small boy I often wondered why our Jersey bull had such an antipathy to red. In later life I decided that he must at one time have lived in a coal camp.

Amusement facilities should be supplied for both the miner and his family. This is a matter calling for a considerable outlay, but almost every company can well afford to expend a reasonable amount for the pleasures of their employees. This is particularly true in isolated camps. The education of the children should be well looked after and the school buildings should be equal to those maintained in similar centers of population in the surrounding district.

A place for religious services should be provided, and where a sufficient number of more than one denomination obtains, separate buildings should be maintained, if at all possible.

If it were feasible to adopt even a few of the above suggestions, we would be much closer to that Utopia for which even the coal miner is entitled to crave, and thus many of the problems which confront the industry would be automatically solved.

Mine Safety in Wartime

By D. Harrington
U. S. Bureau of Mines

THE feverish wartime demand for maximum output from the mines, coupled with the accompanying relaxed discipline arising largely from a shortage of labor, has in many portions of the country resulted in greatly decreased effectiveness of safety organizations and their work. This situation is not so readily apparent in regions which in the past have not had strongly organized safety work, but in those localities where a few years ago efficient safety inspections and regulations, were in effect and good records made the ill effect of present abnormal conditions is readily apparent. This is exactly as it should not be. Mine accidents not only result in suffering and expense to the victims and to the operating companies, but also the general public and the progress of the war are unfavorably affected by the loss of output not alone of those who are injured but also of other mine employees whose time and attention are occupied by the accident.

Definite statistics are not at hand as to the total amount of time lost in our mines due to accidents; however, we know that well over 2000 coal miners are killed annually in this country at this time, and a conservative estimate of the total amount of time lost due to accidents by our three-quarter of a million coal miners would aggregate at least three or four million shifts annually, with the resultant loss of at least 10 to 15 million tons of coal production.

Immense strides toward safer methods of mining have been made during the past ten years. This is well shown in the number of men killed in major coal-mine disasters, the reduction being both steady and rapid; in 1913, 464 men were killed in major disasters in the coal mines of the United States. This record was reduced to 316 in 1914, 262 in 1915 and 154 in 1916. While much progress has been made we still have with us many men of the old school of coal-mining, who insist that the safety movement is a "fad" and whose mines may in general be relied upon to be about as dangerous as they can be and yet "get by" when the state inspector comes round.

The employment in positions of authority or as safety inspectors of men whose sole qualification is many years of experience in mining, who frequently have little or no education and not much judgment, is one of the greatest obstacles to safe and efficient mining existing at the present time. Men of this type only too frequently think no mine should be considered gaseous unless it has had a major explosion, that dust cannot ignite or explode unless gas is present, that first aid is an "old woman's idea," that one air shaft is enough for any mine, that the "eating" of a certain amount of powder smoke will prolong the miner's life, that in fact conditions and methods of 20 or 30 years ago are applicable today. The time has arrived when men of this type should be used only in subordinate positions, leaving the decision of vital questions to the educated man with five to ten or more years of experience and with ability to observe and absorb present-day progressive methods.

Every mining company should have a well defined, active safety organization. Small companies cannot



He Has Given You Everything You Have

afford to have men employed exclusively for safety work, but they should have superintendent, foremen and bosses banded into a formal association with a definite head, with stated time to get together to discuss measures looking to safety (and possibly to efficiency). Some member should be designated to record data as to all accidents occurring, this data to be compiled from time to time and studied and analyzed with a view to determining causes of accident and best methods of preventing repetitions. Companies employing 1000 men or over will undoubtedly find that it will pay financially to have a man or men all of whose attention is paid to safety work, including inspections both on the surface and underground, following up accidents, keeping accident sketches, records, etc., compiling and analyzing such records, and possibly giving instruction in first-aid methods. It is recommended that the accident-record form of the United States Bureau of Mines be adopted with such modifications as may be deemed necessary, these forms being the result of many years' work and the experience of a number of authorities on mine-accident statistics.

That it pays in dollars and cents to have safety organizations can be seen by the number of mining companies that maintain such organization since the passage of workmen's compensation laws. One large mining company established a safety organization consisting of several men, and during the first year of its existence the number of fatal and serious accidents was reduced over 30 per cent. as compared with the previous year. During the next year the record was reduced by another 20 per cent. as against the first year of safety work. (In the foregoing a serious accident is considered as one incapacitating the victim for 14 days or over.) In another region a large company having a comprehensive safety and welfare organization had a record of producing nine times as many tons of coal per fatality as the average of nine other companies producing in the same field and under essentially similar natural conditions, the other companies in general making sport of the "fads and fancies" (as they styled them) of the company with the good fatality record.

While education of miners in safe and efficient methods of working is of immense ultimate value in reducing accidents, it appears that the results are slow and for immediate present-day effect the use of penalties and bonuses, together with educational work, give the best satisfaction measured in quick returns. It is found that many bosses give only indifferent coöperation in the enforcement of safety rules unless offered some incentive such as cash or some other prize for having a good accident record or for excelling the record of other bosses or departments; these prizes should be given to all bosses actively concerned in underground work, but coupled with the prize or bonus system there should be a penalty system assessing loss of money or time for non-compliance with safety regulations. The miners and other day or contract and underground employees can best be handled as to safety by penalizing them for the infraction of safety rules by a "lay off" or money fine on one hand (the money to go to some charitable purpose such as the Red Cross), and by giving prizes or bonus for keeping a place safe, for being at work a maximum number of days per month or for cutting or loading a maximum coal tonnage per month or per year.



Will You Lend It Back To Him?

It may be insisted that assessing penalties is out of the question with labor in its present state of independence. Yet if the penalty is assessed for the purpose of protecting the man from accident he cannot object seriously while the departure of an unsafe man is to be desired rather than deplored. A large portion of the present relaxation of discipline is due to over-anxiety of employers to retain labor and to draw it from neighboring enterprises. If employers would reassert themselves (as they should) in regaining control of the discipline which existed even a few years ago, it is probable that little real opposition would be encountered, if the effort was made in a tactful way. I have in mind several serious accidents in mines during the past year brought about by the victim's performance of acts which he would not have attempted two years ago because of knowledge of punishment certain to follow.

Lack of supervision is one of the most potent sources of accident and indeed of loss of life and of property in mines. The fireboss who is compelled to run through his "beat" in order to cover the territory assigned him is absolutely unable to perfom his inspection in an efficient manner. There should be sufficient firebosses to every mine to allow of the spending of at least a few minutes at every working face and to permit of walking between places. To do this the fireboss may be compelled to spend more hours underground than at present, and possibly there would be required an increased number of firebosses.

Shotfirers, too, should not be allowed to light fuses on the run, as is frequently done. In general the shotfirer should be compelled to inspect the hole and load and fire all charges. Where holes are loaded by miners the shotfirer should be required to remain underground a sufficient length of time to allow of firing all shots in a thoroughly safe manner.

Especially in the pulling of pillars should ample supervision be supplied, and a pillar boss of ability and force of character can in general more than save his salary in the recovery of props, rails, ties and coal as well as enforce safe and sane methods of work. In general, such a boss should not be required to have in charge more than 20 to 30 men, and these should be in a somewhat confined region. At this time, when extremely high rates allow miners to accumulate in a few hours what was formerly a day's wage, the miner is only too likely to seize on any convenient excuse to leave his work. Frequently, if a "straw" boss is at hand the deficiency complained of may be supplied quickly, the miner's pretext for leaving removed and the miner held

at his post. Where miners are under written agreement to remain at work a certain number of hours per day, the presence of a boss over a limited number of men will keep these men at their places whereas in mines having but one foreman and no other sub-bosses, the miners will probably leave work hours before the agreed time.

In one coal-mining locality where subscription quotas for Red Cross, Liberty Loans, Thrift Stamps, etc., were promptly and largely oversubscribed, and where miners or other camp employees even suspected of shirking in the slightest degree any of the ordinary war time responsibilities were summarily treated by the miners themselves, the amount of coal mined per man employed by the company fell from 5.03 tons per day in 1916 to 3.08 tons per man per day in 1917. This decrease in efficiency took place at a time when demand for coal was urgent and when labor was scarce, and the cause was wholly uninfluenced by any change of conditions except that the high wages of 1917 enabled the contract miners to work three to five hours per day and then have earned $7, $10 or $13, or even more, whereas in 1917 they would have remained a full shift to earn that amount. Had the company placed a sufficient number of sub-bosses in charge these men could have been compelled to adhere to their signed agreement to work eight hours per day. Moreover, this would have prevented the danger to life and limb caused by the traveling of haulageways by large numbers of contract men during working hours.



Buy a Bond—Loose the Eagle

The disinclination of miners and mine officials to change from old methods to newer and safer ones results in perpetuation of many dangerous and inefficient practices. Only too frequently is progress met with the statement "It can't be done," this statement often carrying the inference "It won't be done." In one large metal-mining district where lighting was by candle and numerous enormously expensive disastrous fires and accidents were traced directly to their use, a recommendation for substitution of carbide lamps was ridiculed by miners and mining officials alike; yet within a year candles were practically discarded and the lighting cost reduced at least 30 per cent.

In a coal mine shooting coal off the solid, using black powder, numerous explosions occurred until undercutting machines and permissible explosives were introduced; because the machines caused considerable trouble and expense for upkeep and because machine runners were hard to manage, the foreman and superintendent threw out the machine, though the total cost off coal had been reduced and the percentage of lump coal increased by use of machines. In less than a year after discarding machines and permissible explosives from this mine and returning to black powder and shooting off the solid, a disastrous explosion occurred in which two lives were lost and one-half of the mine wrecked so badly that it required several years and the expenditure of nearly 100,000 to reopen it.

This disinclination of mining men to change from obsolete practice to safe modern methods annually costs many lives and frequently results in loss of much property and of entire mines. Although almost any progressive mining man realizes the danger of ventilating even a non-gaseous mine (especially a large mine) with but one air split, yet one can find gaseous mines in many sections of the country with but one ventilating current sweeping the entire mine. Again, while it has been demonstrated repeatedly that by the use of panel mining, ventilation, fires and even explosions can be readily controlled, yet one finds entire coal fields worked on the same dangerous and extravagant system of 20 years ago, even though the natural conditions are admirably adapted to modern panel mining. It is unfortunate that even in some mines that are safe in many particulars occasional practices are allowed through carelessness or ignorance which nearly nullify the safe features.

Mines which undercut all coal by machines are found leaving the cuttings under the coal to such an extent that the shooting is essentially on the solid. In other cases the coal is undercut and permissible explosives used for the sake of safety, yet the holes are charged with seven to nine sticks (3½ to 4½ lb.), thus practically doubling the safety limit set for the amount of permissible explosive per charge. The same total amount of explosive could be employed in a perfectly safe and far more efficient manner by the drilling of a few extra holes.

Frequently operating companies allow efficient methods or practices to become dangerous and wasteful through lack of even occasional inspection or supervision, or through carelessness or even deliberate intent to discredit such methods or practices by under-officials or employees. An explosion was alleged to have been caused by shots in a coal mine supposed to be using permissible explosives exclusively. It was afterward discovered that a miner had inserted some 40 per cent. dynamite into the hole before the shotfirer came around to place the permissible explosive.

Although miners, by working three to five or six hours per day underground, are now earning wages which allow of ownership and operation by them of high-class automobiles, yet they are often disinclined

to do their work in a safe, efficient manner. A mine manager in a mine using permissible explosives complained bitterly of the increased percentage of slack coal and blamed the explosive. Upon investigation it was found that instead of the slack from undercutting by electrical chain machines, being removed, practically all such material was allowed to remain under the coal due to the laziness of the machine men. Hence this coal was shot essentially on the solid. Moreover, instead of using seven or eight holes, each charged with 1 to 1½ lb. of permissible explosive, to bring down a room face as had been the previous practice, four or possibly five holes were employed, each charged with 2 to 3½ lb. of explosive.

Furthermore, instead of firing the "buster" shots and loading out the loose coal before loading and firing the other holes, all the holes were loaded and tamped before any were fired; and when firing was started, it progressed to completion before any loading out of coal was attempted, even though frequently practically all the work of a loaded hole had been done by one already shot. When this situation was brought to the attention of the mine officials they said they had been too busy to look after such details.

One of the effects of the present prosperity of the miner, especially the coal miner, is a disinclination to take time for training in first-aid methods. Bureau of Mines representatives have much difficulty, especially in some parts of the coal-mining regions of the West, in obtaining men to whom to give training in first aid. In some places no active opposition is encountered, but comparatively few men appear for training; in other localities the instructors are told that the miners have been "first-aided to death."

Generally, first-aid training is given by Bureau of Mines instructors at night in order to avoid interfering with mine operations, and the miners are expected to take the training in first aid without being paid therefor. Nothwithstanding the heavy earnings of coal miners at this time, they seem to be disinclined to take training unless paid by the companies to do so, though in general the miner rather than the company is the beneficiary.

As an instance of the effectiveness of first-aid training for coal miners, the men of one coal mine were trained in first-aid methods and practically all injured men come out of the mine well bandaged. The men and management of an adjoining mine working the same coal bed and having practically identical working conditions gave no attention to first-aid practices, and little or no bandaging of injuries was attempted other than using old-fashioned methods. The doctor in the latter camp complained bitterly of infection of wounds, stating that hundreds of shifts of work were lost by men in his camp annually due to infection of trivial wounds, while at the camp using first aid freely there was practically a total absence of infection. War times are made an excuse for the existence of all kinds of unsafe and uneconomical practices. Notwithstanding the passage of an act to safeguard the sale, use and storage of explosives, unsafe practices and conditions both on the surface and underground are only too frequently found. Lack of men or of material or of money are alleged as a cause for non-compliance with regulations. Electric wiring is rapidly increasing underground, and many of the electrical installations are extremely dangerous. Among these might be mentioned fastening wires to posts by nails or wire or rope, setting motors on timbers that soon become oil-soaked and placing switches on posts or flimsy timber partitions. Lack of men or material is given as the reason for such admittedly dangerous conditions. Moreover, many mining companies claim that no improvements or changes should be made now, giving generally as a reason that all men should be kept on coal production. They forget that a fire or explosion caused by dangerous conditions or practices may cost many lives and result in loss of the entire mine.



On the other hand, some companies are taking advantage of high earnings to fortify their mines as to future safety. One large metal-mining company has recently embarked on a ventilation program which contemplates an expenditure of over $1,000,000. This firm has ordered surface fans with a total capacity of over 3,000,000 cu.ft. of air per minute, and in addition will have over 300 new small booster fans for underground service. This company wishes to improve the underground conditions while earnings are large and at the same time be prepared with the best possible working conditions to compete with its rivals when selling prices drop after the war.

It is quite noticeable that small mining companies in general give much less attention to safety than do the larger ones, and in general the accident record of the smaller companies is not so creditable as that of the large concerns. State mine inspectors are almost unanimous in the opinion that small mines and mining companies are much more reluctant to obey the state laws than are the larger concerns. This is somewhat unfortunate and makes the task of the inspector difficult, causing officials of the smaller concerns to charge favoritism on the part of the inspector, when as a matter of fact the real difficulty lies in the non-progressiveness of the smaller concerns themselves.

Safety men, including state mine inspectors, frequently find that their most difficult problem is to impress the advisability of safe practices upon the miners that they wish to protect. On the other hand, only too frequently mine officials are prone to carry out the letter and forget the spirit of safety practices. At time of explosion or other disaster resulting in loss of life, the local management is generally demoralized or disorganized and incapable of acting or thinking efficiently. Moreover, operating officials seldom have had experience at disasters.

The state inspector, on the other hand, has had (or at any rate should have had) experience at disasters, has a general knowledge of the mine and its personnel and is not likely to be personally affected by the death of people who are probably strangers to him. While the company officials should be on the ground to aid and assist in every possible manner, the direction of the rescue and recovery work should be absolutely in the hands of the state inspector, and state laws accordingly should be amended to give inspectors absolute authority at times of disaster. The foregoing comments are general and meant to be constructive in nature.

Minecdotes

Bow Dougherty's Ghost

Bow Dougherty was one of the most superstitious of men. The existence of ghosts and banshees was to him a grim reality; and judging from his numerous stories, he had had a world of experience with spirits of all kinds. He always admitted, however, that each new ghost scared him quite as badly as on the first occasion. Personally, the writer has never seen a ghost; on one occasion, however, I have seen Bow while suffering from the effects of a ghost scare. To me it was very amusing.

It was an idle day at the mine and several of us had been sent to do some trackwork. At noon the fireboss came along to see how the work was progressing, and as usual Bow was relating some ghost story. Dinny Curley, the fireboss, was a practical joker, and, while he was a good official, seldom missed an opportunity for fun. After we finished eating, he called me to one side and told me to wait 20 min. and send Bow to the face of the gangway for track spikes. In the meantime he went out of the gangway, climbed up an outside manway, thence to the airway and down an inside manway to the face of the gangway. After shedding all his clothing he hid his oil lamp and waited for his victim. When Bow was within a few hundred feet Dinny turned his back toward him, bent his body forward and waved the light slowly from side to side between his legs. One look was enough for Bow, and in less time almost than it takes to tell he was back with us. To say he was scared would be describing his condition mildly. We expressed doubts as to the veracity of his statements and insisted on accompanying him to investigate, but there was only one direction in which he would go willingly.

In the meantime the fireboss had retraced his steps and when he again joined the group Bow retold his story. The fireboss listened with considerable interest and then, thinking to set him right on the ghost question, told him it was he and not a ghost he had seen in the gangway. Before he could explain, however, Bow exclaimed: "Go wan, now, Dinny, you can't make me believe that." Then, holding his hands in front of him, and about two feet apart, he continued, "The ghost I saw in there had a face on him that wide."

Great Britain's Fuel Research

By Mark Meredith
Liverpool, England

It is in the highest degree satisfactory to know that the whole question of the proper use of Great Britain's fuel resources, and of the practical problems which must be solved if any large proportion of the raw coal which is at present burned in its natural state is to be replaced by the various forms of fuel obtainable from coal by carbonization and gasification processes, is to be made the subject of authoritative national investigation, and that a fuel research station on an adequate scale is to be established for the purpose. All the arguments are in favor of the pre-carbonization of coal. It would centralize power generation, free our towns of smoke and dirt, yield valuable byproducts now burned to waste, provide large quantities of liquid fuel, and conserve the national fuel resources.

The practical difficulties are enormous, many private syndicates have found to their cost, and no really comprehensive scheme can be formulated, much less carried out, until certain definite problems in coal, power and byproduct distribution have been solved. A great amount of experience and trustworthy data are available in regard to the high-temperature carbonization as practised in connection with the manufacture of gas and metallurgical coke, but as regards the carbonization of coal at low temperatures there is no corresponding body of experience in existence, and few properly accredited data are available.

The British fuel research committee accordingly sees a way clearly open for a serious attempt to determine whether an economical and efficient apparatus can be devised for the carbonization of coal at low temperatures, and whether, by the use of such an apparatus, for the carbonization of properly selected coals, products will be obtained of a collective value greater than that of the original coal plus the cost of carbonization and handling. Nor is it merely a question of process and products; but there has also to be considered whether profitable outlets for the products can be found. It is for the purpose of making a full experimental investigation into the whole question that the fuel-research station at East Greenwich is to be built, and it will be designed and equipped in such a manner that operations on an industrial scale can be conducted under working conditions.

German Pre-War and Present Coal Prices

A remarkable advance in the prices of coal has taken place in Rhenish-Westphalia since the outbreak of the war. For the first time since the beginning of hostilities, according to the *Iron and Coal Trades Review* (England), the German newspapers have published a comparison of the prices charged by the Westphalian Coal Syndicate in the autumn of 1914 and those which came into operation on Sept. 1 last. These quotations are the so-called "guiding prices" which are charged to the merchants, who base thereon the sale prices which consumers have to pay and which are consequently substantially higher than the former, as they include merchants' and dealers' profits, the cost of transport, etc. As given by the German newspapers the comparison of the guiding prices is as follows, the quotations being for coal at the mines:

	Guiding Prices at the Mines on	
Bituminous:	Aug. 1, 1914	Sept. 1, 1918
No. 1 lump	$3.33	$7.17
Washed No. 1 nut	3.39	7.41
Washed slack	2.29	5.93
Coking coal	2.97	6.79
Gas coals:		
No. 1 lump	3.33	7.17
Washed No. 1 nut	3.39	7.41
Small, over 30 m.	2.24	5.94
Small unwashed	1.73	5.19
Semi-bituminous:		
Lump	3.46	7.17
Washed No. 1 nut	3.96	7.91
Small unwashed	1.73	5.19
Coke:		
No. 1 blast furnace	4.20	9.14
Foundry	4.21	9.15
Coke breeze	2.65	3.97
Briquets:		
No. 1	3.39	7.66

W. J. MURRAY

By Floyd W. Parsons

IN the death of W. J. Murray, vice president and general manager of the Victor-American Fuel Co., the State of Colorado loses the dean of its coal-mining industry. Not many men at the finish of their life's work will leave a greater host of friends, a cleaner record of deeds performed, or a better example of strong manhood than did Mr. Murray. His life is an inspiration to all of those ambitious souls of foreign birth who have left the land of their nativity to make a place and a name for themselves in this free country of unlimited opportunity.



Few men were possessed of greater courage than was he, but his boldness had eyes as well as arms. Not many individuals were more blunt in speech, but his very directness in getting straight to the heart of a matter was one of his principal virtues, for those who dealt with him soon learned that they would not have to waste time in getting his opinion in any matter. Underneath his rather stern exterior was a heart tender in its affections and a degree of loyalty that one could seldom meet. His friends were not picked at random, nor were they selected in a moment. It required time to win a place on his list of intimate acquaintances.

Born in 1852, in the County Durham, near Newcastle-on-Tyne, W. J. Murray entered his first employment early in life in the coal mines of England, where he worked until he left the British Isles at the age of 21 to come to America. The mines were a very real memory in his life, for both his father and brother were killed in a mine accident prior to his coming here. This early disaster, however, did not discourage his ambitions in the line of mining, and only made him the more determined to conquer the physical dangers and the hidden forces that surrounded his chosen vocation.

On arriving in the United States, he spent a short time in Pennsylvania, and then headed for Leadville, Colo., where he worked in the silver mines several years. Leaving the metal mines, he again took up coal mining, locating at Crested Buttes, Colo., and the rest of his life was devoted to this business, which he first chose when a lad in England.

In 1882, Mr. Murray married Martha E. Young, who, with five of his children, survive him. W. F. Murray, his eldest son, is now engaged in coal mining in Colorado, while his other boy is at Camp Hancock in his country's service.

In 1887, "W. J.," as he was familiarly called, entered the service of the Colorado Fuel and Iron Co., as superintendent of that corporation's mine at Sopris, Colo. Twelve years later he was appointed division superintendent for the same concern, remaining in this latter position until 1903, when he went over into New Mexico to accept a place as general superintendent of what is now the St. Louis, Rocky Mountain & Pacific Coal Company, at Raton. Two years later he entered the service of the Victor-American Fuel Co., being employed first as general superintendent, then general manager and finally chairman of the executive committee, which latter position he held at the time of his death at La Jolla, Cal., Sept. 11, 1918.

He was associated with J. C. Osgood, founder of the Colorado Fuel and Iron Co., for more than 30 years, and no man in the Rocky Mountain country has done more than has he to advance the science of mining in our western fields. Mr. Murray was a member of the North of England Institute of Mining Engineers, a former vice president of the Rocky Mountain Coal Mining Institute, a Shriner, Knight Templar and a Thirty-second Degree Mason.

I worked for and with him more than a dozen years ago, and as time passed my respect for the man steadily grew, until in his death I feel that the coal fraternity to which we all belong has suffered a loss that cannot be replaced. He was one who never fed arrogance or conceit with supple knees, nor was he deceived by the surface veneer of an empty pretender. His entire energy was devoted to vigorous execution, and he wasted no time in evasion and postponement.

Fortune's chariot did not roll easily for him in the early years of his career, but just as every light has its shadow and every hill its valley, so has every life its reward for honest perseverance, and his efforts were eventually crowned with no mean degree of material success. But far above property, which at the best is only temporal gain, is the force of a good example which lives on in the characters and conduct of those that follow. W. J. Murray's life, above all else, taught the virtue of simplicity and modesty. There was no room in his mind for the pettiness of personal vanity. He had reduced life to its minimum of essential needs and thereby had raised it to its maximum real power.

May we all leave such a splendid autograph on the hearts and characters of our associates as did he. May we surround ourselves with such influences that will hold us up as straight and strong in the days of trial. Then will we end our work and attain the only worth-while reward which comes in the self-consciousness of duty performed.

Anthracite Coal Stripping*—V

By THOMAS F. KENNEDY
Scranton, Penn.†

SYNOPSIS—*The best method of removing overburden from coal depends upon many circumstances but should be decided before the contract is drawn or operation is commenced. The space available for dumping may be (and frequently is) an important factor. The contract for stripping should be carefully drawn and contain as few ambiguities as possible.*

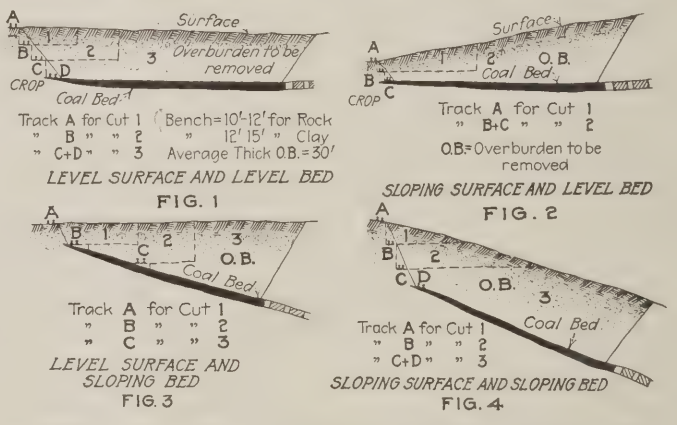
ONE of the most perplexing questions facing the engineer and the contractor in an anthracite coal-stripping problem is the method of removing the overburden. This paper will be limited to a brief but general discussion of the principles involved in the solution of this broad question. In general, anthracite coal strippings may be classified under three divisions—namely, crop, anticlinal and synclinal, the latter two being often termed hogback and basin respectively. These three divisions are subdivided according to the pitch of both bed and surface as follows: Crop—Level surface and level bed (see Fig. 1); sloping surface and level bed (see Fig. 2); level surface and sloping bed (see Fig. 3); sloping surface and sloping bed (see Fig. 4). Anticlinal—Level or sloping surface and anticlinal bed (see Fig. 5). Synclinal—Level or sloping surface and synclinal bed (see Fig. 6). With few exceptions, most of the strippings will fall under one or another of the foregoing types.

Before the method of removal of overburden can be decided upon the contractor, in coöperation with the engineer, should make a thorough study of the most important details of the problem such as the plans and specifications, amount and nature of excavation, strike and pitch of bed, surface topography, available dumping ground, drainage, water and fuel supplies, labor, and access for steam shovel and other equipment to the stripping area.

After an exhaustive study has been made, the problem resolves itself into the following: The removal of the necessary amount of material to expose the largest quantity of coal in the least time at the least expense. No set or fixed rule can be used in arriving at such a result, as each stripping problem has its own peculiar characteristics. In a fair-sized stripping proposition the contractor, if inexperienced, should employ the services of a competent stripping engineer.

In the removal of overburden several means of excavation have been used with good results, but the most economical and practicable, and the one recommended ordinarily, is the steam shovel, which has precedence over other types of excavating machinery. Electric shovels, however, have been used with good results. A few suggestions as to probable methods of removing overburden are shown in the accompanying cross-sections of typical strippings now under operation in the upper anthracite coal region. In many instances surface features will control the method of procedure in starting the cuts. Strippings in the upper anthracite region have an average overburden thickness of 30 ft. with few exceptions.

Fig. 1 shows a series of cuts whose total sum of vertical heights amounts to approximately 30 ft., which is considered the maximum height of clay cut. In solid rock, cuts 10 to 12 ft. deep seem to be the most economical. In such instances the small steam tripod drill can be used effectively in breaking up the rock into sizes that can be handled easily by the steam shovel. Jackhamers are sometimes used for reducing the larger masses of rock. In clay and soft shale, cuts up to 30 ft. can be handled economically. In soft shale rock the churn drill can be used advantageously. Holes 30 ft. deep can be drilled cheaply, and when properly charged and fired these do effective work in breaking down the shale into sizes small enough for the shovel to handle.



FIGS. 1 TO 4. RELATION OF COAL BED TO SURFACE

In Fig. 1, cut No. 1, or the first cut made, is known as the thorough cut, which often involves a question of drainage. The type of steam shovel used determines the depth and width of a cut. A 10-ton Bucyrus with a 2½-cu.yd. dipper is capable of making a cut 10 ft. deep and 40 ft. wide. Special shovels may be made for special work. The path of the shovel in most cases follows the strike of the underlying bed. The overburden should be so excavated as to reduce the number of moves of the steam shovel to a minimum. This detail is important since moving a shovel is a waste of time and money.

After cut No. 1 has been completed, stripping limit to stripping limit cut No. 2 is made, leaving a bench for a track as shown. In rock work benches are 10 to 12 ft. wide, while in clay their widths are 12 to 15 ft. Cut No. 3 is made over the whole stripping. If the thickness of the overburden exceeds 30 ft., the 30-ft. cut is made over the entire stripping and the same operation is followed out as in the beginning. Fig. 8 shows the method of making the cuts here described.

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The shovel has completed cuts No. 1 and No. 2 and is working in No. 3 cut. Benches for the tracks can be plainly seen on the left of the shovel.

The main object of making the preliminary cuts is to arrive at such a depth that the shovel can work most efficiently. Since the steam shovel cannot remove

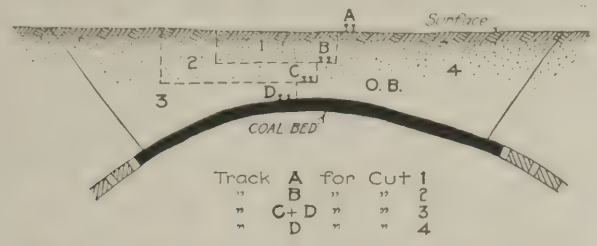


FIG. 5. LEVEL SURFACE AND ANTICLINAL BED

all clay, etc., from the top of the coal bed, hand cleaning with pick and shovel is used.

In Figs. 2, 3, 4, 5 and 6 it will be noticed that the principle involved in the method of excavation is the removal of overburden, so as to expose the coal as soon as possible for mining. The question of removing all of the overburden before coal mining is begun is often considered, but coal in the ground is money tied up, so immediate mining in most cases is resorted to. Fig. 9 shows a 70-ton Bucyrus 2½-cu.yd. shovel removing overburden 18 ft. in thickness in which a thorough cut and a finishing cut were made. The top of the coal bed can be seen in the foreground. The working direction of the shovel is parallel to the strike of the bed.

Cross-section and plan, Fig. 7, shows a side hill stripping where the overburden is transported by means of a plane to a restricted dumping ground located above the strip pit. This type of problem involves the consideration of starting to dump at the proper elevation and also of sufficient area for dumping purposes. Knowing the approximate amount of overburden in the solid and the swelling and shrinkage of the same, the total volume of excavated material can be calculated, so that the dimensions, height, top and bottom bases of the dump may be determined and the proper elevation and the

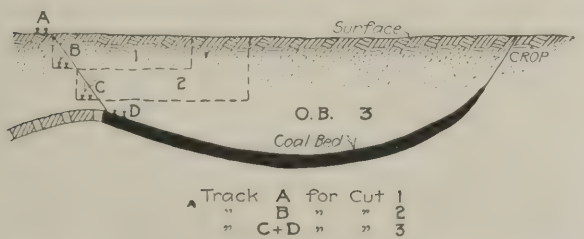


FIG. 6. LEVEL SURFACE AND SYNCLINAL BED

point of dump commencement are then fixed upon the dumping area.

Since the adjoining properties and underlying coal beds may be affected by dumped material such as the rolling of large boulders upon the properties and increase of pressure upon the surface beds under the dump, this phase of the problem should be studied thoroughly. The dumping ground question is highly important, and the dump should be so located and be of such size that the total material removed can be handled economically.

The drainage question should be investigated before actual excavation begins. There are three practical methods of drainage connected with a stripping problem—namely, natural, pumping and subterranean or mine drainge by means of a borehole or some other opening leading to the workings of the bed which is being stripped or to those of an underlying bed. Many of the strippings in the anthracite coal region solve the drainage problem by the last method. It might be stated that when the last method is used the amount of drainage should be calculated so that the mine pumps handling it together with the other mine water should not be overtaxed and so cause damage by flooding either live or abandoned workings.

In the anthracite coal region there are two general practical methods of removing coal—namely, by hand and with machinery or steam shovel. The selection of

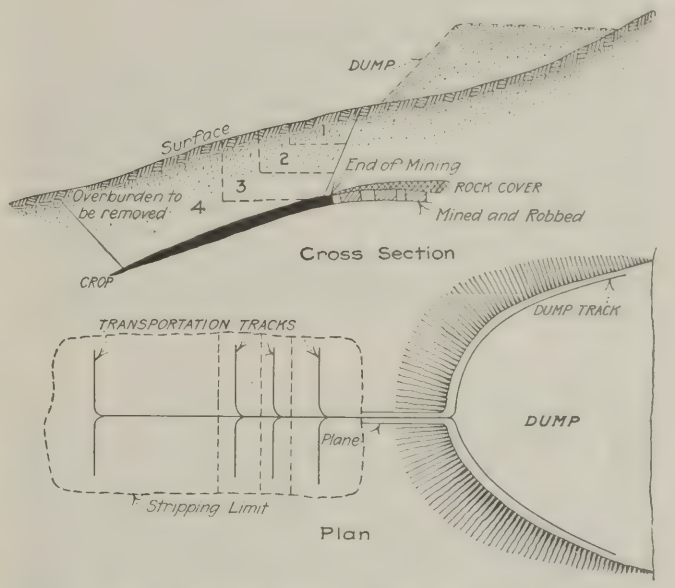


FIG. 7. CROSS-SECTION AND PLAN OF A SIDEHILL STRIPPING

either depends upon the relative or comparative economical advantages of each. For example, the steam shovel may be used in removing a bed 9 ft. thick more cheaply than ordinary hand mining, while in a bed 4 ft. in thickness the hand method would be preferable. Fig. 10 shows a basin stripping, where a 20-ft. coal bed is loosened by shooting. With the aid of a ¾-cu.yd. Marion steam shovel and small plane the coal is transported to the breaker. Fig. 11 shows a coal bed 4 ft. in thickness which, having been stripped, is being mined by hand methods of drilling, shooting and loading into the cars for transportation.

In connection with the mining of a coal bed 10 ft. in thickness or over, a churn drill may be used in drilling holes for shooting purposes. In a stripping proposition on a coal bed that has undergone its first mining the steam shovel is often used to advantage, because under such conditions there is mixed with the pillars an additional large amount of dirt which must be handled. In such a case the contractor and engineer should make comparative estimates of costs of both the hand and steam-shovel methods.

In connection with the removal of overburden and coal the important question of the contract arises. The

universal practice of the operators in the anthracite coal region is to let the work of removing the overburden on a contract basis to an outside contractor, while the coal is usually removed either by a steam shovel run under the direction and charge of a company foreman with the necessary laborers or to a contract miner who usually uses the hand method of mining. There are several reasons why foreign interests such as the contractors are involved in stripping. The company as a rule has no such well built-up organization as that of the contractor whose years of experience ultimately produce the more economical results for the company.

The usual form of a stripping contract is an agreement between the competent parties, the company or individual operator and the contractor, whereby a certain number of cubic yards of overburden or tons of coal are to be removed within a certain time at a certain price per cubic yard. Care should be taken in writing up a contract that only essential terms, conditions, etc., are mentioned. Ambiguity should be avoided; statements should be clear and forcible. Each article of the agreement should be specific, definite, concise and not a conglomeration of sentences having no direct connection with the article itself.

Although each stripping contract has certain terms, conditions, etc., peculiar to itself, the following essential points should be considered and are generally present in every ordinary stripping contract. In drawing up the contract the salient feature is the introductory agreement between the company or individual operator (the party of the first part) and the contractor (the party of the second part), to strip the overburden overlying a certain coal bed in a certain locality within definite time limits in accordance with definite plans, specifications, terms, conditions, etc. Maps and cross-sections showing the location of the stripping limits, approximate number of cubic yards of overburden to be removed and other vital features bearing upon the problem should be attached to the contract proper. The compilation of the contract then develops under two general heads—namely, those articles that have a direct bearing upon the actual removal of the overburden, while the second division covers conditions and terms in general.

Under the first division the following points are highly important: (1) A general description of stripping; (2) the number of cubic yards of overburden to be removed; (3) the stripping limits of area; (4) the average thickness of overburden; (5) the approximate percentages of rock and earth; (6) kind and number of excavating machines; (7) definite number of cubic yards to be removed monthly; (8) price of excavation; (9) classified and unclassified material defined; (10) payment per cubic yard in place; (11) nonpayment for excavation other than that specified; (12) cleaning top of coal bed; (13) extras and method of payment; (14) final estimate.



FIGS. 8 TO 11. ILLUSTRATING SEVERAL METHODS OF REMOVING OVERBURDEN AND COAL

Fig. 8—Method of making cuts for removal of overburden; benches on left for track; shovel working in third cut. Fig. 9—Bucyrus shovel (70-ton) removing all overburden, 18 ft. thick, after making the preliminary cuts; top of coal bed in foreground. Fig. 10—Showing removal of coal in bed, 20 ft. thick, by a Marion ¾-yd. shovel and plane, for transportation from basin stripping. Fig. 11—A bed of coal 4 ft. thick being mined by hand method

The second division covers the following points: (1) Provision of the equipment and the necessary diligence by the contractor; (2) water and fuel questions; (3) erection of necessary buildings and sanitation; (4) owner's right to mine coal at any time; (5) subletting of contract; (6) experienced foremen required; (7) payment of rates to employees; (8) insurance and workmen's compensation; (9) damages in case of hindrance to work; (10) suspension, failure to prosecute work; (11) disputes; (12) mechanic's lien; (13) general specifications, relating to definitions of engineer, coal company, contract misunderstandings, certi-

fied check and bonds, award of contract, unit prices used, quantities paid and the necessary signatures and legal questions involved.

One highly important article of the contract is the definition of classified and unclassified excavation. Classified material is generally divided into two divisions—namely, earth and rock. Sometimes it includes culm and loose rock, which often composes some of the overburden in a stripping proposition.

A certain contract disposes of these questions as follows: "Earth shall include clay, sand, gravel, loam, slate and decomposed disintegrated coal, stone and boulders, containing less than 1 cu.yd.; also stratified solid sandstone in layers of 8 in. or less in thickness when separated by earth as defined above and all other material not classified under rock. Rock shall include all solid slate and sandstone in place in layers greater than 8 in. in thickness, whether or not it is separated by layers of earth as defined above and all boulders containing more than 1 cubic yard."

Loose rock and culm are sometimes defined where local conditions are such that the earth and rock are so classified as not to include these materials.

Stripping operations are often handled inefficiently and with disastrous results due to many causes, of which underestimating is the chief. Underestimating arises chiefly from lack of training and experience, lack of test-pits and borings and cost data, probable future changes, fluctuation in wages and prices of materials, incompetent foremen, plant removal and depreciation, accidents and too small a margin of profit, both on material and labor, also possible legal expenses.

In conclusion, the contractor must have not only the hearty coöperation of the company and its representatives, but also the untiring interest of his organization before the best results can be produced.

Hinckston Run Mine of Cambria Steel Co.

By William E. Winn
Pittsburgh, Penn.

The Cambria Steel Co. has commenced the groundwork for a tipple, coal-conveying system and coal washery at its Hinckston Run mine, adjacent to Johnstown, Penn. This plant will furnish the main supply of prepared coal for the adjoining byproduct coke ovens, now under construction and known as the Rosedale Coke Works. The final plant will take care of a mine output of 6000 gross tons per day, or 36,000 tons per week. Of this amount 21,000 gross tons per week will be washed for coking use, while 15,000 tons will be crushed and then partly cleaned by a Bradford coal breaker for boiler, coking and producer use. The present installation will be one-half of the ultimate plant.

The coal-screening, crushing and washing machinery will operate six days per week, ten hours per day, and the traveling coal-handling bridge, which reclaims coal from the drainage pits and deposits it in the lorry bins, will operate seven days per week, ten hours per day. A belt conveying system will be designed to handle the final capacity.

The run-of-mine coal will be delivered by skips to a 1000-ton capacity bin with two steel hoppers equipped with mechanical feeders delivering a maximum capacity of 340 net tons per hour to the Bradford coal breakers. The breakers will be 12 ft. in diameter and 17 ft. long, with screens having 1-in. and 1¼-in. mesh. The coal dropping through the 1-in. mesh is used for coking after it is washed, and the coal dropping through the 1¼ in. for boiler and producer use. The breaker refuse (rock, slate and sulphur balls) will go to a 110-ton capacity bin for loading into railroad cars.

The coal-washing machines will consist of 36 Campbell bumping tables, 12 ft. long and having a capacity of 2100 tons per day. All exposed gear and chain transmissions will be equipped with substantial guards, to comply with all requirements of the Pennsylvania Department of Labor and Industry. Each washed-coal concrete drainage and storage pit will have a capacity permitting a day's operation of the coal-washing machines; each pit after filling with washed coal will be allowed to drain 36 hours before reclaiming the coal for coking; this system of draining off the water from the washed coal will provide a product for charging ovens, averaging 7 per cent. moisture. The containing structure is of steel framing with concrete panels; it will be completed early next year.

The washery will be practically a duplicate as to design and will handle the same grade of coal as the Cambria Steel Co.'s washery and coke oven plant at the Franklin Steel Works. This plant near Johnstown, Penn., has been in successful operation since 1904, operating on the Miller "B" coal seam; for the year 1917 the following average results were secured.

	Ash, Per Cent.	Sulphur, Per Cent.
Raw crushed coal—unwashed	11.5	2.4
Washed coal—see note	7.3	1.3
Coke from washed coal	9.4	0.9

NOTE—Eight per cent. of refuse was washed from the raw crushed coal.

The coal used in the ovens at the Franklin plant consists of 70 per cent. washed low-volatile coal and 30 per cent. of finely crushed high volatile coal thoroughly mixed before charging.

For the year 1917 it cost (per ton of coking coal charged) 11.83c. for handling and washing the low volatile coal and 5.07c. for handling and crushing the high volatile coal. This cost per ton took care of the coal from its arrival in cars until it was delivered in the lorry bins—and it included labor, power and material and supplies for keeping the plant in good operating condition.

The Franklin washery was described and illustrated in *Coal Age* of July 20, 1912, in an article entitled "Byproduct Ovens, Johnstown, Penn."

In the United States the total bituminous coal production during 1917 was close to 542,000,000 tons and 90,000,000 tons of anthracite was marketed. The uses to which the bituminous coal were put have been estimated as follows: Stationary steam plants, 215,000,000 tons (40 per cent.) : railway locomotives, 190,000,000 tons (35 per cent.) ; households, 135,000,000 tons (25 per cent.) ; total, 540,000,000 tons. Of the 90,000,000 tons of anthracite 40 per cent. was consumed by locomotives and 60 per cent. mostly by domestic users. Reference to the figures given shows that 60 per cent. of the total production of bituminous coal in the United States during 1917 was applied to non-productive uses—35 per cent. for steam locomotives and 25 per cent. for domestic use.



Transportation Situation in Middle West

Reporting on the coal transportation situation in the Middle West, Hale Holden, regional director for the Railroad Administration, says: "There are 14 roads reporting to this office, although not all are included in the Central Western Region, and the loading shows 202,658 cars in August as compared with 202,549 for the month of June and 220,701 for the month of July, and as compared with 150,940 in August, 1917. The extraordinary loading in July, which was the greatest in the history in this territory, following the unusual heavy loading in June, resulted in a production greater than the market in this zone could absorb, and the Fuel Administration was obliged to cast about for ways and means of disposing of this surplus which led up to: (1) Zoning coal from western Kentucky out of Illinois, Indiana and Wisconsin, (2) agreeing to furnish a larger tonnage for the Northwest, and (3) opening the State of Michigan to Illinois coal, which it is thought will absorb 600,000 tons of the surplus.

"In view of the surplus of mine-run and screenings from the Central Illinois field, there has been no complaint in regard to car supply. The surplus of poorer grades of coal will disappear by the middle or latter part of September, but the roads in this territory are prepared to meet any demand that the car supply in sight can possibly make. Our biggest problem therefore is keeping up a full car supply."

Suggests Use of Highways for Coal Movement

Recourse should be had to highways wherever feasible to supplement the transportation of coal by rail, is the opinion of Cyrus Garnsey, assistant fuel administrator. In a letter to the Highways Transport Committee of the Council of National Defense, he says:

"We are also convinced that transportation resources can be greatly increased and larger tonnage movement of coal from wagon mines direct to consumers effected by applying all possible vehicles, horses and the necessary labor in line with national policies promulgated by you, and operating over suitable highways constantly maintained in efficient condition. For this reason we ask that you convey to our field organization our very real interest in this part of their work and assure them we desire to support their organization to the limit in their efforts to effect greater tonnage movement of coal over the highways from wagon mines to consumer.

"We suggest also that whenever conditions of roads, local legislation, lack of suitable equipment, and so forth, tend to impede the most effective and efficient movements, you will promptly bring these matters to our attention. To expedite the handling of these questions the Fuel Administration has committed them to its Mine Track Committee, composed of Frank G. Jones, Chairman, Robert L. Ireland and S. A. Taylor."

Power Situation Affects Fuel Supply

Extracts from the conclusions of Chester G. Gilbert and Joseph E. Pogue, with regard to the power situation, have been made public by the Smithsonian Institution. Messrs. Gilbert and Pogue, who are members of the Institution's mineral technology staff, declare that:

"The righting of the power situation requires (1) the establishment of a comprehensive system of electric transmission lines to be administered as a common-carrier system like the railways. (2) The provision of such a system will necessitate the coördinated growth of central power stations in coal fields and at water-power sites, and in doing so will open to business enterprise a tremendous field of opportunity hitherto closed off from entry, and thus lead to the balanced development of the two major energy resources, coal and water-power. (3) The principle of multiple production, recognized and incorporated in national policy, will supplement the additional service gained through the organized employment of the electrical principle; applied to the production of coal-generated electricity, and, through the medium of municipal public utility plants, to the distributive employment of coal, this principle will effectively correlate the recovery of the commodity and energy values, so as ultimately to effect a full saving of the former and an increased gain of the latter, thus permitting a further relative diminution of the amount of fuel calling for transportation in bulky form. The first two points reduce themselves to a single issue, which is purely a business proposition to be handled by a business organization; the third item is more intangible and it is a matter of policy, which, therefore, cannot be delegated or otherwise handled in objective fashion.

"Thus specific action in respect to establishing a common-carrier system adapted to the power needs of the country will not only go far toward solving the problem of transportation, but it will improve the fuel supply, correct the economic fallacy of drawing upon capital resources while neglectful of income, contribute to the recovery of the values now lost in the consumption of raw coal, lead to an adequate development of electrochemical activities, cut off a needless annual expendi-

ture running well beyond the billion dollar mark, and constitute a potent contribution in the direction of stimulating the upgrowth of a constructive economic policy of national scope attuned to the needs of modern industrial development. It is believed that these results would involve national economies, offsetting in large part the cost of the war."

Railroads Delay Shipments of Mine Timber

Considerable delay to mine props and mine timbers have resulted from the recent order from the Railroad Administration placing the movement of lumber on a permit basis. It was not the intention of the order to include mine props and timbers. Many of the railroads, however, have failed to differentiate between mine supplies and lumber which comes within the purview of the order. The telegraph is being used freely to secure the release of mine props which are sorely needed in many of the coal mining districts.

Fuel Administration Not Discouraging Recovery of Pyrites from Coal

The Fuel Administration took no action looking to the discouraging of the recovery of coal brasses from mines in the Middle West. When it was proposed to erect plants to treat these pyrites, the Fuel Administration simply insisted upon the precaution that the recovery of the coal brasses not be allowed to interfere importantly with the output of coal. The Fuel Administration suggested that the War Industries Board should allocate the production. It was feared that increases in the price of pyrites might make it more profitable to abandon the recovery of coal in favor of the other mineral. The Fuel Administration also suggested that the coal brasses extracted were to move in boxcars only.

Supplies for Mine Use Should Be Obtained from Local Sources

While every effort is being made to allow mine supplies to move without undue questioning, the Fuel Administration has found it necessary to stop all abnormal movements of supplies. Hay for use at a West Virginia mine, for example, was being shipped from Michigan. Another West Virginia company ordered a wagon from Orleans, N. Y. Officials here will insist that supplies be obtained from the nearest available source.

Coal Distributor's License Suspended

Distributors guilty of boosting the price of coal are being dealt with severely by the Fuel Administration. An example of the action being taken is the case of W. H. Blight, of Elmira, N. Y. He wrote prospective customers suggesting that he could secure coal for them if an additional 25c. per ton were forthcoming. The letter came into the possession of the Fuel Administration and Mr. Blight has been prohibited from transacting any coal business whatsoever for a period of sixty days.

D. D. Bush, of the Fuel Administration, is now engaged in working up the data, recently submitted by operators, on the steel requirements of the country's coal mines for the eighteen months prior to Jan. 1, 1920.

To Use Rejected Shell Steel for Chutes

That more chute steel may be provided, consideration is being given to a plan to work over rejected shell steel for that purpose. Shell steel is much too hard to make an ideal substitute for the regular chute steel, but as it can be made to do, it is probable that it will be gladly accepted. Fuel Administration officials are convinced that, with the present serious shortage of steel, it will be impossible to secure further supplies of chute steel at this time.

High Daily Average of Bituminous Miner

An example showing the possibilities of greater individual production is furnished by John Gulliver, of the Pleasant Hill mine of the Clearfield Bituminous Coal Corporation. In June, Gulliver loaded 270 tons, or a daily average of 10.41 tons of coal. In July, he loaded 288 tons, an average of 11.70 tons per day. In August, his output was 297 tons, a daily average of 11 tons. In August the daily average was 6.23 tons.

All records of the Pittsburgh district were broken last week when 130 out of the 134 blast furnaces in that area were in operation. The only four furnaces which were out of blast were being relined. This is quite in contrast with the situation early in February, when 38 furnaces were banked for want of coke.

Fuel Administration field men are reporting from many sections of the country greatly improved conditions as compared with this period of last year. They confidently predict that there will be no coal shortage this winter. Stocks already on hand insure a safe reserve for those periods in the winter when transportation tightens up.

Legal Department

EXISTENCE OF EMPLOYMENT RELATIONSHIP.—A teamster occasionally employed by a coal-mining company to make deliveries to customers, using his own team, cannot be said to have been an employee of the company while hauling a load of coal for his own account, so as to make the coal company liable to pay an award under the Indiana Workmen's Compensation Act on the man being killed, although it was understood that as soon as he had moved the particular load he would return and make a delivery for the company. (Indiana Appellate Court, Sugar Valley Coal Co. vs. Drake, 117 Northeastern Reporter, 937.)

LIABILITY FOR ACCIDENTS CAUSED BY SAGGING TROLLEY WIRES.—The Kentucky Court of Appeals has affirmed judgment in favor of a triprider injured while riding on an electric motor in a mine, due to sagging of the trolley wire when the wire broke at a nearby point. The injured man was declared to be entitled to recover on the theory that the breakage and sagging was caused by a worn condition of the wire which must have existed for some time and which would have been discovered before the accident had due care been exercised to maintain the wire in reasonably safe condition. The court approved the following statement of law given by the trial judge to the jury: It was the duty of the defendant coal company, if its wires carried a deadly or dangerous current of electricity, to use the utmost care and skill in the construction, management, and maintenance thereof, and it was the further duty to exercise and use the utmost care and skill to properly support the wires and to keep them in repair. (Key vs. West Kentucky Coal Co., 198 Southwestern Reporter, 724.)

THE LABOR SITUATION

General Labor Review

Events have crowded themselves into the last few days. The dissentients from the union in the northern anthracite field have declared themselves patriots and purged themselves of the crime of sedition by promising to await with due patience the ruling of Dr. Garfield in the matter of their wages. Then, again, Elbert H. Gary, chairman of the board of directors of the United States Steel Corporation, declared on Sept. 24 in favor of the eight-hour day. The men are to receive time and a half for overtime and double time for Sunday work. It is understood that the Lackawanna Steel Co., the Republic Iron and Steel Co., the Youngstown Sheet and Tube Co. and the Midvale Co. will follow suit. It appears likely therefore that the principle will be extended to the coal mines in which the steel corporations are largely interested.

Progress has been made also in the arrangements for the giving of badges for steady and meritorious service. It is highly important that some such action be taken promptly. Several companies have found that badges of their own devising have done excellent work, and doubtless far more efficient work would be done by the introduction of badges having national significance, especially if the presentation could be accompanied by the reading of a letter from the President such as he knows so well how to write.

It is much to be regretted that with the winter close at hand our good friends in the north are having so much trouble with labor. The difficulties seem to be arising everywhere except in Vancouver, where the shooting of the miner slacker Goodwin was expected to make trouble, but did not arouse much resentment in the miners. It appears, however, that all District No. 18 may go on strike to enforce a single-shift operation at one particular mine, despite all the promises made regarding legislation in favor of the single-shift operation of all mines. The Edmonton district has many men on strike and at the other end of the great Dominion, in Pictou County, Nova Scotia, there are all manner of strikes.

James Morgan is the chairman of the new union body which calls itself the "Anthracite Union" and has no affiliation with the United Mine Workers of America. It is said to have, so far, only 600 members. Talking about new unions, one has just been started by 80 petty officials of the Delaware, Lackawanna & Western R.R., Coal Department, the Lehigh Valley and the Lehigh & Wilkes-Barre Coal Co. They met in the Union hall at Wilkes-Barre and propose to band together the mine and firebosses who, because of their employing and discharging labor, can not become members of the United Mine Workers of America. They claim that they are discriminated against by reason of the fact that they have no union to enforce their needs and voice their demands. They receive straight salaries of $127 to $137 per month, but get no extra pay for overtime.

Upper Anthracite Region Not Pro-German

On Sept. 21 500 delegates from 70 local unions in District No. 1 (the northern anthracite field) met in convention in the Union Hall at Wilkes-Barre to protest by resolution against the general statement that they were tainted by pro-Germanism or by the evil spirit of the Industrial Workers of the World. Said they:

"We wish the world to know that we are not pro-Germans or I. W. W's or disgruntled obstructionists, but true and loyal American citizens and supporters of our great Government in anything it may undertake, as well as true and loyal members of the United Mine Workers and obedient to the wishes of its officials when said officials heed our demands and coöperate with the rank and file of the organization informing them by official communication of the progress made."

Then they add a promise in the words following to stand by Dr. Garfield as loyally as they do by the union if he will do what they desire:

"Whereas Dr. H. A. Garfield, United States Fuel Administrator, whom we honor and trust to give us justice when the facts are properly presented, has stated that we are entitled to an increase in wages and that he is now working on the amount to be granted as well as on the method in which to apply it, therefore be it resolved that we . . . pledge ourselves to be loyal to our great Government as we have been in the past, that we are bitterly opposed to any suspension of work pending the adjustment of our demands for an increase in wages and that we will do everything in our power to assist the Fuel Administration in the production of a maximum output of coal, and be it further resolved that we request the Fuel Administrator to alleviate the unrest in the anthracite region by naming a specified date when the increases will retract [to which the increases will retroact] and we believe that if this is done there will be no further trouble in the anthracite regions."

The 250 strikers at the Grassy Island shaft, the Grassy Island slope, the Olyphant and Eddy Creek collieries of the Hudson Coal Co. at a meeting held Sept. 17 at the Oliphant colliery voted to return to work. The men declare, however, that if an increase is not granted in ten days a second strike will be called.

The strike in the southern anthracite field is now completely at an end. It is computed that by their action the miners lost $200,000 in wages. The whole production of anthracite fell 11.3 per cent. Whereas it was 2,088,000 short tons the week before, it dropped to 1,847,000 short tons during the week of the strike. Fortunately the anthracite region only mines as much in a week as the bituminous region mines in a day. In other words, the bituminous output is six times the output of the anthracite region.

National Awards for Steady Work

The Department of Labor, as far back as May, 1917, began to consider the adoption of some form of insignia for the employees of plants engaged in filling Government contracts, the purpose being to show the public at large that the person wearing the insignia was doing his bit, at least in a degree, as was the man who was wearing the country's uniform.

The following rules and regulations concerning "The Issuance of War Industries Badges" have been drawn up by C. T. Clayton, Director of Training and Dilution, of the Department of Labor. The rules and regulations have been approved by practically all the employers of labor and by the employees themselves. All of the officers of the American Federation of Labor have approved these rules and regulations, but the national organization as a whole has not had an opportunity as yet to give its assent.

They have been presented to President Wilson for his approval and he also has been asked to write a pledge of loyalty which will be given to each candidate for the war-industries badge. The whole matter now awaits the approval of the President, upon receipt of which it will be given the widest publicity. The well-known New York artist Jo Davidson is engaged in designing the insignia.

Civilian war workers have long and generally felt that they were taking a vital part in the prosecution of the war

and were entitled to some recognition. Many of such workers, if they had their choice, would be at the front. For these reasons the Government has been considering the award of appropriate industrial insignia.

For the present it is proposed to limit the issuance of badges to civilian workers in those industries where a substantial proportion of the output is directly or indirectly required by the United States Government or by the allied governments and to such industries as are certified, by a competent Government agency, as essential. Care will be taken to exclude the concerns in any industry which are not actually working on Government or essential work. Wherever, from the mixed nature of the work or for any other reason a question shall arise as to whether the industry or the individual is entitled to the badge, the final decision shall rest with the Director of the Industrial Insignia Service.

The following service divisions have been established: Mining, war industries, shipbuilding (and ship repairing). Other divisions will be established as the need arises. A copy of his pledge of loyalty will be given on his enrollment to each candidate seeking the insignia, which the candidate will sign and the enrolling officer countersign. The pledge will also be placed upon the enrollment sheets; and at enrollment a description of the candidate's occupation, employment and nationality will be made out and a copy sent to the Director.

War workers shall be entitled to wear the War Industries Badge only if they work 100 per cent. of the established working hours in each month; less such absence as is involved in a customary vacation, or because of sickness or some other unavoidable cause. Candidates will be invested with the base of the badge, which contains the candidate's official number. At the end of four months' service each candidate properly adjudged to have complied with the standards will be awarded the primary disk. Upon the expiration of each further period of four months' service a new disk, indicating the additional service, will be substituted for the original disk, which forms the center of the badge. When the badge is introduced in any plant such workers as satisfy the administrative officers that they have complied with the rules for four months or more shall be immediately awarded the full badge.

For local administration there will be an enrolling committee of not less than three at each plant. One of the committee will be a person having authority in the corporation. He will represent the employer. The rest of the committee will be elected by the employees, one for each shop or department. The chairman of the committee will be nominated by the members, subject to the approval and appointment of the Secretary of Labor.

Such committee shall have the following powers and duties:

a. To enroll candidates for the War Industries Badge.

b. To ascertain the cause of absences or shortened working hours of any war worker who fails to work the prescribed periods, or to produce either in quality or quantity his fair proportion of output.

c. To decide to whom badges and indicia of service shall be awarded.

The names of candidates whom the committee think worthy of the badge or succeeding indicia shall be submitted to the employer before public announcement, giving him an opportunity to object to any name and to discuss the matter with the committee. In case of disagreement the matter will be referred to the Director for final settlement, a written statement of facts being supplied him as a basis for his decision.

Rules To Be Observed in Distributing Badges

a. Upon enrolling, each candidate will be entitled to the beginners' badge, which shall consist of the pin and bar foundation of the badge, without the indicative medallion, but bearing upon it the serial number assigned the possessor for use during the war; the badge and all indicia to become his property thereafter if not forfeited for cause before the close of hostilities (see rule d).

b. Upon enrolling, each candidate will also receive a card containing his name, address and other identifying information and a copy of the pledge, such card to be signed by the candidate and countersigned by the enrolling officer. Each candidate will be required to furnish a photograph measuring approximately 1½ x 1 in. and mounted upon the card. At the termination of each month's service, the card shall be presented to the committee for endorsement.

c. A war worker permanently disabled in service will receive a special disk, to be placed upon his badge, indicating that fact; such disk being public acknowledgment of the worker's patriotic service and honors.

d. Whenever a war worker desires to leave his employment for any cause, he shall surrender his badge to the committee. If he satisfies that committee that he has taken up war work elsewhere, the committee will grant him a transfer card, directed to the local committee at the new establishment; and upon presentation to that committee they will advise the first committee, which will redeliver the badge to the war worker through the committee at the new establishment. If the war worker has no new job in view, the committee at the establishment he is leaving will give him a transfer card directed to the nearest office of the United States Employment Service. Such card will entitle the war worker to especial assistance in securing other employment in war work. Upon placing the worker, the examiner-in-charge of the Employment Service office will notify the committee, or the war worker may apply through the committee at the new establishment, which shall notify the committee at the original establishment; and if the new employment has been taken up without unreasonable delay, in the judgment of the committee, transfer of the surrendered badge shall be made and due notice sent the Director.



KEEP IT BURNING

e. The War Industries Badge will not be awarded to boys between the ages of 16 and 20 years, in localities where the Boys' Working Reserve training system is in operation. In

establishments having members of that organization, the committee will award to boys within the prescribed ages the Boys' Working Reserve Badge instead of the War Industries Badge, and such boys will be expected to become members of the Boys' Working Reserve and conform to the rules of the reserve regarding industrial education, which will be a part of the qualifications for award of their badge.

When such boys have earned the Boys' Working Reserve Badge they may on attaining the proper age be awarded the War Industries Badge in addition to the Boys' Working Reserve Badge, and that badge shall be given with indicia which will indicate the full period of service performed, including the service while earning the Boys' Working Reserve Badge.

f. The Government does not obligate itself to replace a lost badge or medallion. Should a member lose these, he can become a candidate for a badge only as a new worker. Any persons who may find a lost badge are requested to return it to the nearest local committee, which will forward it to the Director to be returned through his local committee to the person to whom it was first awarded. The badge is the property of the Government, and not for sale at any price; nor can it be given to any one except upon an award duly made by a regularly constituted committee, or upon a special award by the Director upon sufficient evidence justifying such action. The badge will remain until the close of the war the property of the Government, protected by the sanctions regarding unlawful conversion of Government property. If declared by a local committee to be forfeited, and the sentence is not reversed by the Director, the holder must return his badge to the committee for cancellation. If a war worker quits his job he shall return the badge to the local committee. (See rule d.) The employer is requested to assist the committee by taking up badges when he pays off war workers who are leaving his employment.

g. Appeal on any matter connected with badges may be made by any party to the Director.

RULES REGARDING THE CONFERRING OF BADGES

Badges should, whenever possible, be conferred upon candidates in groups or classes, with simple but impressive ceremonies. The members of the enrolling committee, headed by their chairman as an accredited representative of the President of the United States, should be present; the rehearsing of the pledge of service, the hoisting of the flag and delivery of a short address by some noted citizen with the formal conferring of the badges by a Government official or officer of rank should be elements of the program. The badge represents the honor and dignity of patriotic service, recognized by the Government of the United States. It is an American Legion of Honor; and no lack of respect should be shown in conferring it upon those who may earn the right to wear it.

Large Outputs of Patriotic Miners

We have received information regarding several big records of earnings and coal production. Some of these have been published, but they will bear collecting. Joseph Malachick drew $158.34 for two weeks' work at the Adelaide plant of the H. C. Frick Coke Co. His pay for four weeks was $300.96.

Harry Pyle, a miner employed by the MacGregor Coal Co. at the No. 1 Bando mine near Rockwood, Somerset County, earned $516.10 from July 15 to Aug. 16. As this period includes 26 working days, his earnings averaged $19.85 per day. The work for which he received the pay stated included the mining by hand of 410.26 long tons of entry coal, the lifting of 34 yd. of bottom at $2 per yard, the lifting of 10 yd. of bottom at $1 per yard and the working of two hours at 64½c. per hour. The coal mined by Pyle per day averaged 15.78 long tons.

The seam in which he worked was only about 4 ft. thick. He started the last half of August by mining 22, 21 and 18 tons in three consecutive days. Pyle is about 38 years old, and weighs about 165 lb. He is 5 ft. 10 in. in height. The mining rate figures $1.06 5|10 per ton.

The illustration herewith shows William Bumpus, a colored man, who is engaged by the Carbon Fuel Co. to load coal at its North Carbon mine, Decota, Kanawha County, West Virginia. In July he loaded 650 tons of coal and handled 70 tons of slate, yet he laid off three working days in that month so that he could work in his war garden. The coal he works in is the Eagle seam, which averages at North Carbon about 4½ ft. in thickness. Bumpus has always been a consistently high coal loader, but in July he distanced his own record. He is ready to defend that record and surpass it if Uncle Sam will furnish the necessary railroad cars.



WILLIAM BUMPUS LOADED 720 TONS IN A MONTH

Moundsville, W. Va., announces that one miner in that region, Charles Fogel by name, earned $169.89 for 11 days' work. One day in that period Fogel celebrated by loading 30 tons 17 hundredweight. He made $18.20 during that eight hours of work. The rate must therefore have been 59c. a ton, and the 11 days' record, 287 tons and 19 hundredweight or an average of 26.18 tons per day.

This beats even the records of Ed Blagg and Joe Swagda as recorded on July 6, 1918, on page 29 of *Coal Age*. It must be remembered, however, that Blagg was working in an entry and perhaps his coal was thinner, for it was only 3 ft. 8 in. thick. It would appear that the Bumpus record closely parallels that made by Fogel, if it is assumed that Bumpus worked 24 days in July and if his slate is figured as coal. His tonnage then would be 26.25 tons per day.

Other records are coming in which prove the industry and patriotism of our coal miners. John Mullins, a miner at Hemphill, Penn., who works for the Solvay Collieries Co., dug and loaded 691 tons of coal between Aug. 15 and Sept. 14, a wonderful record—25.59 tons a day on the assumption that he worked 27 days, the number of week days occurring in that period of time. The rate paid for mining appears to have been 65c. a ton, for the wage was $449.15.

Leave the Mines To Get Drafted

The operators of Illinois complain that the exemption of miners and other mine workers does not exempt. The younger men would rather fight than dig coal, and they find that while there is no direct route from the mine to the national service, indirect routes are not yet tightly closed. A man can always leave the mine and get employment at a factory making nonessentials, and from such a plant there is a wide-open door to the army and navy, which he accordingly enters forthwith by enlistment or draft. Many of the men thus leaving are drivers, and as a driver or motor runner will haul from 30 to 300 tons a day his absence causes more loss of tonnage than is caused by the absence of a coal digger.

The Flag at Your Tipple Means Nothing If You Have Not Its Service in Your Heart—Buy Liberty Bonds



Pledges should be made in bunches. Do not make a pledge to buy Liberty Bonds without pledging yourself: (1) To earn by steady work and (2) to save by a frugal life enough money to pay for the bonds in a few months. He who works steadily makes materials for war, and he who saves his money saves material and labor which can be applied to the support of the fighting forces.

EDITORIALS

When Your Neighbor Is Angry

WHEN YOUR neighbor is angry it is his troubles and not he who speaks. Now more than at any time is the time for the operator, superintendent or foreman to keep this piece of plain fact, as a motto before his eyes, lest he flare up and make trouble with his employees that he will later regret. There is usually something back of an exhibition of grouchiness. In every instance let us try to find out what that something is, so that we can remove the trouble or at least assure our aggrieved neighbor that he does not help matters by his violent expression of anger.

It will help us, also, if when we meet with anger we forget the person who manifests it and fix our attention on the cause of the worry or trouble, on something impersonal. Nothing is more soothing than a keen diagnosis. It soothes us to regard the irascible man as a "patient" in the fell clutches of a disease or a circumstance. It diverts one's attention from his reactions of the "patient" and concentrates the mind on underlying causes.

Many a foreman appears to have an extremely irritable temperament. His language to the mine workers under his care is not warranted to make them friendly to him or to the companies employing him. So long as we load him with responsibilities and duties that one man cannot fill it will serve but little to counsel him to be more prudent and considerate. His troubles, and not himself, will continue to do his talking.

You surprise him at home with his family and find he is a pleasant, mild mannered man, with a devoted wife and happy children; but at the desk of his mine shanty he is like a caged lion. Relieve him of some of his duties, badger him a little less at the daily interview and give him a little wholesome advice of a sedative character and see him become bland and encouraging again.

The first duty of a superintendent is not to scold but to hearten a foreman, to give him a cheerful outlook on affairs that will help him to do his work without worry. Work without worry and work without fatigue should always be our aim. We almost never should pay a man to worry, and we should but rarely ask for work that would make an accustomed worker fatigued. A willing, ready worker is what we all want. What are we doing to make our workers both ready and willing? It can't be done by overexaction, because that inevitably produces worry, excitement, feverish action and ill-considered behavior. It can only be done by loading each man to capacity, forbidding him to accept any further duties, and by providing him with a good example of courteous consideration. A man who receives courtesies in the main office is likely to show courtesies in the mine office. An untroubled man is like a well-laid fish line, not likely to get snarled; but, like the line, when once he is disarranged, endless trouble is in store.

Why We Pay More for Cleaned Coal

THERE are not wanting people who claim that there should be no extra price conceded for coal cleaned by picking devices or passed over a picking table. They argue that coal should be cleaned at the face, and if it needs more cleaning it has not been properly cleaned by the miner. It is true that the miner should clean the coal before loading it into the car and should exercise judgment to keep dirt out of the coal, but when he has done all that is within reason he cannot produce a coal comparable with that cleaned at the tipple.

It must always be remembered that picking coal, even bituminous coal, is, for several reasons, an expensive operation—it takes labor, machinery and power, and also buildings to house the operation; moreover, it also removes a large part of the material for which the operator has already undertaken to pay, for the weight is taken before the waste material is picked out.

Of course, the operator can often use a portion of that waste. Little of it should be entirely incombustible; some of it will be "sulphur," or pyrites, which as fuel has a low thermal value; some of it is a coal high in ash but burnable. But whatever it is, its value is not equal to that of the coal which is to go to market, and the operator who takes it out needs to be recompensed for its loss, whole or partial, as well as for the labor involved in the systematic losing of it.

It has been contended that the operator who cleans his coal admits tacitly that he has neglected to keep his miners in line, and has permitted them to load dirt. All that can be said about this accusation is that, if this is true, in doing so he has wronged himself; for he must, in cleaning, throw away or use the rubbish his workingmen have delivered to him and do it all at his own loss of material and labor. No operator who begins to run a picking table relaxes in his efforts to keep the dirt in the mine. He is apt rather to be more active than before, as he keeps a closer record of his losses.

The extra payment made, therefore, for coal passed over a picking table or picking device is a payment that is earned. It is a return for money expended and for values actually lost. To fail to pay it would be to perpetrate an injustice. Like all injustices, it hurts two classes; in this case the operator and the public, for when the profit in cleaning coal is lost it will not be cleaned and the public will suffer accordingly.

"Do Your Bit"—What Do You Mean, "Bit"?

SINCE we entered the war the expression "Do your bit" has been freely used in America. Some people have remarked that it is a highly inadequate expression, and they wonder how it came to be so current in Great Britain, when the "bit" everyone was doing, whether rich or poor, was so amazingly large and entailed such a degree of self-sacrifice.

It is, however, but a small bit or share of the whole magnificent national endeavor that any of us can ever do. Work and struggle as we may, the action of the individual must always be dwarfed by the greatness of the effort of a hundred million of our people leagued, moreover, as they are with the legions of our Allies. Yet it is important that each of us do our "bit," our full share, and make our proper contribution to the whole result. We must all give to the great endeavor either in Liberty Loans or in taxes. Each can only do a bit; the more need therefore that each one does that bit that the whole aggregate effort may be worthy.

There are about 40 million wage earners in the United States, and they are asked to tackle a loan of six billions of dollars. The bit of the average wage earner is therefore $150. Remembering how greatly the receivers of large incomes are crippled in their purchasing power by unequal taxation, we cannot expect them to shoulder as much of the burden as they otherwise undoubtedly would. The amount of $150, therefore, does represent closely the bit or share demanded of the least of us, and those who make a good earning should put up far more.

Do not believe that any inherent honor exists in being born or admitted by naturalization into the citizenry of a great country with magnificent traditions. Those who were born to America could not help themselves; those who entered our country were accepted without any careful inquiry. The distinction is not in our citizenship, but in our patriotism. Our honor rests solely in the contribution we make to those splendid ideals and that glorious history that is America.

It is our "bit" that counts, that makes our citizenship an honor and not a disgrace. He who lives among a people born to honor and world service is not ennobled by that association, but is rather disgraced, if he cannot hold his head erect and fearless in that company.

Large then as the birthright we have received must ever be the service we render. Our "bit" must be big that we may rightly appropriate, each one to himself, the virtues of his ancestors and foster ancestors. It is useless for Æneas to proclaim that he has descended from the gods if he bemean himself like a swineherd. This is the hour of all hours at which we can show whether we belong or do not belong to our glorious past, if it is ours or another's—this America, this tradition. The Liberty Loan is only one of the many opportunities now offered us whereby we can prove the spirit and mettle of our souls.

The Question of Water-Power Development

FROM time to time in the past, but particularly since the introduction of proposed legislation into Congress for the provision of more power where needed, the question of developing the water-power of the land has been agitated. Many there are who now, through the press or from the stump, loudly proclaim that available water-powers, wherever located, should at once be developed, that the neglect of this source of energy is costing this country one of its irreplaceable natural resources, which should by all means be conserved.

Now, in a measure, all of this is doubtless true—but the perspective with which it is viewed is awry.

Great engineering feats are undertaken for one of two reasons—to tickle the vanity of some individual or group of individuals, or because they will pay. The pyramids, palaces, hanging gardens, temples, etc., of ancient times were examples of the former; the railroads, the bridges, the gigantic ocean liners of modern times are examples of the latter. Ask any banker to find capital wherewith to finance any industrial project and the question will be immediately asked, How much will it earn?

The present is an abnormal time wherein normal economic conditions are in many respects "sadly out of joint." It is inevitable, however, that a time will come when ordinary conditions will again prevail. At present the task before the American people is to at once and forever absolutely crush Prussian militarism. Whatever means may be necessary to this end must be employed, and this with as much speed and dispatch as possible. More power is needed for war manufacturing, and the quick way to get it is with steam-power plants.

So far as the wanton squandering of the nation's coal is concerned, about which so much is being spoken and written, all that can be said is that coal is being used for the generation of power purely and simply because it is the cheapest source of energy. It is true that water costs nothing, but the equipment necessary for its utilization costs much. Coal-power has held supremacy over water-power in the past and will continue to do so until economic conditions dictate otherwise.

To sum up, regardless of how fervently the editors of popular magazines or vivid "yellow" sheets may entreat, how eloquently senators and representatives may thunder, how viciously soap-box orators may rant, the water-power of the land now running to waste will be harnessed and made to generate needed energy just as soon as legal restrictions will permit and such development will pay a reasonable return on the money invested. It will not be done before.

No Covenanted Peace with Germany

AMERICA, unless we repudiate civilization and abandon humanity and put a premium on savagery and brutality, can make no covenanted peace, no peace by agreement or negotiation with Germany. It would be a covenant with hell, a partnership with infamy.

Nor would such a peace secure peace, except so long as it suited Germany. We can judge the future only by the past, and to Germany sacred treaties are scraps of paper only. Germany's whole history is a record of national treachery, national bad faith, national dishonor, national murder, and national infamy.

Of the old men and children murdered, of the women and girls ravished, of the noncombatants taken from their homes and deported to work for their conquerors, of the merchant ships sunk and passengers and crews murdered, of the hospital ships sunk, the hospitals and unfortified cities bombed, of the mutilation and murder by crucifixion and otherwise of wounded and captured soldiers—of all this beastliness there is plenty of evidence, evidence that no one can disbelieve.

The best answer to German peace propaganda is sinking more U-boats, sending more men to France, speeding up our work along every line, and a heavy subscription to the Fourth Liberty Loan. Peace must mean the triumph of right and justice, the defeat of Germanism, not a truce with it, not a compromise with it.

DISCUSSION BY READERS

Mine Rescue Work

Letter No. 3—I have been deeply touched by the reading of the two letters that have appeared recently in *Coal Age* (July 6, p. 32, and Aug. 8, p. 283), describing rescue work in mines. The accounts given recall to my mind the distressed faces of miners who were brought to the surface, after weeks of suffering in the dark chambers of the Courrieres mine, in France, following the terrific explosion of Mar. 10, 1906, when 1200 miners were lost in that death-dealing blast.

We did not have, at that time, the efficient breathing apparatus with which to enter the mine, and there came to our aid hundreds of Westphalian miners who had been well trained in the use of such apparatus in rescue work. Thanks to their help, the mine was entered and the work of rescue commenced.

As time went on and days passed without the rescue of many whose lives we had hoped would be saved, that hope was fast dying in our hearts. The company was claiming that all the men remaining in the mine were killed and argued that, to save the property from further damage by the fire burning in the mine, the workings should be flooded.

Remarkable Rescue of Entombed Miners

Just then, one committeeman who had fought this proposition from the start, claiming that there were miners still alive below, went down again and entered a certain air-course where he came upon the dead bodies of men that he was sure were not there on his previous visit. His report of this caused the rescuers to make renewed efforts, with the result that 20 days after the explosion, 13 men were brought to the surface alive.

The men rescued were in a pitiable condition, having lived on dead horseflesh for many days. They had found shelter in a stable where the afterdamp did not penetrate. One can imagine what joy the rescue of those entombed men brought to many waiting hearts. Again, five days later, Apr. 4, another miner, named Berton, was rescued. In reply to our inquiry asking how long he thought he had been in the mine, he said "eight days." He little dreamed that he had been down in those dark chambers 25 days.

The fact that such rescues have been made should prove conclusively that the deadly gases of the afterdamp often do not penetrate the entire workings of a mine, and there is always a possibility that trained men, with efficient breathing apparatus, will be able to reach men who still live, having barricaded themselves in a chamber to escape the fatal atmosphere filling the passageways of the mine. In the Courrieres disaster men were found in such positions as to indicate that death overtook them instantly, the afterdamp giving them no opportunity to escape, but this is not always the case.

Let us remember that the past good record of a mine for safety must not be relied upon to that extent that men cease to watch and use every precaution to prevent coming disaster. The Courrieres mine had the reputation of being a safe mine, but greater precaution should have been used as it was known that danger was near, owing to a big fire in progress, in an adjoining seam of coal. The day of the disaster a few miners refused to enter the mine, my cousin among the number, fearing the danger they had to face.

Let me suggest, in closing, that more attention should be given to planning the ventilation of a mine with a view to assisting, in times of danger, in the work of rescue. Also, let every effort be made to improve the types of breathing apparatus now in use. The Gibbs apparatus, developed by the Bureau of Mines, is a step in this direction.

GASTON F. LIBIEZ,
Peru, Ill. Mine Examiner.

Perplexities of Mine Foremen

Letter No. 1—It was with much amusement and a good deal of appreciation that I read the editorial entitled "Let the Operator Get On the Job," *Coal Age*, July 25, p. 185, but dealing with the perplexities of mine foremen. If there is an employee around the mines who comes in for more trouble, and who carries, or miscarries, greater responsibilities than anyone else in the mine, it is the mine foreman.

The description given in the editorial is true, every word of it. In the position he occupies as an officer charged with the carrying out of the mine laws, and as an official of the company charged with the management of the mine, the mine foreman is truly a cross between a "safety engineer" and a "mine manager." In the present crisis, the title "Mine Foreman" might be defined as applying to that official who is responsible for *"a maximum of production for humanity's sake."*

Early on the job, in the morning, his troubles begin. The machine runners have not cut the coal in many places, which must remain idle for the day, as the loaders in those places are going home. The outlook for the day's run is dark, but the mine foreman, though an ordinary human being, must grin and bear it, although he may give expression to his feelings by a few cuss-words, occasionally.

Eventually, however, if the man is worth while he masters the situation as best he can and the hoisting of coal begins. He then turns his attention to the supplies of timber and tracking ordered by the men, on learning that these supplies are short. His requisition sent to the office some time since has not been filled and the men must wait; but the foreman must keep the coal running. His problem is to hold the men in their places and be responsible for their safety, until the needed supplies can be had.

A good mine foreman knows that to produce coal many things are needed; it may be better tools, powder,

facilities for haulage are urged; a motor to take the place of several mules in a certain section of the mine, and other changes to enable him to put the required tonnage on the tipple.

Many excuses and promises are offered the mine foreman by the management in response to these suggestions, but the desired equipment is not forthcoming. Too often it happens that a wiser head than his has changed his requisition, in the office; and an inferior quality of material, or a different brand of supplies than that indicated are furnished, because of its cheapness. It is false economy to send material into the mine, supposing that the man who must use that material can get the same results, and assuming that he does not know the best brand and understand his own needs better than the man in the office.

Another source of worry for the harassed mine foreman arises when the superintendent is called to account for failure in tonnage or an increased expense sheet, or other matters of a similar nature, and passes it on to his man, "Friday," whom we all recognize as our friend, the mine foreman. The big chief may not get to the mines more than once a year, and his coming is the occasion for many annoying requests made to the superintendent, but which, eventually, fall as a burden on the shoulders of the foreman in the mine.

Lest it should be thought that I consider all mine foremen good and competent to fill the office they hold, let me say that I have observed many incompetent men in this position, both in anthracite and bituminous mines. A good foreman never acts as if he owned the mine, while a less efficient man will show his incompetency by the abusive manner in which he conducts himself, and the heedless way in which he rushes here and there about the mine, but accomplishes little. The incompetent man impresses you with the fact that he is *boss*, which is something seldom observed in a good foreman, whom the miners come to respect, knowing that what he says goes.

Mistaken Conception of Authority

Well do I remember a visit to a mine in the southern anthracite region, where I went, in company with a party of bituminous operators, to inspect a certain large mine. The superintendent of the mine was with us, while the foreman piloted use through the workings. If ever a foreman showed his incompetency, that man did, by his manner and his many attempts to display his smartness, while every instruction given to his men was accompanied by an oath.

The impression on the minds of the visitors was that the production of coal in that mine would be greatly increased by putting another foreman in charge. In my opinion, however, Murphy was only the victim of improper training. Perhaps, he never had a chance to make a good mine foreman of himself. He had never been shown the errors of his ways, or reasoned with by a superior in office; but had grown up as a weed.

Let us study the mine foremen who are under us, strive to lighten their load and make them better and more efficient men. They are really the mainsprings of our mines, being in daily and intimate contact with the men who mine and load the coal.

Let us realize that the lot of the foreman is a hard one and be ready to recognize the man who has an ambition to rise. Many a foreman has the natural ability to make a good superintendent; perhaps, even surpassing the qualities of the man who is his superior in office. No man can progress today, unless he is a man of the hour and continues to grow each day.

Philadelphia, Penn. OBSERVER.

The Miner and His Pleasure

Letter No. 4—Since our country entered the war, the coal miner has had little time or inclination to think of pleasure. The scarcity of coal, in addition to the patriotic feeling of the average miner whose chief desire is to serve his country at this time and stand behind the boy "over there," has deprived him of even the thought of pleasure.

In almost every window of the miners' homes throughout the anthracite field hangs a National Service Flag, having from one to four stars, in token of the number of boys who have gone out to answer their country's call. The abiding thought in every mind is "duty today, pleasure tomorrow."

Sometimes I think too much is expected of the coal miner. The many complaints registered against this class of workers leads the public to hold them entirely responsible for meeting the utmost demand for coal and guaranteeing the winter's supply. The charges that miners are frequenting the saloons and that liquor is keeping them from their work in the mines fail of justice to the average miner.

Saloons in Mining Camps Not Thriving

In most mining camps, today, the saloons are not thriving; many have been obliged to close their doors and their keepers have gone to work in the mines. It is a common thing to see, in the daily press, the charge of drunkenness, and the writer's invariable claim that this is the cause of the shortage of anthracite.

If the statement of Mr. Buttons, chief of the Department of Mines of Pennsylvania, in addressing the retail coal dealers, in Harrisburg, some time ago, is true, that "drunkenness among miners is the sole cause of 20 per cent. of the shortage of anthracite," why does the Government permit this evil to go on?

In my opinion, one of the chief drawbacks to coal production, in the anthracite region, is the low wages paid to the miners, as compared with the attractive wages offered in other lines of work. Scores of miners are leaving the mines every day to take up other work. While some mine workers are making good wages, the average is below that of workers in other industries.

Great Need of Stabilizing Wages

Wages and cost of living should go hand in hand. The one should form the basis for computing the other. It would be well for the Bureau of Labor to continue its investigations of living conditions in the coal regions, and either make an adjustment of wages or control the rising prices of living necessities. If the cost of the latter were stabilized wages could also be stabilized, and such an achievement would be a blessing to all industrial workers.

The Government has stabilized the prices of wheat. sugar and some other things, but the movement should be extended further. If the Food Administration, through its methods and influence, can exert a pressure

to restrain speculators and profiteers from boosting the prices of a few essentials it should be possible to control all necessities of living, in a like manner.

Some time ago, I saw an item in a newspaper quoting President Wilson as stating that "profiteering is yet a rampant evil." The statement should be an incentive to more energetic and effective efforts in restraint of such practice. Certainly, the adjustment of wages and the cost of living should be of vital concern to the Government, in the present crisis, with a view of holding the mine worker in his place in the mine.

Attitude of the Miner Toward the War

Since the "Work or Fight" slogan was created and became a national policy, the attitude of the average miner is expressed in the words, "I will work where they will pay me the most wages, or I will fight with the boys in France." Coal miners appreciate their importance as workers in an essential industry, but they do not like the idea of being entirely barred from doing their share of fighting; they are opposed to class exemption. They have proved themselves fighters and can be excused for their desire to be made part of the American army that will some day *tread the streets of Berlin.*

The coal miners are true to this government; and that fact is the reason why the anthracite fields today are short from 35,000 to 40,000 men. Notwithstanding this shortage, the production of anthracite has never been greater than in the past year. Any miner, foreman, superintendent or operator who is not doing his level best to increase the output of coal, today, is watched as a dangerous man—a public enemy.

Before closing, I wish to ask a question in regard to the granting of vacations in war time. From mine official to miner, everybody is assumed to give superlative service, doing the best possible. In peace time, I believe a vacation should be allowed every working man under the sun if the man is worked to his capacity. I believe that the human body is like a machine and needs time to rest for the repair of the system. The rest accorded to mine officials, by all large coal companies in the Wyoming Valley, is for the most part a rest for the brain. Is that needed any more than rest for the muscles of the body of a mine worker?

Some time ago, a young man, working in the Wilkes-Barre Court House, was granted a vacation of ten days. He went into the mine for his vacation and loaded 200 tons of coal, showing his patriotism. Men should be honest with themselves. War-time vacations should be for the upbuilding of brain and muscle and not simply for jollification and pleasure. President Wilson has said, "we must not think of pleasure, until after the war when we will all have a big time." MINER.

Kingston, Penn.

Loading Coal at the Face

Letter No. 5—Referring to the record of Ed. Blagg, as given in *Coal Age,* July 6, p. 29, where it is stated that he loaded an average of 23 tons of coal a day of 8 hours, during the month of May, when working in No. 1 mine of the Buckeye Coal & Railway Co., at San Toy, Ohio, let me say that, although this is a remarkable achievement, we have no right to doubt the truth of the statement. I have heard some men remark that it could not be done, but they are men who fail to recognize that conditions are not everywhere the same as those under which they are working.

Here in Kentucky, I can say with truth, it would be impossible to make the same record. In this field, the miner is required to work under roof conditions that are often bad, besides being obliged to pick out the bone and sulphur from his coal when loading it into the car. It is my belief that, when stating facts or describing work performed in the mine, we often fail to give the particular conditions that made such possible. Many who read the account do not realize the great difference in the conditions in many mines. Hardly any two coal fields are alike, and the work of loading coal depends very largely on these conditions.

In mines where I have worked in Williamson and Franklin Counties, in Illinois, there is about 7 ft. of good clean marketable coal, overlaid with a good roof. Compare the work of loading coal under these conditions, with that in mines in Indiana in the low-coal region, or in the low coal of the Hazard, Harlan, or Pineville districts of Kentucky, or in some of the mines on Coal River, in West Virginia, or the low coal in the New River district. In any of the districts just mentioned, a miner could not be expected to load as much coal as when working in a thicker seam and under more favorable conditions.

There are, however, some disadvantages in loading coal in a high seam. In most cases the height of the car, in such seams, makes it difficult to load the coal with the same speed. Also, the timbering frequently requires more time and the cars being heavier are not as easily handled as the smaller cars in low seams. But these difficulties do not restrict the loading of a large tonnage to the same extent as does the handling of a draw-slate, which is so common in the working of a low seam of coal. In most mines, the miner must do his own timbering and in many cases, lay his own track. The tonnage a man can load then cannot be compared with what he will load when most or all of this work is done for him, as in many mines in Illinois.

In one mine, at least, in Hopkins County, Ky., the company employs shotfirers, who drill and shoot the coal, and the loader has nothing to do but to load it into the cars. When a loader has loaded all the coal in one place, he goes to another where there is loose coal ready to be loaded. He will generally try to find a place where the coal is handy to the track so that he will not have far to throw it into the car.

Working Conditions Determine a Man's Tonnage

It is readily seen that a comparison of the tonnage per man, under these varying conditions, cannot be made with justice to all. In order for a man to load a big tonnage in a day, he must have his place cut regularly, the empties must be there for him to load, and he cannot be expected to do much timbering or tracklaying. In addition, he must have a good light and good air. In this field, all shots are fired at quitting time, which gives the miner a great advantage as compared with places where the shots are fired at any hour of the day.

Since reading the poster page, in *Coal Age,* giving the record to which I have referred, I have tried to keep tab on five miners who are average workers. I find that these men spend, on the average, one hour in drilling

and charging the hole and about 15 minutes in timbering their places, which leaves 6 hours and 45 minutes for loading coal, in a day of 8 hours.

About a third of this time, however, is wasted in waiting for empties, which leaves only about four hours and a half for loading. Watching these men closely, I found that it took about twenty minutes for them to push a car into the room and load it. The cars held a ton and a half of coal and, at this rate, they could load about twenty tons each a day if they kept at work.

This is not claimed to represent the average tonnage per man, in this field. In my opinion, it could be much increased if the loaders were given half a chance; but, in many cases, the fault lies with the operator who has not provided the equipment necessary to keep the coal moving. When the drivers do their best the mule power employed is inadequate to haul out of the mines all the coal the miners can load. The trouble is not in loading the coal, but in putting it on the tipple.

Cleaton, Ky. OSTEL BULLOCK.

Use and Location of Booster Fans

Letter No. 2—I was much interested in the inquiry of "Mine Superintendent," *Coal Age*, Aug. 8, p. 287, in regard to the proper location for a booster fan when changing the circulation, as proposed in the second figure on the same page. It is not stated whether there are any entries working outby from the 9- and 10-E and W entries off the 9- and 10-N entries, shown in his sketch.

In replying to this inquiry, I will assume, first, that there are other entries working outby from those shown in the plan submitted. In that case, the air in the ninth and tenth cross-entries could be increased by placing regulators in the outby section or sections, provided the circulation in those sections is in excess of what is needed.

The building of the overcasts at the mouth of the 9-E entry, and splitting the main air current at this point so as to provide separate circulations for these east and west entries is a good suggestion, as it will increase the quantity of air in circulation, since the air in each split will then have only half the distance to travel. My suggestion of placing regulators in the outby sections would, of course, increase the water gage and reduce the total quantity of air circulating in the mine; and it is probable this would offset the good effect of building the overcasts and splitting the air at the ninth and tenth entries, all of which must be carefully considered. Such being the case, the only thing remaining to be done is to increase the power producing the circulation or to install a booster fan.

Assuming that the 9- and 10-E and W entries are equally developed and the same number of men are employed in each section, the proper location of the booster would appear to be at the intake airway, near the overcast and before reaching the point of split. Since the return airway in this mine is also the haulage road, the fan cannot be located on that entry. By locating it on the intake airway near the overcast, it will have the effect of increasing the volume of air in both the east and west sections, without placing regulators in the outby sections, as suggested previously.

It is my opinion that a booster fan will work equally well whether forcing or exhausting the air. Its location on the intake or the return airway must be governed by the conditions. In this instance, the location on the intake is determined by the fact that the haulage is performed on the return airway. I am assuming, now, that the stoppings inby and outby from the booster are in good condition, as otherwise the air would leak through the stoppings, and the current inby from the fan would not all reach the working face. The result would be that the leakage outby from the fan would cause that air to pass through the fan again and again. The booster would thus do little more than churn the air.

Referring to the statement of the inquirer that he is "inclined to place the booster in the return current, either on the 10-E or 10-W entry," I fail to see how he would get any benefit from such an installation, even admitting that the fan would work better as an exhaust than as a blower, unless one of these sections is working more men than the other and requires more air. Where both sections are working the same number of men and need the same quantity of air in circulation, the location of a booster in one of them would not give that result.

In my opinion, the only way in which the booster, in this case, can be used as an exhaust fan would be to alter the arrangement and make the intake airway the haulage road. If the mine is generating much gas this should be done anyway, especially if the booster is electrically operated. Without making such change, as I said before, the booster should be located near the overcast and outby from the split.

EMPLOYING A "BOOSTER" INSTEAD OF A REGULATOR

I have assumed, as is required by the bituminous law of Pennsylvania, that the principal ventilator is located outside of the mine. If there are no workings outby from the ninth and tenth cross-entries, it is my belief that there would be no advantage in putting a booster fan in this mine at all. What is needed, in that case, is larger airways and better stoppings. If these do not improve the circulation, a larger ventilator must be installed. In my opinion, a booster fan should only be employed to get air into a long split or section of a mine, at such a distance from the fan that otherwise it would be necessary to introduce a regulator in the shorter air split, so as to force more air into the longer split.

I cannot agree with the statement, made in the reply to this inquiry, on page 287, that "the location of a booster fan must always be on the return side and the fan must be operated to exhaust the air from the intake, inby of the leak." It is not always a case of leaky stoppings when a section of the mine is poorly ventilated; I believe that the trouble is usually due to excessive resistance in that section or split. If it were entirely due to leaky stoppings, these could be fixed, in many cases, cheaper than a booster fan could be installed and operated. It is a difficult matter to reduce the length of a split or its resistance, and the only way to get more air into that split is to increase the resistance in other sections, or splits, or to install a booster fan in the long split.

Uniontown, Penn. RICHARD MAIZE, Inspector of Mines.

INQUIRIES OF GENERAL INTEREST

Hauling Capacity of Storage-Battery Locomotives

I have experienced considerable difficulty in the operation of my storage-battery locomotive, which has failed to give me a full active 8-hour day on a single charging. The machine has a 300 ampere-hour capacity at 85 volts; and, as it is operating on a road where the grades do not exceed 3 per cent., it appears to me that this size of battery should yield a full day's work in our mine if suitable equipment is provided.

Thinking over the matter, I had concluded that the trouble is due cheifly, or wholly, to the fact that our mine cars, are the old plain-bearing type, the wheels being somewhat worn run hard. I believe that the excessive friction thus produced is an overtax on the locomotive, causing it to discharge or become very weak, after only about six hours of service.

I was, therefore, contemplating the purchase of new trucks or cars, equipped with the flexible roller-bearing type of wheels, which I have seen advertised in the columns of *Coal Age* for a considerable period. However, chancing to talk the matter over recently with a friend who has been operating mines for a number of years, he told me that I needed a larger locomotive, and stated that, in his opinion, the trouble would not be wholly overcome by the new type of equipment that I proposed to install. He was positive that the locomotive I was using was too small for the work.

Having observed the valuable and helpful assistance that has been afforded inquirers on similar problems through the columns of *Coal Age,* I would like very much to present my proposition and receive such advice as *Coal Age* and its practical readers are able to give. I know of no better plan of gaining valuable information than that presented by the wide circle of friends who contribute their knowledge and experience for the benefit of the industry. I hope that there will be many who have solved difficulties similar to my own and will be willing to give me the benefit of their experience.

Huntington, W. Va. OPERATOR.

We take pleasure in presenting this proposition for discussion, knowing that the broad field of practice represented by the readers of *Coal Age* will yield much helpful advice. We regret, however, that the correspondent has not given much data that are involved in such a problem and which are absolutely necessary to insure an intelligent answer to his inquiry.

While it can be stated with certainty that a great improvement will result from the adoption of flexible roller-bearing equipment, the capacity of the locomotive now in use to perform the required work cannot be told without a knowledge of numerous data not given, such as the weight of the locomotive resting on the drivers, condition of track, length of haul, weight of loaded trip, and last but not least the competency of the motormen. The only data given in the inquiry are the power-rating of the locomotive and the maximum grade of the haulage road.

It is possible, therefore, to offer only a brief suggestion based on the power of the motors, as determined from the given amperage and voltage under which the machine is designed to be operated.

In mine-haulage practice there are two general rules of estimating on the horsepower of a locomotive. One rule makes the effective wattage of the motors, per ton-mile-hour, practically equal to twice the tractive effort of the locomotive, expressed in pounds; and the tractive effort thus determined may be taken as one-sixth of the weight resting on the drivers, dividing by 2000 to reduce to tons.

Applying this rule, in the present case, assuming an efficiency of 90 per cent., the effective wattage derived from the amperage and voltage under which this locomotive is designed to operate is $300 \times 85 \times 0.90 = 22{,}950$ watts. For a speed of hauling of six miles per hour, the effective wattage per mile-hour is $22{,}950 \div 6 = 3825$ watts. Taking this as double the tractive effort of the locomotive gives for the latter.

$$\textit{Tractive effort} = 3825 \div 2 = 1912.5 \textit{ lb.}$$

Again, taking this as $\frac{1}{6}$ of the weight resting on the drivers, the weight of the locomotive available for haulage, in this case, is

$$(1912.5 \times 6) \div 2000 = 5.7, \textit{ say } 6 \textit{ tons.}$$

It may therefore be assumed that, if this locomotive is properly designed and its power properly proportioned to the weight resting on the drivers, the machine in use is a 6-ton locomotive.

Another rule, sometimes used in practice, makes the effective horsepower, per mile-hour, of a properly designed mine locomotive as 9.85 hp., per ton resting on drivers. For a speed of hauling of 6 miles per hour, the required effective power, per ton on drivers, would be $6 \times 0.85 = 5.1$ hp.

Applying this rule, the effective horsepower estimated on the given amperage and voltage, in this case, assuming the efficiency of the motor as 90 per cent., is $0.90\ (300 \times 85) \div 746 = 30.76$ hp. This effective power in a machine designed to haul at a speed of 6 miles per hour would call for a weight of $30.76 \div 5.1 =$ say 6 tons resting on the drivers, as found previously.

Finally, assuming a track resistance of say 15 lb. per ton, the grade resistance for a 3 per cent. grade being $3 \times 20 = 60$ lb. per ton, the total resistance opposed to the tractive effort of the locomotive is $15 + 60 = 75$ lb. per ton of moving load. The tractive effort being 1912.5 lb., the total moving load in this case is $1912.5 \div 75 =$ say $25\frac{1}{2}$ tons. Since this includes the weight of the 6-ton locomotive, the weight of the loaded trip is $24\frac{1}{2} - 6 = 18\frac{1}{2}$ tons that this locomotive would haul up a 3 per cent. grade, under the conditions assumed in the solution of this problem.

EXAMINATION QUESTIONS

West Virginia Examination (1918), Mine Foremen and Firebosses

(Selected Questions)

Ques.—Where would you take your air measurements and how and when would you enter them in the foreman's record book?

Ans.—The law requires (Sec. 64) that the mine foreman shall measure the air current, with an anemometer, at least twice each month, at the inlet and outlet and at or near the faces of the advanced headings; and shall keep a record of such measurements, in a book having a form prescribed by the Chief of the Department of Mines. The measurements should be entered in the book at the time they are taken, the entry being made with ink and dated and signed by the mine foreman as evidence that he has fully complied with the mining law of the state.

Ques.—State in detail what a miner should do on entering his working place and after the firing of each shot.

Ans.—On returning to his working place, after the firing of a shot, the miner should proceed with great caution. In the first place, he should not return until the air current has cleared away the smoke and gas produced by the shot, so that he can see clearly what is before him and discern the character of the roof above him. He must observe the condition of each timber and note if any of them have been misplaced by the shot. He must examine the roof carefully as he proceeds and be particularly cautious as he approaches the place where the shot was fired.

Before attempting to handle any coal for the purpose of loading it into the car, the miner must reset any timbers that have been misplaced by the shot, and examine carefully the face of the coal to see that there is no loose coal hanging and liable to fall. If the mine is generating gas, he must examine to ascertain if any fresh feeders have been struck and note if there is any increased outflow of gas from the coal. Having assured himself that the place is safe for work, he can proceed to set and load his car.

Ques.—Of what use are the following instruments, in and around coal mines: Anemometer, water gage, thermometer and barometer?

Ans.—The *anemometer* is used for ascertaining the velocity of the air passing in an airway, for the purpose of calculating the quantity of air in circulation at that point.

The *water gage* is used for determining the ventilating pressure per square foot of sectional area, at a point in the mine affording communication between the intake and return airways. Each inch of water gage corresponds to a pressure of 5.2 lb. per sq.ft. of section. The reading of the water gage marks the difference of pressure between the intake and return airways, at the point of observation, and shows the pressure required to circulate the air inby of that point. A water-gage reading taken on the fan drift shows the pressure required for the entire circulation in the mine, including the shaft.

The *thermometer* is used to ascertain the temperature of the mine, which is of interest in connection with the hygrometric condition, or the amount of moisture carried in the air. In other words, the capacity of the air for absorbing moisture in the mine and rendering it dry and dusty.

The *barometer* is used to observe the changes in atmospheric pressure, which suggest, to a greater or less extent, the gaseous condition of the mine. A falling barometer indicates a decrease of atmospheric pressure, which is liable to be accompanied by an outflow of gas from the abandoned workings, void places and other reservoirs of gas, in the mine or the strata overlying the openings in the seam.

Ques.—(a) What supplies are necessary in and around the mine, for the safe working of the same? (b) What is your duty and what would you do if these supplies were not on hand?

Ans.—(a) Supplies of timber, rails, tracking and all other material used in the mine, together with first-aid outfits, including stretchers, blankets, waterproof coverings, and suitable means for conveying the injured from the mine and giving them first-aid treatment should always be kept on hand at every mine, and be in a condition ready for instant use when needed. There should also be kept on hand a sufficient supply of tools and repair parts, powder, oil, etc.

(b) It is the duty of the mine foreman to see that all needed supplies are kept constantly on hand and available for use. In case supplies are not available at the mine, it is the duty of the foreman to notify the operator or agent of the mine, in writing, as required by law (Sec. 72), stating his inability to comply with the requirements of the law, owing to the lack of supplies. Sec. 39 of the law provides a penalty for any operator refusing to furnish the supplies necessary for the mine foreman to comply with the law.

Ques.—(a) What qualifications should a miner possess before letting him work alone? (b) What tools should every miner be required to have on hand in order to make his place safe?

Ans.—(a) Before any miner is permitted to work alone he should be required to demonstrate his ability to mine coal safely and to perform all the work required of the miner, including the timbering of his place and the shooting and loading of his coal. He must be able to detect the presence of gas, observe dangerous roof and be familiar with the mining laws and the mine rules and regulations relating to safety.

(b) In addition to the miners' tools, such as picks, drills, tamping rods and needles when the shots are fired by squibs, every miner should have an axe, saw

COAL AND COKE NEWS

Harrisburg, Penn.

With a view to drafting a comprehensive and fair standard of rates for insurance carried by coal operators under the compensation act, and especially for the anthracite operators, a conference was held in Wilkes-Barre on Sept. 19, with operators, officials of insurance companies, mine inspectors of both the bituminous and anthracite fields and officials of the State Department of Mines. The need for readjustment of insurance rates under the compensation law has existed for several years, as anthracite operators and the Associated Companies have protested that the standards now set apply only to the soft coal regions.

The conference, which was a lengthy one, and included the presentation of many technical statements and reports, revealed that during the several years since the schedule was made up safety appliances and methods in the mines have been so improved that some decrease in the rates may be expected.

One of the most important questions taken up was whether or not the State Department of Mines would consider an anthracite mine as "nongaseous" if no gas had been found in a mine for a period of one year or more. If they would approve this, the Insurance Companies stated that they would allow the mine to receive the "non-gaseous" rate. The Chief of the Department of Mines, Seward E. Button, stated that while only a section of a mine may give off gas, it was the custom to class this as a "gaseous mine." He contended that a mine may not generate gas for two or three years, yet a pocket of gas could be found at any time, and cited many instances to prove his contentions and would not agree that the Department of Mines should class a mine as "nongaseous" when it was possible that gas might be found any day.

An effort was also made by several insurance companies to exclude the use of the Davy lamp in the schedule, but nothing definite was decided and will not be for some time. A slight decrease of rates is looked for.

Investigation of all workmen's compensation awards commuted or permitted to be made in a lump sum payment to a Pennsylvania workman permanently injured in an accident will be made by the workmen's compensation Board.

The Board has announced it will discourage lump-sum payments of compensation, excepting when the claimants desire to use such commuted funds in the purchase of artificial appliances or for occupational training to equip themselves for their old tasks or a new occupation.

The census ordered by the compensation board to obtain the histories of all commuted cases during 2½ years that the board has been in existence is the first action of this kind taken by any compensation board or industrial commission of the United States in an effort to replace permanently disabled men in industry at proper tasks. It is believed that a large percentage of these cases can, by proper direction be returned to industry at a benefit, both to the injured men and to industry itself.

Holding in effect that an employee who has finished his work remains under the provisions of the compensation act until he has left the plant or property of his employer, Judge O'Boyle (Luzerne County) by an interesting opinion on Sept. 23 reversed the judgment of the Workmen's Compensation Board in the case of Bridget Tigue against the Forty Fort Coal Co., and directs compensation for the plaintiff in the sum of $1543.

The case is rather unusual. William Tigue, late husband of the plaintiff, was employed as a miner in the Forty Fort colliery of the defendant company and on Dec. 18, 1916, while walking from the shaft toward his home within the inclosed colliery yard of the company along the railroad used regularly by himself and other employees, was struck by a locomotive of the Lehigh Valley R. R. and killed.

When the case was first submitted to the referee he found for the plaintiff that she was entitled to compensation, but the Compensation Board on appeal reversed the decision of the referee, and then the case was sent to the court for a ruling.

The company denied liability because the decedent was not in the course of his employment when killed and that his death was not due to the condition of the defendant's premises, but to the Lehigh Valley R. R. engine. The court, however, holds that Mr. Tigue was doing something in the course of his employment from the moment he entered the inclosure on his way to work until he left the premises and got outside the inclosure on his way home, and that his death was due to conditions on the premises of the defendant company.

Uniontown, Penn.

Responsibility for providing fuel of such quality and in such quantity as to keep the blast furnaces operating at maximum capacity during the coming winter was squarely accepted by 300 representative operators of the Connellsville regions at a meeting here which was addressed by high officials of the United States Fuel Administration. By formal resolution the operators authorized the fuel chiefs to deliver personally to President Wilson upon their return to the capital a message to the effect that "the furnaces shall not bank because of lack of production of the Connellsville coal and coke region."

While the output of the local regions has shown a steady improvement since the perfection of Production Manager Byers' organization the program of that department calls for an increase of approximately 75,000 tons weekly by the middle of October. Mr. Byers announced at the meeting that the regional fuel administration had set the second week of October as the banner week of the year, and that an output of 800,000 tons was the goal of the fuel drive.

Fuel production for the week ending Sept. 14 exceeded all previous records of the region, showing an increase of 18,400 tons in coal over the previous week, which had also established a new record. The coke production for last week was 346,958 tons and the coal output was 216,184 tons. Reduced to terms of coal the total production for the region was 736,621 tons.

An outline of the fuel administration distribution department, as well as the reasons for establishing a rigid inspection of all coke shipments, was given by J. D. A. Morrow. Although there are 46 more blast furnaces now than a year ago, he declared, the steel output will be 4,000,000 tons less. That situation was mainly brought about by lack of quality in the coke, and he warned the operators that no action would be too drastic for the fuel administration to take to correct that evil. He talked in very plain language and his meaning was unmistakable.

Charleston, W. Va.

Much tonnage was lost in the Pocahontas and Tug River districts during the week ending Sept. 19 mainly because of labor shortage. The loss due to car shortage was only 2052 tons, while labor shortage caused a loss of 52,271 tons. The total tonnage produced during the period already mentioned was 433,013, representing a decrease of about 5000 tons as compared with the previous week. Coke manufactured was about the same as for the week previous, or 49,829 tons. Efforts are being made to take up the slack at the mines because it is getting to be too often the case that miners in the Pocahontas and Tug River Districts fail to work up to capacity.

The greatest drawback to increased production in the Fairmont District is the late placement of cars, which seems to have now become a chronic condition in that field. For instance, last Saturday (Sept. 21), while the district was furnished with 1142 cars at 7:00 a.m., only 621 cars had been placed by the B. & O. The car supply itself has been none too good, not averaging much over 1200 cars a day, which is below the maximum requirements of the district. The production in the district as a whole has also been curtailed by an order issued which makes it impossible for team track loaders to get any cars at all for loading coal. They are not even to be allowed to load cars emptied on an agent siding. The order has completely paralyzed operations of team track loaders in this section. Complaint is made by mines in the district and specific instances cited showing that cars have been taken from coal operators and sent to plants for the loading of non-essentials. For three days last week there were no placements of cars on the M. & K. R.R. Twenty-one coal mines and four coke ovens with a capacity of 110 cars, in the Preston-Monongalia field, were shut down because of such a car shortage.

Coal production in the Winding Gulf district for the week ending Sept. 14 totaled 123,471 net tons, an increase of 6734 net tons over the previous week. This is regarded as satisfactory in view of the holiday loss. Still further production gains were scored during the week ending Sept. 21 in the New River and Winding Gulf fields, the increase for the combined districts being in the neighborhood of 5000 tons. Results are being achieved in the movement for increased production under the direction of E. E. White, production manager, and continued increases in production are expected by coal operators.

Though the New River district mines had a 100 per cent. car supply last week, production was seriously curtailed when a large number of the miners took a day off on Monday the 16th to hunt squirrels. Two-thirds of the miners out of one mine alone, as an instance, were absent from their posts.

Had all the mines in the Kanawha region reported this week it would have shown a total production of over 200,000 tons. With reports from seven mines lacking, the officially reported total production was 196,587 tons, representing an increase of 8000 tons reported over the preceding week, the hours required to produce such a tonnage being 5847. Car shortage has been reduced to 359 hours and labor shortage was only 675 hours. Mine disability represented a loss of 489 hours. While the car supply was not 100 per cent. it was almost that.

Birmingham, Ala.

Greatly improved output of coal in the Birmingham District during the next few weeks is expected, due to full resumption of mining operations at the Lewisburg mines of the Alabama Co., renewed efforts of the Railroad Administration to satisfy the full car demands of the mining interests here, and the efforts of the miners to turn out greater supplies of coal.

Coal production during the week of Sept. 21 promises to show greater increase than that for any week in some time, for the reason that the low water mark was reached during the previous week, when only 385,621 tons was the reported coal output of the district's coal mines, according to figures compiled by the local office of the Fuel Administration. Production for the week just ended is estimated at 395,000 tons, roughly. Experts say the output should not drop below the 400,000-ton mark in the future, and the 450,000-ton mark is confidently expected for future weeks.

Mining operations have been begun at the old Bamford mines, which have lain idle for the past twelve years, with Birmingham operators in charge. The coal at these mines is of a good grade and runs from three to five feet. The mine was found in workable condition after long idleness, but the new owners have put in many improvements, including a new spur track to the main line of the Southern R.R., from which it is only a 12-mile haul to Bessemer. It is understood that the entire output of the mine has been contracted for.

Tonnage figures for coal production during the past two and a half months are as follows, by weeks: Week ending July 13, 412,478; July 20, 415,653; July 433,738; Aug. 3, 417,462; Aug. 10, 427,718; Aug. 17, 411,035; Aug. 24, 430,311; Aug. 31, 390,413; Sept. 7, 392,939; Sept. 14, 385,621.

Dallas, Tex.

About a score of new coal mines are to be opened in the McAlester-Wilburton coal fields, according to reports in McAlester, Okla., following the action of the War Industries Board in approving the applications of these companies. Something like 700 applications for authority to open new coal mines were made to the War Industries Board by operators in the McAlester-Wilburton section, and of this number only about 20 were approved.

The first report from Washington that the War Industries Board would frown on the establishment of new industries was followed by a period of marked inactivity, for there was an inclination to take this order at its face value without investigation. Later it was explained that the desire of the Board was to encourage all essential industries, particularly the production of coal, and that steps should be taken at once to place details of the proposed new development before the Board for formal action. Then followed a period of marked activity during which the propositions for the opening of many mines were placed before the Board.

The War Industries Board in acting on these propositions has explained that the mere production of coal is not all that is required to get approval of a proposal to open a new coal mine or to develop idle coal lands. The quality of the coal must be considered, the labor supply available for operating the coal mine without interfering with other essential industries, ability of the railroads and other transportation systems to move the coal from the mines to points of consumption, and finally the amount of coal that can be produced from the proposed mine, are factors that largely determine whether or not the new mine will be allowed to be developed.

Lack of transportation facilities was the chief reason for the disapproval of the applications from many of the Oklahoma concerns, and poor quality of coal to be produced ranked as a second reason for refusal.

PENNSYLVANIA

Anthracite

Sugar Notch—Two members of the surveying corps for the Lehigh and Wilkes-Barre Coal Co., while working in the No. 9 colliery of the company on Sept. 20, were burned when an open lamp ignited a pocket of gas.

Avondale—Four employees of the Delaware, Lackawanna & Western Railroad Co. were burned by an explosion of gas on Sept. 20, shortly after the beginning of operations. The two laborers had stood a set of timber near their chamber the night previous and were placing "cogging" about it the next morning. Shortly after the miner entered with a naked lamp and, encountering a pocket of gas, the lamp exploded, burning the men severely. They were all removed to the State Hospital.

Lattimer—Complaint was made on Sept. 23 by coal companies that the agreement which was drawn up this summer that one war industry would not recruit new hands from another plant engaged in Government work is being violated. C. Pardee & Bros. charged that their staff of miners has been raided and that nine have been located in a war plant nearby. The War Labor Board will be asked to act.

Hazleton—Despite the heavy rains in the past week the anthracite coal mines in the Lehigh region have not been affected by high water, and production has not been interfered with to the least extent. The precipitation was so gradual that pumps were fully able to handle the situation. The rains have refilled reservoirs that were low and there is no further scarcity of water anywhere throughout the district.

While wartime prohibition does not become effective until July 1, this town is already feeling the effects. So far this month (Sept. 22) only eight men have been arrested by the police on charge of intoxication, a record of which Mayor Heidenrich said he feels proud. Usually arrests for this misdemeanor exceeded all others, and were especially numerous around paydays at the mines. The falling off is attributed to the spread of the "dry move" and the high cost of liquor as a result of wartime conditions.

Mauch Chunk—The Lehigh Coal and Navigation Co. is planning for the reopening of the abandoned anthracite mine near Summit Hill.

Bituminous

Pittsburgh—The plant of the Orenstein-Koppel Co. at Koppel, Beaver County, Penn., has been sold by Alien Property Custodian Palmer to W. A. Chamberlain, auditor of the Pressed Steel Car Co. for $1,312,000. The 3000 shares of stock held by the German interests were sold to Hamilton Stewart, representing the Mellon interests of Pittsburgh, for $100.75 per share.

Uniontown—G. S. Harsh, L. W. Fogg and John A. Thompson, receivers of the Tower Hill-Connellsville Coke Co., have finished their labors and turned the property back to the stockholders of the corporation. J. R. Nutt, of Cleveland, Ohio, treasurer of the company, acknowledged the return for the corporation.

Greensburg—Joe Petris and Steve Stanton, firemen, were killed and two others are seriously injured as the result of a boiler explosion in the power house of the Westmoreland Coal Co. at Rillton, near here. Four boilers exploded and the escaping steam filled the boiler house. Other boilers remained intact and heroic workmen kept up steam to run the cages in order to hoist the 300 workmen from the mines. Repairs are rapidly being made and work will be resumed in a few days.

Black Lick—The Jewel Coal Co., controlled by men from Indiana, are constructing a siding, tipple, etc., preparatory to making shipments from its mines near Josephine. An incline plane will be constructed from the mine to the tipple and it will be necessary to build a two-span bridge over Black Lick creek to reach the railroad siding. The mines are now operating with a capacity of about 200 tons per day, the coal being hauled by teams and trucks. The capacity will be doubled upon completion of the tipple. Shipments will be made from the Cresson branch of the Pennsylvania Railroad.

WEST VIRGINIA

Bluefield—All office and store employees of the Panther and Lathrop Coal companies, operating in the Pocahontas field at this place, have entered into an agreement to go into the mines each and every Wednesday night to help load coal as a war measure and to donate the proceeds from such work to the Red Cross. This action was the climax to a meeting of the miners of the two companies held to name representatives of the miners on production committees.

Charleston—Such rapid progress has been made on the construction of the plant of the Big Bottom Coal Co. at Tad, on Campbells Creek, that the company will be able to begin the mining and shipment of coal in about ten days. The general manager of the new company is J. S. Cheney, of Charleston.

Dingess—The first coal company to be closed in district No. 9 on account of loading dirty coal is the Chafin and Hatfield mines at Dingess. This operation was closed by orders of the National Fuel Administration, effective Sept. 21. Numerous complaints were received by the consumers and manufacturing plants because of the bad quality and low grade of coal sent out by some of the mines, and as a result the announcement was made that after a certain number of offenses the mines found guilty would be closed. This suspension will remain until otherwise ordered by the Government.

OHIO

Athens—The labor train arranged for by the Buckeye Coal and Railway Co. to run from Athens up Bailey creek to supply a number of the company's operations in that field has been started by the Hocking Valley Railway Co. It required a month for the railroad company to find the three passenger cars necessary after the running of the train had been approved.

KENTUCKY

Hazard—Fire destroyed the power plant of the Hazard Coal Co. on Sept. 21, it being reported that the loss was heavy. The company will rebuild immediately.

Henderson—The Louisville, Henderson & St. Louis Railroad Co. on Sept. 23 lost a coal tipple valued at $10,000 in a fire at Henderson, which is supposed to have been started by rail tramps who had been sleeping in the tipple.

TENNESSEE

Chattanooga—The Chattanooga Iron and Coal Co., Chattanooga, Tenn., suffered severe damage to the engine room and dry blast tower when fire started in the oil storage room and spread to other sections of the plant.

ILLINOIS

Marissa.—The Aluminum Ore Co., of East St. Louis, has been leasing coal lands in the Darmstadt neighborhood between here and Lenzburg, with the intention of establishing a mine and operating it for a fuel supply for its big plant.

O'Fallon.—Samuel Meister, of Bay City, Mich., has been obtaining options on coal lands in this vicinity for a new company which is planning to take over and operate the mine formerly known as the O'Fallon Coal and Mining Co. Meister is offering $50 a ton for the coal rights and 5c. a ton for all coal hoisted.

Freeburg.—The Mulberry mine, near here, has been purchased by a newly organized company, the New Era Coal Co., which has been incorporated at Springfield with a capital stock of $25,000. The incorporators are H. B. Kooser, T. H. Gorman, L. Weiler and F. A. Friend, all of St. Louis. The mine employs about 100 men.

Oglesby—The Oglesby Coal Co.'s mine has been closed under an injunction issued by Judge Sanborn of Chicago. The injunction, which is a permanent one, was granted to prevent mining under the property of the Marquette Cement Co.'s property. The closing of the mine came as a great surprise to the officials of the mining company, especially at a time when the production of coal is being speeded up over the entire country.

Personals

E. W. Hoffman has resigned his position as superintendent of the mines of the Meco Coal Co. on Yellow Creek, near Homer City, Penn.

M. J. Zuby, formerly mine foreman for the Tide Coal Mining Co., at Tidedale, Penn., has been made superintendent of the mines of the Meco Coal Co. near Homer City, Penn.

Frank Farrington, president of the United Mine Workers of Illinois, was married Sept. 19 to Miss Alberta May Applewhite, at her home, 20 Campbell Ave., Indianapolis, Ind.

Eugene Jenks has been promoted from chief engineer of the Cowanshannock Coal and Coke Co., at Yatesboro, Penn., to superintendent of the No. 5 mines of the same company at Nu-mine, Penn., to succeed William Craig, resigned.

G. W. Colson, general manager of the Logansport Coal Co., Logansport, Penn., has been appointed general manager of the Pittsburgh & Allegheny Coal Co. and Pittsburgh & Clarion Coal Co. Mr. Colson has had considerable experience both in the United States and in European coal fields.

Thomas Bevan, of Scranton, Penn., has been appointed by W. W. Inglis, vice-president and general manager of the Delaware, Lackawanna & Western R. R., as general storekeeper of the coal mining department. Mr. Bevan was for seventeen years connected with the electrical department of the coal offices.

A. J. Case, formerly mine foreman of the Lucerne mine of the Rochester and Pittsburgh Coal and Iron Co. at Lucerne, Indiana County, Penn., has been promoted to superintendent of the Jacksonville mines Nos. 1 and 2 of the Jefferson and Clearfield Coal and Iron Co., at McIntyre, Penn., to succeed H. B. Stamper, resigned.

Obituary

Jack H. Morrison, aged 49 years, member of the firm of the Central Coal and Coke Co., of Carson, La., and superintendent of this company's properties in Louisiana, died at San Angelo, Texas, on Sept. 19, following an attack of appendicitis. Mr. Morrison at the time of his death was a member of the Government price-fixing committee on lumber.

Lieutenant George T. Rodgers, of Headquarters Company, 110th U. S. Infantry, was killed in action in France July 29. He was formerly a member of Company F of the Old Tenth Regiment of Pennsylvania and was promoted to a First Lieutenant before going over. At the time the United States entered the war Rodgers was division engineer of the Jefferson and Clearfield Coal and Iron Co., with headquarters at Indiana, Penn. His home was in Brookville Penn., and his mother and one sister survive him.

Publications Received

Petroleum: A Resource Interpretation. By Chester G. Gilbert and Joseph E. Pogue. Smithsonian Institution, United States National Museum. Bulletin 102, Part 6. Illustrated, 74 pp., 6¼ x 9¾ inches.

The Diesel Engine, Its Fuel and Its Uses. By Herbert Haas. Department of the Interior, Bureau of Mines. Bulletin 156. Petroleum Technology No. 44. Illustrated, 122 pp., 6 x 9 inches.

Annual Report of the Minister of Mines for the Year Ending Dec. 31, 1917. An account of mining operations for gold, coal, etc., in the Province of British Columbia. Illustrated, pp. 485, 7½ x 10½ inches.

Trade Catalogs

Pneumatic Rotary Dump for Mine Cars. Wood Equipment Co., Chicago, Ill. Bulletin 180. Pp. 12; 8½ x 11 in.; illustrated. Shows some typical installations of the pneumatic rotary dump and gives many reasons why the use of the dump improves mining conditions.

Type FK-20 Oil Circuit Breakers for Industrial Service. General Electric Co., Schenectady, N. Y. Bulletin 47,433. Pp. 16; 8 x 10½ in., illustrated. The circuit breakers described and illustrated run up to 300 amp. and 2500 volts, and are intended primarily for use with induction motors in industrial applications. Under proper supervision they may be used in coal mines.

The Gibbs Oxygen Breathing Apparatus. Mine Safety Appliances Co., Pittsburgh, Penn. Bulletin O-104. Pp. 20; 6 x 9 in.; illustrated. An interesting booklet containing an account of the development of the Gibbs apparatus, and listing the general requirements with which an efficient breathing apparatus should comply. The Gibbs device has been adopted for use by the U. S. Bureau of Mines and is made in America by American workmen.

Watt Cars—Mining and Industrial. Watt Mining Car Wheel Co., Barnesville, Ohio. General Catalog. Pp. 156; 8½ x 11 in.; illustrated. A splendidly prepared catalog, and one beyond criticism from any point of view. The typography, illustrations and paper are of the finest. Many of the company's most successful types of mine cars are described. The catalog is divided into five sections, embracing mining cars, industrial cars, ore cars, wheels and couplings.

Coming Meetings

Coal Mining Institute of America will hold its its annual meeting Dec. 4 and 5 in Pittsburgh, Penn. Secretary, H. D. Mason, 911 Chamber of Commerce Building, Pittsburgh, Penn.

American Institute of Mechanical Engineers will hold a meeting of the Middle West sections on Oct. 25 and 26 at Indianapolis, Ind. Secretary, Calvin W. Rice, 29 West 39th Street, New York City.

Recent Coal and Coke Patents

Furnace Grate. H. O. Dorsey, Atlanta, Ga., 1,274,147, July 30, 1918. Filed Nov. 14, 1917. Serial No. 201,965.

Smoke Consumer. T. Parobi, Dundee Lake, N. J., 1,273,402, July 23, 1918. Filed Apr. 13, 1917. Serial No. 161,697.

Dump-Car Construction. H. S. Hart, Chicago, Ill., 1,273,853, July 30, 1918. Filed May 24, 1918. Serial No. 236,275.

Coal Mining Apparatus. H. A. Kuhn, Pittsburgh, Penn., 1,273,504, July 23, 1918. Filed May 18, 1914. Serial No. 839,331.

Coal Mining Device. J. F. Joy, Belle Vernon, Penn., 1,273,869, July 30, 1918. Filed Sept. 22, 1917. Serial No. 192,773.

Locomotive Noiseless Smoke Consumer. J. H. Lewis, Chicago, Ill., 1,273,885, July 30, 1918. Filed July 25, 1914. Serial No. 853,006.

Fuel Briquet. W. Kennett and E. T. Krebs, Carson City, Nev., 1,273,619, July 23, 1918. Filed Feb. 13, 1918. Serial No. 216,995.

Stoker. W. H. Haas, assignor Murphy Iron Works, Detroit, Mich., 1,273,481, July 23, 1918. Filed Nov. 11, 1914. Serial No. 871,484.

Apparatus for Distillation of Coal. J. L. Grafflin, Astoria, N. Y., 1,274,033, July 30, 1918. Filed Nov. 20, 1917. Serial No. 203,011.

Interlocking Control for Mine Hoists. C. L. Perry, assignor to General Electric Co., Schenectady, N. Y., 1,273,661, July 23, 1918. Filed Mar. 25, 1918. Serial No. 224,618.

Ash Conveyor System. A. Girtanner and R. H. Miller, assignors, to American Steam Conveyor Corporation, Chicago, Ill., 1,273,849, July 30, 1918. Filed Apr. 29, 1915. Serial No. 24,628.

Industrial News

Mobile, Ala.—The National Coal Co. has increased its capital from a nominal $2000 to $20,000.

Hazard, Ky.—The Kentucky Block Coal Co. has increased its capital from $35,000 to $100,000.

Hazard, Ky.—The Lots Creek Coal Co., Hazard, Ky., has increased its capital from $60,000 to $100,000.

Colmar, Ky.—The Long Ridge Coal Co. has filed notice of an increase in its capital from $20,000 to $50,000.

Columbus, Ohio—The Strabley Co. has been incorporated with a capital of $150,000 by John H. Price and others.

Girdler, Ky.—The Steele & Alder Coal Co., capital $18,000, has been incorporated by P. M. Alder, W. B. Steele and Rex E. Steele.

Miami, Okla.—The Eagle Picher Mining Co. is said to be considering plans for the development of coal properties in the vicinity of Miami.

Harlan, Ky.—The Upper Harlan Coal Co. has filed notice of an increase in its capitalization from $60,000 to $100,000 to provide for expansion.

Thurber, Tex.—The Texas & Pacific Coal Co. has filed notice of an increase in its capital from $3,000,000 to $4,000,000 to provide for business extensions.

Pikeville, Ky.—The Fannin Coal Land Co. has been incorporated by J. M. Fannin and associates to operate coal properties in this section, with capital of $50,000.

Hazard, Ky.—The Yerkes Mining Co., capital $1500, has been incorporated by J. E. Baker, W. A. Stanfill and others to enter the coal mining business.

Louisville, Ky.—The Louisville Soap Co., Floyd Street, has had plans prepared for the construction of a series of new coal hoppers at its works to cost about $9000.

Pittsburgh, Penn.—The Pittsburgh & Lake Erie R. R. has commenced excavations for a new coal-handling plant at Brightwood, Penn., to cost about $250,000.

Albany, N. Y.—The New York Central R. R., St. Lawrence Division, is having plans prepared for the construction of a new mechanical coaling plant at Ogdensburg to cost about $30,000.

Muskogee, Okla.—The Baxter Springs Coal Mining Co. has been organized at Muskogee with a capital stock of $20,000. The incorporators are J. T. Sartin, W. O. Manley and C. M. Bowles.

Philadelphia, Penn.—Director of Supplies Joseph S. MacLaughlin has made application to the City Council for an appropriation of from $250,000 to $300,000 for coal for the municipal buildings.

Beattyville, Ky.—The Mekes Branch Coal Co., Beattyville, one of the Kentucky river mining companies, has changed its name to the White Ash Fuel Co., and increased its capital from $25,000 to $50,000.

Charleston, W. Va.—Numerous improvements are being made at the plant of the Barren Creek Coal Co., at Queens Shoals, with a view to increasing the output. This plant is under the management of J. R. Ramage.

Richmond, Va.—The Raven Coal Co. has been incorporated with a capital of $500,000 to operate coal properties. J. E. Hall, Bluefield, W. Va.; Justin J. Stevenson and Willard S. Holcomb, Columbus, Ohio, are the incorporators.

Longstreth, Ohio—The Locke Coal Co. has been chartered with an authorized capital of $30,000 to mine and sell coal. The incorporators are Frank Locke, John Turner, Herbert Locke, Charles Locke and Edwin D. Ricketts.

West Philadelphia, Penn.—The Pennsylvania Railroad Co., 3200 Powelton Ave., Philadelphia, has awarded a contract to Brann & Stuart, Commercial Trust Building, for extensions in its coal wharf No. 2 at West Philadelphia.

Sewelton, W. Va.—The Sewelton Coal Co. has been incorporated with a capital of $150,000 to operate coal properties in the Sewelton section. E. F. and J. W. Graham and W. A. Charlton, all of Hinton, W. Va., are the incorporators.

Roanoke, Va.—The Kentucky Cardinal Coal Corporation has been incorporated with a capital of $250,000 to develop coal lands in the Roanoke field. J. C. Stras, Roanoke, is president; and J. A. McQuail, Hiawatha, Va., is secretary.

Pittsburgh, Penn.—The La Belle Coal Co. has purchased a tract of about 44 acres of coal lands in Harmar Township for a consideration of about $30,000, and is understood to be planning for the early development of the property.

Zanesville, Ohio—The Western Pennsylvania Coal Co. has been incorporated with a capital of $225,000 to mine and sell coal. The incorporators are L. B. Burger, Joel R. Lewis, Samuel H. Sedwitz, David J. Lewis and Joseph Goldberger.

Beech Creek, Ky.—The Kirk Coal Co. which recently filed notice of an increase in its capital from $10,000 to $100,000, is now developing approximately 250 acres of coal properties in the Beech Creek section, having a capacity of 500 tons daily.

Madisonville, Ky.—The Circle City Coal Co. has plans for improvement of its tipple facilities, these plans calling for abolishment of the present incline to the tipple and installation of automatic machinery to lift the mine cars to the tipple for dumping.

Pittsburgh, Penn.—The Pitcairn Gas Coal Co. has recently taken title to about 11 acres of coal properties in Patton township for a consideration of approximately $15,000. It is said that the company is planning for early development operations.

Splash Dam, Va.—The Sutherland Coal Co. has been incorporated with a capital of $50,000 to engage in the development of coal properties in the vicinity of Splash Dam. S. H. Sutherland, Clintwood, Va., is president; and T. L. Sutherland, Lebanon, Va., is secretary.

Heidelberg, Penn.—The M. C. & H. Coal Co., recently organized, is planning for the development and operation of about 50 acres of coal lands in this vicinity. The initial plant to be installed will have a capacity of about 25 tons a day. Patrick Henry is secretary-treasurer.

Charleston, W. Va.—The Booker Washington Development Co. has been incorporated with a capital of $100,000 to operate coal properties in the Charleston district. I. Shuster and John P. Swanson, Danville, Va., and T. B. Bowman, Charleston, are the principal incorporators.

Bradford, Penn.—The Natural Resources Development Corporation has been incorporated in Delaware with capital of $25,000,000 to develop and operate coal, oil and natural gas properties. Carl K. Dresser and James P. Ryan, Bradford; and A. M. Bush, Tulsa, Okla., are the incorporators.

Mount Morris, Penn.—The Mount Morris Coal Co., recently organized, is planning for the development and operation of about 200 acres of coal lands in the vicinity of Morgantown, W. Va. Mining equipment, including electrical machinery, will be installed at the property. M. B. Clovis is president.

Pittsburgh, Penn.—D. Kirk, chief engineer of the Pittsburgh Terminal Railroad and Coal Co., is considering the reconstruction of the tipples at mines Nos. 6 and 7, located about 10 miles from Pittsburgh on the Monongahela River and the old Wabash R. R., now used by the Western Maryland Railroad.

Oklahoma City, Okla.—The Oolagah Coal Co. of Enid, Okla., has been organized and charter filed in the office of Secretary of State Lyon at Oklahoma City. The company is capitalized at $300,000 and the incorporators are Robert D. Anderson, O. A. Triplett, both of Enid, and Henry Flanders, of Weimer, Okla.

Charleston, W. Va.—Anchor Coal Mining Co., Morgantown, W. Va. Capital stock, $100,000. To operate mines in Monongalia County and elsewhere in West Virginia. Incorporators, John C. Pollock, of Fairmont; Wilford B. Grim and E. A. Allen, of Shinnston; Ernest H. Gilbert and Mable Wilson, of Morgantown.

Louisville, Ky.—The Pittsburgh Coal Co., which in past years handled river coal from barges almost exclusively, is now handling considerable quantities of rail coal, including western Kentucky. At the present time the company is endeavoring to locate a new or second-hand locomotive crane to aid in unloading and handling coal in the yards.

Joplin, Mo.—The Lightning Creek Coal Co., will start work Oct. 1 on the development of its coal mine near Pittsburg, Kan. About $25,000 is to be expended. Material and equipment needed and not yet purchased include coal cars, concrete, boilers, hoist, lumber, roofing, steam engine, wire cable, etc. P. E. Tabor is superintendent in charge.

Charleston, S. C.—In connection with extensive improvements to practically double the present capacity of its plant, the Charleston Consolidated Railway and Lighting Co. is planning for the installation of new coal and ash-handling equipment at the Charlotte St. generating station. The entire expansion program is estimated to cost about $700,000.

Baxter Springs, Kan.—Work will be started Oct. 1 by the C. and M. Mining Co. on the development of its coal property near here. The estimated cost of the proposed plant is put at $25,000. Equipment and material not yet purchased include a steam shovel, engine, boilers, concrete, screens, belt, tracks and cars. G. R. Cook is the superintendent at the works.

Beaumont, Tex.—The Texas Steel Co. has acquired a tract of coal property near Birmingham, Ala., and plans to develop the lands for a production of over 150,000 tons a month. The site is located in the Warrior River district, and in connection with the proposed coal plant a coke works is contemplated, to be used for the company's steel works at Rusk, Texas.

Clarksburg, W. Va.—Clarksburg will be the headquarters of the Clarksburg Domestic Fuel Co., which will develop coal lands in Harrison County, the company having been granted a charter by the secretary of state. The incorporators are Thomas J. Francis, J. H. Stephenson, Robert Shuttleworth, Edward W. Laubenstein and Louis E. Dorsey, all of Clarksburg.

Oakland, Md.—The Freeport Coal Co. is planning for the development of about 300 acres of coal lands near Corinth, W. Va., and proposes to provide a plant with an initial capacity of about 100 tons a day. A housing settlement for employees at the mines will also be established. The company has recently increased its capital from $25,000 to $100,000. R. T. Thayer is superintendent.

St. Louis, Mo.—An inventory of the estate of Charles E. Gartside, former president of the Gartside Coal Co., filed in the Probate Court, shows that he left a personal estate of $217,002.25, on which $210,500 was in bonds. One-half of the estate was bequeathed to his wife and the other half to a niece and three nephews, one of whom is Robert A. Niggeman, president of the Gartside company.

Springfield, Ill.—The skip-stop system installed by the Springfield Consolidated Railway Co. will save 10 per cent. of the coal normally consumed. Twenty-five per cent. more will be saved by the elimination of part of the heating and lighting of the cars. The normal consumption by the Springfield Consolidated Railway Co. and the Springfield Gas and Electric Co. is 100,000 tons annually.

Columbus, Ohio—The Arrowhead Coal Co., recently chartered with a preliminary capital of $1000, which will soon be increased one hundred fold, has acquired a tract of 1000 acres of coal lands in Perry County, on the Pennsylvania, which will be developed by stripping. Machinery has been ordered and it is expected that coal will be loaded in 60 days. The overburden is about 20 ft. on the average.

Charleston, W. Va.—Former Judge H. D. Rummel, of the Common Pleas Court of Kanawha County, heads the newly organized Central Byproducts Coal Co., which will establish a plant in Big Sandy District of Kanawha County, representing an expenditure of about $60,000. The incorporators, in addition to Judge Rummel, are H. S. Rummel, H. T. Smarr, D. O. Blagg and J. C. Morris, all of Charleston.

Bellaire, Ohio—The shaft mine of the Captina Coal Co., which is located at Armstrong, has been taken over by A. A. Minder, Robert Matnice, James F. DuBois and Charles Wise, all of Bellaire. The new owners, who intend to secure a charter, will soon start development work looking to an increase in output. The mine will be electrified and new equipment and material will be purchased. William Rennie is superintendent in charge of operation.

Pittsburgh, Penn.—A deal is pending between the General Edison Company of New York, and D. B. Zimmerman of Somerset, Penn., president and chief owner of the Quemahoning Coal Co., operating several mines in Somerset County, for the purchase of the latter company and the Indian Creek Railroad, connecting with the Baltimore & Ohio R.R., and serving some of the mines. The remaining mines are on the Baltimore & Ohio Railroad.

Morgantown, W. Va.—Taylor County people are behind a new coal venture in Monongalia County and plan to operate mines in that county near Opekiska, the company to be known as the Somerville Coal Co., whose chief office will be established at Grafton. The company has an authorized capital of $30,000, the incorporators being Eugene Somerville, Laura E. Somerville, Mary M. Somerville, Mary S. Holden and Rufus Holden, all of Grafton.

New York, N. Y.—The United States Steel Corporation is said to have acquired a tract of about 12,000 acres of coal property located on the Monongahela River in the northern section of Greene County for a consideration understood to be in excess of $4,000,000. It is said that the company will soon commence operations for the development of the properties, which will produce coking coal exclusively, and will be used in the various furnaces of the company.

Oklahoma City, Okla.—City officials of Oklahoma City have decided to establish a municipal coal yard. Contracts for a coal supply will immediately be made. This will not interfere with local coal yards, but coal will be sold from the municipal yard when other coal yards are out, and the poorer classes will be served first. According to Allen Street, county fuel administrator, not more than one in twenty families in Oklahoma City have provided a coal supply for the winter.

Charleston, W. Va.—Further development of coal lands near Hartland, in Clay County, will be undertaken in the near future by the Clay County Fuel Co., which has a capital of $100,000, Charleston and Philippi business men being chiefly interested in the new venture. The principal figures in the new company are S. A. Moore, of Charleston; A. J. Peck, of Charleston; William Taylor George, of Philippi; H. J. Wilcox, of Philippi; A. A. Lilly, former Attorney General, of Charleston.

Chicago, Ill.—The general offices of the Wood Equipment Co., manufacturers of the Pneumatic rotary dump, have been moved from the McCormick Building to 1220 East 75th St., Chicago. The company has acquired a large tract of land fronting on the Illinois Central R. R., together with a number of buildings, including a workshop. The growing demand for the company's product will necessitate the enlargement of the factory facilities, and new construction will be undertaken as soon as conditions permit.

Newark, N. J.—The Burnrite Briquet Co., of Newark, N. J., has filed plans for its proposed new manufacturing plant at Avenue A, Alpine and Earl Streets, to cost $95,000. The initial works will consist of five one, two and four-story buildings for general manufacturing, as follows: One, two and four story main structure, 66½ x 88 ft.; one-story, 52 x 54 ft.; one-story, 42 x 42 ft.; two-story, 24 x 40 ft.; and one-story, 31 x 164 ft. A steel coal conveyor trestle, 280 ft. long, to cost about $7000 will also be constructed.

Indianapolis, Ind.—Plans for the formation of a protective organization by Indianapolis coal dealers to stop the theft of coal from cars in the railroad yards have been discussed and further meetings will be held. It is estimated that the thefts amounts to $100,000 annually. One dealer reported that his company had lost $7500 in one month through wholesale thefts from cars. Martin Rehfuss, Jr., fuel administrator for Marion County, said that he would coöperate with the coal dealers in their efforts to stop this loss.

Charleston, W. Va.—The Kanawha Collieries Co., Charleston National Bank Building, recently organized, is planning for the immediate development of a tract of coal property of over 1000 acres of a total site of about 2700 acres of land held in the Swiss section of the state. The company will install a complete mining plant for development and operation, consisting of tipple machinery, conveying equipment, mine railway line with cars and other machinery. All equipment will be electrically operated wherever possible, with substation provided for this purpose. William G. Conley is president.

Toledo, Ohio—Dock activity during the week ending Sept. 21 was generally satisfactory, although the tonnage loaded was not as large as during the previous week. Special efforts are now being made to get a large tonnage to the Northwest before the close of navigation. During the week the Toledo & Ohio Central docks handled 73,000 tons as compared with 92,000 tons the previous week, making a total of 1,522,000 tons for the season. The Hocking Valley docks during the same week handled 190,333 tons as compared with 207,000 tons the previous week, making 3,487,000 tons for the season.

Cincinnati, Ohio—The Lunkenheimer Co., manufacturers of high grade engineering specialties, royally entertained the delegates and visitors of the N. A. S. E. National Convention held here during the week of Sept. 9. The company obtained permission to use Cincinnati's wonderful Zoological Gardens, and judging from the large attendance every one visiting the convention was present. It was the consensus of opinion of the delegates and their friends that the Lunkenheimer outing made the 1918 convention one of the most enjoyable and interesting ever given and one long to be remembered.

New York, N. Y.—C. A. Graves has been appointed Administrative Engineer for New York State by Delos W. Cooke, State Fuel Administrator. Mr. Graves was formerly Assistant Administrative Engineer in charge of the New York-Metropolitan District. He is president of the Graves Engineering Company and vice president of the Southern New York Power & Railway Corporation. Previous to his forming the Graves Engineering Co. five years ago, Mr. Graves was power engineer for the Edison Electric Illuminating Co. of Brooklyn, and previous to his work in Brooklyn he was superintendent of power for the Peckham Manufacturing Co., manufacturers of electric railway equipment.

Pittsburgh, Penn.—The Pennsylvania Coal and Coke Corporation, of Cresson, Penn., has commenced the foundation for a new tipple at its Patton mine, to replace the tipple entirely destroyed by fire July 18. Mines Nos. 33 and 37 are located near Patton. Picking belts will be installed for the hand removal of impurities intermixed with the lump size of coal, and and experimental coal-washing jig with the necessary coal-handling equipment will be provided for the removal of impurities intermixed with the nut and slack sizes of coal. During construction of the surface plant coal mined at No. 33 mine will be delivered over Mine No. 37 tipple by underground connection. The entire construction is in charge of H. H. Hasler, mining engineer for the Pennsylvania Coal and Coke Corporation.

Seattle, Wash.—Due to heavy demand for steaming coal for the new government ships and the regular offshore vessels, no immediate relief is in sight for the fuel shortage that is hampering a number of the steamship lines operating out of this port. Curtailment of service may become necessary unless the steamboats change to wood fuel. Increasing output of new Government ships in this district has added immensely to the demand for steaming coal, and the labor shortage in western Washington mines has prevented the mines from meeting this. The movement of 100,000 tons of Northwest coal to Chile, it has been explained by operators, has no effect on the sea situation, as the coal for that country is railroad fuel and is not adapted for ship use.

St. Louis, Mo.—Application of the Laclede Gas Co. to the Missouri Public Service Commission for permission to increase its rates for gas has disclosed that the company is losing $789,000 a year because it is under long-time contracts which cause it to sell its byproducts at less than the market price. The company buys and sells its coke under a reciprocal contract with the Consolidation Coal Co. which does not expire until Dec. 31, 1919. Under that contract the company pays a maximum price of $3.65 a ton for its coal. It receives $4 a ton for gas-oven coke and approximately $5 a ton for its metallurgical coke. Although it gets its Elkhorn coal at $3.65 a ton, while the Government price is $5.15, delivered in St. Louis, its advantage in that respect is heavily overbalanced by the fact that, if it were not for the contract, it would be getting $7.75 for gas-oven coke and $9.90 for metallurgical coke.

Pittsburgh, Penn.—H. H. Hasler, mining engineer, Pennsylvania Coal and Coke Corporation, Cresson, Cambria County, Pennsylvania, is making a study of the coal seams at mines Nos. 33 and 37 near Patton, mine No. 46 near Winburne, mine No. 8 near Ehrenfeld and mine No. 15 near Beaverdale. The owners have in view the marketing of only well cleaned and sized coal and contemplate removing the impurities loaded in the cars by the miners by hand-picking the larger sizes and washing the nut and slack sizes. They are also seriously considering mechanical appliances for reclaiming the coal values in the extensive refuse pile adjoining mine No. 33. This pile consists of slate, pyrites, bony rock and coal. Preliminary tests show that 25 per cent. of the pile is very fair coal containing on an average 11½ per cent. ash, less than 1 per cent. sulphur, 25 per cent. volatile matter and 63.50 per cent. carbon.

MARKET DEPARTMENT

Weekly Review

Bituminous Mines Slow To React to Stimulation—Soft Coal Output Shows Decline in Spite of Efforts Made To Boost Output—Improvement in Car Supply Discloses Shortage in Man Power—Anthracite Production Falls Off Because of Strike

THE bituminous miner, as a class, does not seem to react noticeably to the many attempts being made to speed him up. In spite of the earnest work of production committees to boost output, in spite of get-together meetings held for the express purpose of acquainting the miner with the importance of his labor to the war program, in spite of an improved car supply and the existence of other favorable conditions, the output of soft coal keeps going down from week to week. During the week ended Sept. 21, the bituminous mines shipped 12,650,000 net tons of coal. This quantity is by no means near the maximum capacity of the mines, though it exceeds by 2,060,000 net tons the output of the corresponding week of 1917. To successfully meet the urgent demands imposed by our war industries the bituminous mines should be working to the straining point, and it is toward this end that the production department of the Fuel Administration is laboring.

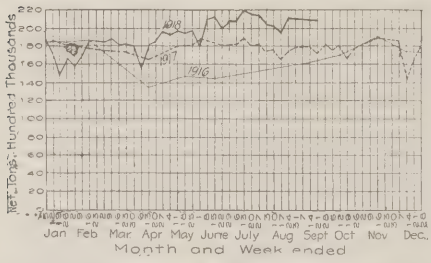
As the car supply at the mines continues to improve the shortage in man power makes itself more evident. Labor at the mines is uneasy, and if too hard pressed the worker packs his belongings and goes elsewhere, lured on by the higher rates of wages paid in other industries. It never before was so difficult to maintain a spirit of contentment in the mine worker, and this is undoubtedly responsible for the poor showing made by some operations.

The recent strike in the anthracite region caused a drop in production for the week ended Sept. 21, as the total output for that period amounted to only 1,847,000 net tons, a decrease of 241,000 net tons as compared with the week preceding and 159,000 net tons lower than the production during the corresponding week of 1917.

So far as market conditions are concerned, the demand still continues greater than the supply, with a scarcity existing in the domestic sizes of anthracite. The smaller sizes of steam coals are plentiful in the larger cities of the Atlantic seaboard, and some of the producers, it is claimed, are even shading prices in order to dispose of their stocks.

WEEKLY COAL PRODUCTION

Bituminous coal production during the week ended Sept. 21 varied but little from the week preceding and is estimated at 12,650,000 net tons. This output, while 0.4 per cent. below the production during the week of Sept. 14, exceeded production during the corresponding week of 1917 by 2,060,000 net tons, or 19.4 per cent. It will be noted that while the decrease in production during the week ended Sept. 21 was slight, compared with the week preceding, the decrease during the corresponding week of 1917 compared with the week of Sept. 14, 1917, amounted to 387,000 net tons, or 3.6 per cent. thus interrupting for the



second successive week the parallelism of the curve of daily production this year and last maintained during the past three months. The daily average during the current week is estimated at 2,108,000 net tons, slightly lower than the week preceding, but considerably in excess of the daily average (1,765,000 net tons) during the week of Sept. 21, 1917.

The strike in the anthracite fields during the week ended Sept. 21 caused production to decrease 11.3 per cent. The output is estimated at 1,847,000 net tons as compared with 2,088,000 net tons during the week preceding, and as against 2,006,000 net tons during the corresponding week of 1917. The daily average during the current week is estimated at 308,000 net tons, considerably less than the daily average for the coal year to date of 337,000 net tons, which is 2.1 per cent. in excess of the daily average of the same period of last year.

Carriers' reports show increased shipments of bituminous coal during the week ended Sept. 21 from the district including northeast Kentucky, high volatile of southern West Virginia and smokeless fields of West Virginia, Alabama, the district including Illinois, Indiana and Western Kentucky, and the district including Cumberland, Piedmont and Somerset and Fairmont.

Bituminous coal dumped at lake ports, during the week ended Sept. 21, amounted to 1,143,568 net tons, a slight decrease compared with the week preceding. However, compared with the weekly average during July, August and September, the current week's tonnage was 80,000 net tons, or approximately 8 per cent. in excess.

The falling off in shipments to New England during the current week was even greater than the decrease in tidewater shipments, reports from all harbors showing approximately 15 per cent. less coal moving to New England than during the week preceding. Rail receipts also declined 8 per cent., making a total decrease in New England coal, for the current week compared with the week preceding of 12.6 per cent. The decrease in shipments from New York and Philadelphia amounted to 5.7 per cent., from Baltimore 21.1 per cent. and from Hampton Roads 18.4 per cent. Compared with the weekly average for the coal year to date, New England coal receipts, during the current week, fell approximately 36,000 net tons or 6 per cent. Both rail and tidewater figures show a falling off compared with the weekly average, while analysis of tidewater shipments show that New York, Philadelphia and Baltimore exceeded the weekly average, but Hampton Roads fell behind 19,000 net tons or 10 per cent.

Beehive Coke—Beehive coke production in the United States during the week ended Sept. 21 is estimated at 614,000 net tons, 21,000 net tons, or 3.5 per cent. less than production during the week preceding. The daily average during the current year is estimated at 102,000 net tons as against 106,000 net tons during the week of Sept. 14. Operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania report production of beehive coke during the week of Sept. 21 at 386,640 net tons, and operation of their plants at 76.7 per cent. of their full time, as against 77.8 per cent. during the week preceding. Slightly greater yard labor shortage existed during the current week and as in preceding weeks was the limiting factor.

Byproduct Coke—Operating conditions in the byproduct industry changed but little during the week ended Sept. 21. The plants of the country were operated at 89.2 per cent. of their present capacity as against 89.4 per cent. during the week preceding. A slightly better coal and labor supply existed during the week, while repairs to plants limited production slightly more than during the week preceding. Material improvement occurred during the week in Indiana, Pennsylvania, Tennessee and West Virginia. In Indiana better supply of coal brought about the improvement, in Pennsylvania better labor conditions, in Tennessee repaired plants and in West Virginia other causes. A falling off in production occurred in Alabama, Maryland and Minnesota, and is attributed by the operators in the former state to repairs to plants and in the latter two states to other causes. Increased capacity of Pennsylvania plants is due to starting up more ovens at the Carnegie Steel Co., at Clairton, Penn.

CARLOADS OF COAL ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended Aug. 31	Sept. 7	Sept. 14	Sept. 21
Bituminous shipments, 123 roads	223,966	195,367	223,131*	222,874†
Anthracite shipments, 9 roads.	41,281	32,234	40,699	36,859

* Revised from last report. † Subject to revision.

BUSINESS OPINIONS

Dry Goods Economist—Cotton and cotton goods prices continue to hold the attention of the trade. What constitutes a "fair" price for raw cotton now has not yet been disclosed, if, indeed, it has been determined by the committee appointed last week by President Wilson. There has been no change in the wool situation.

Marshall Field & Co.—Current wholesale distribution of dry goods is running well ahead of the heavy shipments for the same period a year ago. The total volume of road sales for immediate and spring delivery is in excess of the same week in 1917. Customers in the market numbered about the same. Collections continue good.

American Wool and Cotton Reporter—A feature not to be overlooked in the wool market is that pressure is being brought to bear in regard to Australian wool. The supply is becoming large and unwieldy, and probably as the shipping situation improves more of such wool will become available to English or American manufacturers. In the minds of the cotton trade the question of price-fixing is naturally uppermost. Prices will be fixed only for the present crop, it is understood, and not for that of another season.

Bradstreet's—Government work expands at the expense of non-essential enterprise, and as goods for ordinary trading tend to become scarcer, buyers in the prosperous crop-yielding zones are anxious to get down orders. In the big eastern centers, however, where taxes, subscriptions to the Liberty bonds, high wages for labor, and the prospective withdrawal of large numbers for militant efforts are factors, buying is conservative. Nothwithstanding all reservations, the flow of business is considerably stronger than the ebb, war work, of course, predominating. Non-essential lines reflect further curtailment, and while buying of holiday gifts has started, the tendency is to eschew luxuries, though here and there new-found wealth has brought about some squandering.

The Iron Age—Price fixing for the fourth quarter, as announced from Washington Tuesday, brought some surprises. Lake Superior iron ore producers asked for 50c. more and were granted 25c., on the ground that the 45c. advance given them three months ago was all absorbed in higher rail freights. Eastern iron ore producers had expectations of sharing in the ore advance, but this was denied them and all other ore producers outside the Lake districts. All basic and foundry iron furnaces get the benefit of a $1 advance. For Tennessee furnaces the advance ranges from $1.25 to $1.75. Virginia furnaces and those in eastern Pennsylvania fare considerably better because of greater distance from the basing points. The general committee of the Iron and Steel Institute has promptly put out new price tables based on the President's proclamation as to pig iron. Differentials on foundry and higher silicon irons are raised; cast iron pipe is put up $5; cut nails and horse shoes are advanced, and various other revisions upward are made.

Atlantic Seaboard

BOSTON

Receipts of bituminous by rail show steady decline. Recent Washington rulings more liberal as to permissible reserves for Class I plants and are being liberally construed. Slackening receipts by water are also the rule. Largely increased requirements for oversea purposes, including naval needs, one of outstanding features. Already there is real anxiety over the advancing season and curtailed shipments. Slow dispatch at Hampton Roads may necessitate releasing additional ships for ocean service. This one of pressing problems. Anthracite shipments sag off. "Storrow anthracite" now coming forward. Difficulties over "allotments" still arise.

Bituminous—From Central Pennsylvania in particular can be noticed a gradual but none the less steady decline in shipments for New England, both all-rail and via the New York piers. Figures for the first three weeks in September show that the reduction all-rail from this one district amounted to more than 25 per cent. Wholesale embargoes placed through recommendation of the different state administrators had a material bearing on this diminished movement, but there has also been evident a large increase in shipments for government use. In addition there has been the case of byproduct plants demanding much heavier deliveries because of new ovens in operation. As an instance of this, two large power plants in Massachusetts chiefly dependent upon coal that has now been requisitioned for byproduct purposes are now relying upon emergency orders to build up a reasonable supply.

The situation as to permissible reserve limits is now much clarified. The Washington ruling of Sept. 13 allows Class I plants to accumulate 105 days supply, and this is so much nearer a reasonable stock limit that consumers on the whole feel much easier. The local fuel authorities are also trying to deal with this subject in a broad-minded way.

Meanwhile, receipts by water have also sloped off to quite an extent. The movement of a considerable volume of coal westward and to line byproduct plants, together with government requirements at the piers, has very much curtailed the flow to Hampton Roads. Detention there only increases, and it is nothing unusual for a steamer to wait five days or even longer for a cargo. The railroads here have had better success lately in accumulating reserves and are fully alive to the wisdom of taking on coal whenever it is available. There is, in fact, a moderate spot demand from the railroads and other large buyers and now that the discharging berths are in better shape, there is no undue delay in handling coal promptly on arrival.

Those who are best informed admit a growing concern for the winter outlook. Without question receipts in New England both by rail and water are going to be cut in drastic fashion. There are rumors of requirements across the Atlantic that exceed any estimates given out, and since those demands will have to be met largely from Hampton Roads, whence comes the largest tonnage for this territory, the subject is one of some interest. Mr. Garfield is on record himself as saying that recent estimates early in the year show that for bunkering purposes alone the increase is 100 per cent. beyond that of last year. We have not yet begun to comprehend the amount of coal that will have to move across the Atlantic between now and spring. More and more ships are coming off the ways and each one adds to the fuel consumed.

A large number of buyers, especially smaller consumers, are still inclined to be fussy about quality and about bunching of cars and the cancellations of requisitions previously on file for administration coal are many and frequent. When shipments have come forward as easily as they have the past two months there is always a sense of security which leads consigners to postpone receiving coal which later they are sure to want.

Out of the movement of wagon coal from Central Pennsylvania there have been some interesting developments. The volume of this coal for New England is much reduced, the high point having been reached when during August about 700 cars were shipped each week to New England consigners. The movement has now dropped to about 350 cars weekly. At the time when the number of box cars was greatest there were many cases of congestion in New England, wagon coal having reached destination at the same time coal was pouring in through regular trade channels, both all-rail and by water. Several serious cases of demurrage resulted and on that point the Railroad Administration has come to the relief of the ultimate consigners by stating that on suitable certification by the fuel authorities a refund will be allowed in case of reforwarded coal, the demurrage to count only from the time delivery is accepted by the party for whose account the car is unloaded.

Anthracite—A further falling-off in shipments of domestic sizes is still noticeable. The "independents" are making no better shipments and the companies are struggling to meet their obligations as pointed out by the anthracite committee. Among the later requisitions is one for 50 cars daily of domestic sizes consigned to Mr. Storrow at the New England gateways. The program is for each retail dealer applying for a share of this coal to send his check in advance to the New England Fuel Administration and bind to accept whatever size is sent him regardless of his preference. In other words, it is considered "anthracite," no distinction being made as to size or grade. It will be interesting to watch the progress of this experiment. The coal has already begun to start forward.

There continue to be difficulties over the "allotments" granted to various communities. Many of these arbitrary estimates are futile because so little heed has been given to local distribution and other conditions understood clearly only by the retail dealers themselves. In consequence towns that are simply unloading ports have been "absolutely embargoed," more attention having been given the size of population than the actual number of tons unloaded during the basic year. Too much in the way of regulation has been attempted and unless some of the bars are taken down there will be a lot of suffering result from the use of a too finely graduated measuring stick.

NEW YORK

Anthracite moving slowly and local dumpings fall behind. Further steps taken to conserve fuel and "lightless night" order to be enforced. Buckwheat sizes plentiful. Shipments to non-essentials result in larger supplies of bituminous. Bunker situation satisfactory.

Anthracite—The situation is moving slowly but surely. Dealers are far from satisfied with the tonnage available, but they are not complaining because they know that consumers are better supplied than they have been under normal conditions in previous years. However, there is a steady demand for the domestic sizes and there is small prospect that this winter will see any surplus on hand. With the month to go three days, dumpings at the local docks for the first 27 days of September were 25,704 cars, as compared with 27,666 cars for the corresponding period of August, a decrease of 1962 cars. This is not encouraging to the trade when it is realized that the early fall months are here.

Part of this decrease is accounted for in the suspension of work by upward of 30,000 mine employees for a few days last month. For the week ending Sept. 27 the dumpings were 6727 cars, a decrease of 69 cars from the previous week, a loss which was principally felt by the local trade inasmuch as New England is receiving most of its coal by rail. On the other hand, production for the week ending Sept. 14 is estimated at 2,088,000 tons, an increase of 29.1 per cent. over the preceding week. Shipments for the week were 40,699 cars, an increase of 8465 cars over the preceding week, but a loss over the shipments of the two previous weeks. The trade is interested in the reports showing increased production and shipments, but are wondering where the coal is being sent.

Shipments of domestic sizes, including pea coal, have been ordered discontinued to 321 communities in this state by the Anthracite Committee, producers and distributors being ordered to concentrate their shipments to other points in the state. This may result in more coal being sent to this market.

With a scarcity of the domestic sizes the reverse exists with respect to buckwheat and smaller coals. There is plenty and more of the smaller coals to go around and some producers have had men out looking for buyers. This is said to be particularly true of independent operators, some of whom, it is also claimed, have been shading prices. In some instances retail dealers, it is claimed, are being asked to take a proportionate share of buckwheat, rice or barley with their orders for the domestic sizes, in order to reduce the stocks of the small coals.

Current quotations, per gross ton, f.o.b., tidewater, at the lower ports are as follows:

Circular	Individual	Circular	Individual
Broken..$6.75	$7.50	Buck...$5.10	$5.90
Egg.... 6.65	7.40	Rice.... 4.65	5.10
Stove... 6.90	7.65	Barley.. 4.15	4.30
Chestnut 7.00	7.75	Boiler.. 4.60	
Pea..... 5.50	6.25		

Bituminous—The stopping of deliveries to non-essential industries has put the situation on a better basis so far as supplies of commercial coal goes. There is more coal available for consumers on the preference list, and some shippers were reported to have so much on hand that they are soliciting business. However, when efforts were made to run down these reports they could not be verified. On the other hand, there were shippers who were anxious to locate some available coal. In some circles it was said that producers of gas coal which had been loaded in box cars had disposed of it to outside parties.

The report of dumpings in this harbor fails to show more coal coming here. For the week ending Sept. 27 there were but 7059 cars dumped as against 7277 cars the previous week, a decrease of 218 cars. For the first 27 days of September there were 27,617 cars dumped as compared with 26,908 cars for the first 27 days of August, an increase of 709 cars. For September the average daily dumpings were slightly below the average for the previous two months.

From the mining regions come reports of heavier production and shipments, 36,884 cars having been shipped from the central Pennsylvania fields during the week ending Sept. 14, over the shipments of the previous week, which included Labor Day.

To further save fuel plans are under consideration by State Fuel Administrator Cooke and his associates for consolidating the small electric plants and replacing the less economical isolated plants with central station service. Mercer P. Moseley, chief of conservation for this state, points out that a 100-hp. plant burns 9 lb. of bituminous coal per kilowatt-hour, an average 10,000-hp. plant burns 3 to 4 lb. per kilowatt-hour, and a first class 50,000-hp. plant burns only 2 lb. per kilowatt-hour. He also says that coöperation among electric power companies will save large quantities of coal and increase the profits of operation.

The railroads continue to absorb fuel in good volume. There is a strong call for supplies from points along Long Island Sound, and a decided effort is to be made to take care of the situation before real winter sets in and before transportation difficulties arise. The bunker situation remains practically unchanged. There are plenty of vessels here to take up all the coal available for bunkering purposes but there is no delay in loading.

State Fuel Administrator Cooke has issued an order permitting wholesalers to

add to the purchase price of any coal shipped by water and delivered alongside consumer's docks in New York State, a charge not to exceed 28c. per net ton. This charge shall include insurance, and may be added to the mine price of the coal, plus freight rate to tidewater plus war taxes on freight, plus demurrage at loading points, plus actual boat charges. The order does not apply to coal delivered to retail dealers. The wholesale margin shall include any purchasing agent's commission, or selling agent's commission heretofore authorized by the United States Fuel Administrator, and shall not be in addition thereto. The combined charges or commission of any number of wholesalers or jobbers of a given shipment or shipments of such coal shall not exceed the maximum charge herein allowed for one wholesaler.

Mr. Cooke's order amends an order issued by Ellery B. Gordon, Assistant to the State Fuel Administrator, on June 27, in which he authorized a margin not to exceed 35c. per net ton on coal physically handled by jobbers within the harbor limits of New York State.

Current quotations, based on Government prices at the mines, net ton, f.o.b., tidewater, at the lower ports, are as follows:

	Mine Gross	F. o. b. N. Y. Gross
Central Pennsylvania:		
Mine-Run, prepared or slack	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of-Mine	3.08	5.23
Prepared	3.36	5.51
Slack	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite receipts of wanted sizes short. Some accumulation of egg and pea again. Rumors of heavy shipments on the way. Unfavorable labor conditions. Production slightly off. Decision on wages expected daily. Dealers trying to satisfy all customers. Cool weather starts fires. Coal in good preparation. Credit conditions ideal. Steam coal slightly eased. Bituminous in fair volume. Car supply 60 per cent. Current demands cared for.

Anthracite.—Small receipts continue to annoy the retailers, at least the wanted sizes. The consuming public has hardly lost any of its peculiarities as regards the size of coal it wants. It is true that the threatened strike and partial tie-up did induce many of them to take any size that the dealer had in stock. Now that the mining trouble seems to have been temporarily averted the same insistence on stove and chestnut has again cropped up. In the meantime egg and pea are once more accumulating in the yards. The demand for pea coal has been better the last few days, as with the coming of cool weather the humbler class of patrons is calling for it, and in other instances customers who are waiting for stove and nut have been willing to take a ton or so of the small coal to help out.

The labor situation is even more burdensome than ever. Men are scarce and wages high. As a result there is much private bidding for labor, and the changes from one yard to another are a common occurrence. The operators are also reporting that they are growing shorter of help from day to day, despite all restraints which have been placed against the men leaving the mines.

No decision has been rendered as yet by the local fuel administration on the increased margin asked for by some of the retailers, and there is no likelihood that there will be so long as the wage question in the anthracite region is pending. The dealers claim that they are "up against it," as their expenses are slowly creeping up from week to week.

The order from the fuel authorities directing that no further deliveries be made on filling orders which have received two-thirds of their allotment, until Jan. 1, was hardly necessary at all. The retailers are practically a unit in regretting that they followed the committee's suggestion in the spring to fill orders on the two-thirds basis, which was at their option to choose as they thought best. Most of them started in to try to cover all of their orders in this manner and they now find themselves with hundreds of orders on their books without a single pound delivered. Now, with coal burning weather here, they are being sorely pressed to keep these customers satisfied with a ton or two.

With the coming of cool weather the office of the fuel administration was deluged with requests to start furnace fires. These inquiries came from office buildings and schools. In fact so numerous were these requests that the committee was much gratified to learn in this manner the dependence that the people had placed in them. The committee disclaimed direct authority in the matter, but left it up to the individual to decide whether it was necessary to have heat or not. They were warned, however, that they must be careful not to heat buildings at a temperature in excess of 68 deg. The authorities have made it known that they are going to insist on this regulation and in the larger buildings expect to install recording thermometers under seal and will punish any flagrant violations. In the suburban sections the various local fuel committees had ruled that the public heating plants should not turn steam into their mains before Oct. 15, but this week they modified their ruling to the extent of allowing steam to go out but under a reduced pressure.

Inquiry was made lately of the dealers as to the condition of coal reaching their yards; that is, as it related to preparation. In most instances the report was that there was rarely any room for complaint. Of course, there is a considerable tonnage of washery coal coming on the market, and often the dull appearance of much of this product is the cause of complaint from some customers. Even this coal will cause no question if enough fresh-mined coal was received to mix with it. However, the dealers have learned that most of the washery coal is of good quality and have no particular trouble in having their customers accept it. So far as the shipping companies are concerned they practically receive no complaints whatever.

Credit conditions continue ideal and there is really no such a thing as an outstanding account. Many dealers come in the offices and offer spot cash if they can only procure prompt shipment, but of course such tenders are of no avail. The only people who do pay cash in advance these days are the dealers who on searching their records find they have bought a car or so from some shipper in 1916 and no permanent relations having been established, this generally resolves itself into a cash transaction.

Probably there is some slackening of the pressure for steam coals following the easing off of the strike conditions at the mines. At any rate the small domestic demand for buckwheat which sprang up at that time has about vanished, with the exception of those far-sighted dealers who continue to put away a good tonnage of this coal when they can get it. Rice coal is moving fairly well, although small tonnages can occasionally be procured by new customers, most of this going to concerns who, having abandoned the use of culm as a mixture, are having a measure of success with rice. The market for culm can be said to be almost flat, as it appears that every consumer who had the least idea of being able to use it has now given it a trial. No particularly active business is expected in this grade until later in the season.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.25	Buckwheat	$3.40	$4.45
Egg	4.80	6.15	Rice	2.90	3.80
Stove	5.05	6.40	Boiler	2.70	3.70
Nut	5.15	6.50	Barley	2.40	3.30
Pea	3.75	5.00	Culm	1.25	2.15

Bituminous—Labor and car supply continue to dominate the bituminous trade. Of cars there appears to be an average of a 60 per cent. supply during the last ten days, while labor at no operation is nearly adequate. This condition would show itself more seriously if the car supply should approach 80 per cent. to 90 per cent. Fairly good receipts of coal are reaching the city both from the Pennsylvania and West Virginia zones, although the heavier users are not able to add to their stocks in the volume they did during the summer. It can be said that the industries here are fairly well taken care of for current needs, and most of the anxiety on their part is due to wondering what the future supply will be. It is understood that the wagon mines are being fairly supplied with cars and some brokers in this coal have recently have had fair tonnage for their trade.

BALTIMORE

Demand for cleaner coal spreads, and rejections of box cars are becoming more frequent as supply becomes a little easier. Operators called to discuss condition. Anthracite men in quandary as to short supply and methods of delivery under restricted profit margin.

Bituminous—Supplies of bituminous here continue to get easier as a steady run of fuel keeps up, and a number of big war plants that have supplies a long way ahead are kept out of the market. The heavy proportion of box-car shipments continues, however, and there is a growing tendency on the part of some consumers to refuse to receive the coal in this manner. The box-car coal as a whole not only is less desirable than the coal shipped in open-top cars, but it costs more initially and for unloading. The reduction of heating efficiency by reason of bad coal has spread so seriously from the ordinary business consumers to the preferential fuel supply classes, including railroads, shipyards and steel plants, that the fuel administration has called a meeting for October 3 in Cumberland, Md., of 500 operators of the Somerset, Cumberland, Piedmont and Upper Potomac districts to devise some method of correcting the evil.

There is talk in the trade over the statement that the Government is planning to district coal mines in certain sections and require a minimum production, even if miners have to be shifted from mine to mine to accomplish the result. One of the difficulties of ordinary business is the constantly growing call here of the Government for the best class of coal. Thus the navy has just established a supplemental pool at tidewater to be known as No. 73. Lack of pier labor has presented another problem. First it closed Port Covington and Locust Point piers, leaving Curtis Bay running for coastwise and Government coal, and Canton running for Government coal, as well as harbor and bay points delivery. So much delay was had in loading floats, barges and schooners for ordinary business that it was determined to reopen Port Covington for that purpose. After ten days the order was rescinded and Canton was instructed to get out the business as best it could by working all night shifts.

Anthracite—The situation here is so tight for hard coal that both the dealers and fuel administration officials are fearful that cold weather will find many homes without coal. The local fuel committee has ordered dealers to deliver only one- or two-ton lots. Dealers claim that after supplying part of their trade with two-thirds and having more than 200,000 tons of undelivered orders on their books, much of it since spring, such a plan is not equitable.

Lake Markets

PITTSBURGH

Lake shipments to close of navigation. Byproduct coal scarce. Car supplies fairly satisfactory.

The Pittsburgh district is now regularly shipping in the lake trade from 300,000 to 350,000 tons of coal a week. This is more than its original quota, but on account of meager shipments from some other districts the lake trade not only cannot be taken care of by Oct. 15, the date originally fixed, but can hardly be taken care of up to the close of navigation. R. W. Gardiner, production manager for the district, states that he expects to be required to continue lake shipments as long as the boats can run. Essential industries are being taken care of, as to their current consumption, but are not allowed to stock any coal. Byproduct coal supply is not satisfactory, but the ovens are losing little time, the chief point being that they cannot accumulate the stocks that ought to be provided against the winter. A large quantity of coking coal must be moved to the head of the lakes, and when navigation closes the local situation will be better in that respect.

Coal operators are hopeful that full transportation facilities will be afforded during the winter, but doubt whether the railroads are entirely proof against bad weather. Car supplies in the past week have improved and the situation in this respect is rather satisfactory at the moment.

There is practically no open market activity and prices remain quotable at the set limits: Slack, $2.10; mine-run, $2.35; screen, $2.60, per net ton at mine, Pittsburgh district, with 15c. extra allowed to be charged by brokers.

BUFFALO

Bituminous market quiet. Coal moves more freely on account of more cars. Operators still anxious for greater output. Anthracite by lake good, locally scarce.

Bituminous—The supply seems to keep up, but the issue to shippers of a long list of concerns that are to have no more coal "till further notice" looks ominous. Still it is hoped that this is a further move toward caution and conservation. Besides, in many instances the prohibition is on account of these consumers having an overstock on hand. The shipper sees in it a still further cutting down of his business

and the jobber with no mine connection is in de pair.

A further cause of uneasiness on the part of the jobber is the growing disposition of the consumer to order coal of the government zonal manager and ignore the jobbers entirely. Some jobbers find their business badly cut into from this source alone and all are afraid that taken all together the inroads will put an end to them. The move to allow the railroads to sell coal seems to the jobbers to be a direct effort to put them out of business.

Bituminous prices continue on Government basis, with little or no report now of deviation from them, as follows: Allegheny Valley thin vein, $4.65; Pittsburgh lump, $4.45; Pittsburgh mine run and slack, $4.20; smithing and smokeless, $5.85; cannel, $5.60 to $6.10, all per net ton, f.o.b. Buffalo.

Anthracite—The local shortage continues and is likely to till the lakes close, when it will be easy to fill the local trestles and keep the retailers busy till the cellars are all well stocked. It is hardly expected that the supply will come in fast enough at any time to provide full winter stocks, for Buffalo is too near the mines to make that a necessity, so the complaint of insufficient supply is likely to go on.

The lake trade keeps up well, though there does not seem to be any effort to gain on the shipments of last season. The amount loaded for the week was 114,600 net tons, of which 50,400 tons cleared for Duluth and Superior, 26,900 tons for Chicago, 9500 tons for Fort William, 7300 tons for Sheboygan, 6100 tons for Marouette, 5900 tons for Racine, 3000 tons for Houghton, 2800 tons for Sault and 2700 tons for Hancock.

CLEVELAND

Movement of bituminous to the Northwest is again slackening, and it is now doubtful if September shipments, scheduled for 4,900,000 tons, will much exceed 4,500,000 tons. Car supplies at No. 8 district mines in southern Ohio are reported better, but operators claim local draft boards are calling employees for examinations with no thought of production and in disobedience to General Crowder's instructions. Operations have been much impeded by this.

Bituminous—Production in the No. 8 district of southern Ohio shows a slight improvement over last week, due wholly to a better car supply. Labor is the most disquieting factor, and through no fault of its own. Local draft boards, operators complain, are calling some of the most important men for examination, and in some cases the enforced absence of a handful of men has thrown the entire mine out for the day.

Some railroad fuel continues to come east from Illinois and Indiana, but this is being offset by the shipment of railroad fuel from Ohio mines into Pittsburgh territory. The latest requisition for Ohio rail fuel to be moved east is for 300 cars. Instructions issued by D. F. Hurd, district representative of the Fuel Administration, requiring that orders accepted by operators from jobbers show the final consignee and destination, have been modified to the extent that they do not apply to shipments destined to Canada. The great bulk of Ohio coal continues to go to the lakes, and retail dealers are getting mightly little coal, not more than 15 to 20 per cent. of their requirements, at the most.

City officials of Cleveland have announced they have put away 3000 tons in the municipal coal pile, to be sold in quarter and half-ton lots later. Industrial stock piles continue to melt, and the burden of proof in seeking further supplies is put by operators squarely up to plant officials. The report of the Pittsburgh Vein Operators' Association of Ohio on car supply for the week ended Sept. 21 places the shortage at 13.46 per cent. The railroad rating of members reporting was 8638 cars, and they were supplied 7475. The loss in production, accordingly, is placed at 58,150 tons. Car supply on the Pennsylvania R. R. shows steady improvement. In the week ended Sept. 14 car supply was 15.47 per cent. short, showing an improvement of 2 per cent. The latest report on shipments by association members is for the week ended Sept. 14, when the total carloads was 4969, compared with 4408 carloads the first week preceding and 8876 carloads the second. The movement in the week ended Sept. 14 was 554 cars of railroad fuel, 3011 to the Great Lakes, 1137 to Ohio, 111 to Michigan and Indiana, and 156 to Canada.

Lake Trade—Operators now fear that 4,500,000 tons will be the best they can do for the Northwest in the way of bituminous coal in September. Shipments so far this month hover around the 1,100,000 tons a week mark, those for the week ended Sept. 21 being estimated at 1,095,353 tons, not including vessel fuel. The Great Lakes fleet lost several days early in the week through rough weather on Lake Superior, and the supply at the Lake Erie docks has been somewhat lower than usual. The Northwest is beginning to complain to operators, for with each succeeding week the opportunity of recovering the tonnage lost earlier in the season diminishes. If September falls the expected 400,000 tons behind the Fuel Administration's schedule, the shortage for the lake trade to Oct. 1 will again top the 1,000,000 ton mark.

DETROIT

Jobbers find it difficult to do business under the modified zone regulation. Scarcity of domestic coal continues. Lake shipments are large.

Bituminous—Limitations becoming effective under the recent order of the Federal Fuel Administration, reserving West Virginia coal for use of gas and byproduct plants, railroads and domestic consumers, have placed a new handicap on their business, Detroit jobbers say. The West Virginia mine-run and slack are now being withheld from the industrial consumers that formerly absorbed the greater bulk of this coal coming to the Detroit market. As the territory served by the local jobbers does not include enough railroads, gas works and byproduct plants to constitute an extensive market, the jobbers must place their chief reliance on retailers supplying domestic trade. The retailers are able to handle only a moderate amount of the stock.

The steam plants that have been using West Virginia coal for years are now permitted to purchase only coal from Indiana or from Illinois, which is described as a very unsatisfactory substitute. Some of the industrial plants rather than take chances with coal from the new districts are said to be providing for current needs from reserves they had planned to hold for winter protection.

Anthracite—Detroit's supply of anthracite is still short and is not being increased in a way to reassure the anxious domestic consumers, who are obliged to have recourse to that form of fuel. Shipments arriving this month will scarcely average 1500 tons a day. At that rate of delivery it is calculated nearly 60 days will be required to provide baseburner owners with a start on winter supply.

Lake Trade—Coal is moving over the lake routes in substantial volume and shipments for the month are likely to pass the 4,000,000 ton mark. Growing demands of the grain trade are expected soon to cause a diversion of some carriers that have been available for coal cargoes.

COLUMBUS

The coal trade in Ohio territory continues firm in every respect with the possible exception of screenings, which are coming in rapidly. Domestic and steam tonnage is in strong demand and extra efforts are being made to ship a larger tonnage to the Northwest.

There is still a little softness in screenings, due to the continuation of the embargo against small sizes being shipped into Michigan, which was one of the big markets for that grade. But other steam users, relieved from their limitation on storage, have been gradually absorbing the extra tonnage of screenings and the situation is well in hand.

Domestic trade is now attracting attention of coal men and fuel administrators alike. Dealers have been busy delivering fuel and reports show that fully 65 to 70 per cent. of householders in Columbus and immediate vicinity are provided. Orders are coming in fast, although dealers are not rushed as was the case earlier in the season. Retail prices are firm at former levels. Anthracite as well as Pocahontas is now out of the market entirely. Domestic coke is in good demand. Considerable West Virginia splint is offered as there is a considerable tonnage arriving in this section. The main supply of coal for domestic purposes comes from the Hocking Valley and Pomeroy mines.

The steam trade is rather quiet as reserve stocks are now pretty fair and there is no immediate urgency for shipments.

The lake trade is active and especial efforts are put forth to supply the Northwest as early as possible. As a result lake traffic is being speeded up to a high pitch. Little time is lost in loading and unloading, and the ore movement is good. Car shortage on some of the coal carrying lines is having an effect to reduce the lake tonnage.

Prices on short tons f.o.b. mines are as follows:

	Hocking Thin Vein	Hocking Thick Vein	Pomeroy	Eastern Ohio
Sized grades	$3.00	$2.75	$3.00	$2.60
Mine-run	2.75	2.50	2.75	2.35
Screenings	2.50	2.25	2.50	2.10

CINCINNATI

With a fair car supply, coal movement is well maintained, and some reserves are being accumulated. Proper distribution under priority rules is the chief difficulty of the trade.

With a continuance of cool weather, which has come a trifle early, and the beginning of actual consumption of coal for heating purposes by domestic consumers, hotels, office buildings and others, the season has really begun. Industrial operations also tend naturally to increase in activity and volume as the fall and winter progress, and this also increases coal consumption. The practical application of the priority orders of the Fuel Administration to the distribution of coal is beginning to worry jobbers and operators considerably, especially considered in connection with the operation of the zone system, which has thrown the usual channels of distribution into the discard in favor of the short haul. For instance, there has as yet been very little coal from western Kentucky or Indiana on this market, and that which has arrived has been the cause of considerable dissatisfaction. In the sections close to these fields, where consumers are accustomed to the coal, it is used as a matter of course; but it is much inferior to the fuels from West Virginia and eastern Kentucky to which industrial consumers in and around Cincinnati are accustomed, and as the latter fields are considerably closer to this market than those of Indiana and western Kentucky, the freight rate makes the latter coals cost virtually as much as the better fuel. However, the fact that there is objection to these low-grade fuels indicates in itself that the pressure of actual scarcity has not yet been felt. There may be another story when it is a question of using cheap coal or going without.

LOUISVILLE

Screenings, nut and slack and all steam coals are a little draggy at the present time, while the demand for domestic sizes is somewhat better than it was last week. Domestic coal is scarce on this market, most of the retailers being short of stock.

According to local jobbers, retailers and mine operating concerns, there is a general scarcity of domestic coal this week, with supplies of both eastern and western Kentucky grades scarce. A week ago there was a slight surplus of domestic coal in most of the yards, but this has been cut down by cool weather and a good demand for small lots. Eastern Kentucky screenings are a little draggy, with mine-run fair, while lump is scarce. However, eastern Kentucky coal has been arriving on the local market better than it was.

Under new regulations southeastern Kentucky steam coal is only going into Michigan on permits, while domestic coal is being shipped to that state freely. The mines of the district are being handicapped in disposing of nut and slack under the 30 day provisions, which in the present case should be lifted in order to establish a better market.

Eastern Kentucky has a fair supply of labor and is getting a 60 to 75 per cent. car supply. The larger part of the Blue Gem coal from Kentucky fields is now moving south to the textile districts. Harlan coal is moving to the Lakes and Michigan district. Elkhorn coal is going to the steam and byproducts plants, and Hazard coal is moving to the lakes and almost every district except the south. Western Kentucky coal is moving into Kentucky and Tennessee only. Movement of the latter coal for Kentucky consumption will be considerably reduced when the Federal powder plant at Nashville is running full blast, it being said that about 7000 tons a day will be required there.

Some little Indiana coal is moving into Louisville for use of industries located on the terminals of the Kentucky & Indiana Bridge and Terminal Railroad Co., and retailers are securing some of this coal when unable to secure supplies of western or eastern Kentucky grades. The western Kentucky field is much handicapped at this time on account of shortage of labor, and a 30 to 40 per cent. car supply.

BIRMINGHAM

Steam trade good but easy. Domestic sizes scarce, with strong demand. Car supply fairly good. Labor conditions unchanged.

The trade remains easy as regards steam grades. There are sufficient inquiries and orders in hand to prevent any accumulation at the mines, however, and coal is moving to consumers steadily. The railroads as a whole have a limited supply of fuel in their chutes, and some complaint of shortage came from lines operating in Georgia during the past week.

The domestic market continues to show

great strength and the several days of cool weather the past week boosted the order files of dealers considerably. Receipts are not commensurate with the requirements of the trade, but are as good as or better than the normal record for this season of the year.

The figures of Representative Holmes, of the Fuel Administration, for the week ending Sept. 14, show a production of 385,621 net tons, the lowest weekly output since June. Paydays and registration hampered operations to some extent, while on other days labor worked very irregularly.

Coke

CONNELLSVILLE

Attention to coke quality. More by-product ovens at Clairton. Less foundry and more furnace coke.

Greater stress continues to be laid upon quality of coke than quantity, the testimony of blast furnaces continuing to be that it is quality of coke rather than shortage in supply that is restricting the output of pig iron. The Fuel Administration is inspecting the coke produced at different works in rotation, and through the medium of public meetings is seeking to arouse operators and miners to an appreciation of the importance of producing good coke. The case is put flatly, that the more steel is supplied the more lives of soldiers will be saved, and the better the coke the more pig iron will be made and consequently the more steel.

The output of beehive coke and of raw coal of the Connellsville region shows no material change from week to week. Output is restricted chiefly by mining conditions, car shortage being only occasionally in evidence.

The Carnegie Steel Co. last week put in operation the seventh 64-oven battery of byproduct ovens at the Clairton plant, and the remaining three are expected to be in operation by Nov. 1. The ovens are working on 19-hour coking time, which means 1000 tons of coal per battery per day, the coke yield being about 650 tons. Except for some Pittsburgh district coal furnished by the Fuel Administration occasionally as it can be found, the ovens are operating on high volatile coal from the lower Connellsville region, which accounts for the 65 per cent. yield indicated, the object being to produce as much sulphate of ammonia and toluol as possible. The old basin runs 30 per cent. and less volatile, and coke requirements in the case of Clairton are subsidiary to byproduct requirements.

Offerings of foundry coke in the market are less than formerly, the Fuel Administration having attended to a number of cases of 72-hour coke being offered as foundry grade when it was not urgently needed, and requiring that the coke be furnished to blast furnaces. Essential foundry needs are well taken care of, and the brokers are still able to pick up a carload or so at a time and get a 25c. commission from the operator for disposing of it. Furnace coke scarcely ever reaches the open market, for if any surplus develops the Fuel Administration generally finds it first. The market remains quotable at the set limits; Furnace, $6; foundry, 72-hour selected, $7; crushed, over ¾-in., $7.30; clean screenings from old dumps, over ½-in., $5.50, all per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended Sept. 21 at 339,475 tons of coke, a decrease of 8855 tons, and 222,403 tons of coal for shipment, an increase of 6219 tons.

Buffalo—The market is steady, but without recent change. Furnaces are getting what they need by dint of old arrangements and the rather liberal amount of byproduct coke that is produced here. With a third plant, now under construction, the local furnaces ought to be well supplied. Breeze coke is active, most of it selling at government prices, though some cutting of the very fine product is reported. The ore movement keeps up, receipts by lake for the week being 335,550 gross tons. Harry Coulby, chairman of the mobilization committee of Cleveland, has issued a note to vessel owners urging them to keep their craft moving as rapidly as possible, as the ore, coal and grain to be moved yet this fall will require all available tonnage.

Middle Western

GENERAL REVIEW

Operating conditions favorable, with car supply excellent. Higher grade southern Illinois coals, both steam and domestic, remain firm. Coal from other districts selling under Government price.

Operating conditions are continuing favorable to the producers. For the past week the car supply has been excellent; so good, in fact, that a few of the larger coal-carrying railroads have loaned cars to their less fortunate competitors, with the result that practically all the mines in the mid-Western field have been supplied with as many cars as they could load.

Labor appears to be steady, and while there is no great supply of men to draw on, the mines are not closing down through lack of labor. So far as the Middle West is concerned, the labor supply is better than it has been for some time past, and is likely to continue good. There are, however, isolated cases of mines suffering from a man shortage, but these cases are too few and rare to make much real difference in the Mid-West territory, considered as a unit.

As usual, the higher grade coals of southern Illinois remain firm, both in steam and domestic sizes, but practically all other coal from the producing districts of Indiana and Illinois may be purchased under the Government price. This is more especially noticeable in steam, rather than domestic sizes.

In addition, this weak state of the present market will continue just as long as operating conditions prove favorable, or until such time as the Fuel Administration sees fit to enlarge the zone, so that the Illinois and Indiana operators may market their coal outside of the present fixed territory, which is proving not extensive enough to absorb the coal being produced.

CHICAGO

Little interest shown in steam coals, as many plants have sufficient fuel on hand to run from two to three months. Domestic market in better condition.

There has been little interest shown during the past week by the large purchasers of steam coal. Those that buy regularly, on the open market, are placing their orders as usual, only at a substantial reduction from the Government price.

To size up the situation, the coal-buying public is not much interested in coal just now. There are a number of reasons for this, chief among which is the fact that the average steam plant has sufficient coal in storage to run from eight to twelve weeks.

The domestic market is in somewhat better condition. The recent rule of the State Fuel Administration, that no anthracite be burned until Christmas, has forced a number of householders, who had already been fortunate enough to get hard coal, into the market to purchase some bituminous.

MILWAUKEE

Rumor that all Lake Michigan coal-receiving ports will soon be embargoed. Shortage of labor seriously hampering deliveries.

Lake receipts of coal are slacking up some, and a rumor is afloat that all Lake Michigan ports will soon be wholly or partly embargoed. Vessel masters who bring the story from the lower lake docks are inclined to credit it. The Reiss Coal Co., which maintains docks at Waukegan, Ill., and other lake ports, has been directed by the Government to cease taking in coal at Waukegan. As the naval station at Great Lakes, near by, relies upon the Waukegan supply for kitchens and hospitals, and as scores of homes are without fuel, the people in these places are naturally greatly disturbed over the order.

State Fuel Administrator Fitzgerald considers the coal outlook for the winter in this district favorable. He says not quite as much anthracite is on the docks as at this time last year, but the amount of bituminous in stock is greater. However, if the lake supply should be curtailed or cut off altogether, there would be a different aspect to the situation.

Receipts of coal by lake at Milwaukee thus far in September include 171,700 tons of anthracite and 160,600 tons of bituminous, making the season's receipts of hard coal up to the time of this report 443,905 tons, and of soft coal 2,655,532 tons.

Hard coal is being dealt out sparingly to the smaller dealers in Milwaukee, and as a consequence many homes still remain unsupplied. If this condition of things does not change soon many consumers will have to substitute soft coal or go without fuel. A shortage of labor is also hampering deliveries. One firm alone recently purchased 20 trucks, half of which are still awaiting their first loads.

West Allis, a suburb of Milwaukee, has only a small portion of 30,000 tons necessary to tide homes and factories over the winter, and the authorities and factory proprietors have petitioned the Government for relief. Some of the factories are engaged in war work.

The city authorities will sell coal to needy people during the coming winter at cost. The distribution will be made from the various fire engine houses and ward lots.

Fire is raging in the City Fuel Co.'s yard at Manistique, Mich., in the Green Bay district, and many tons of coal have already been destroyed.

ST. LOUIS

A quiet, easy market as far as demand is concerned, with a surplus of all sizes excepting Carterville grades. Production not heavy. Cars are plentiful and transportation good. Demand seems to ease up everywhere locally.

The St. Louis market continues easy. There is no demand for anything but the Carterville grades. This is especially noticeable in domestic. The retail demand for coal has fallen off to a remarkable extent in the last ten days and a survey of the retail situation develops the fact that dealers have enough orders on their books now for from one to two weeks ahead and the bulk of this business is for Carterville coal, which cannot be secured. As a rule there is not more than a couple of days supply of orders for Standard and Mt. Olive on hand.

The domestic demand in the country is in somewhat the same condition. Plenty of Carterville orders and no Carterville coal, and a reasonably good supply of Standard and Mt. Olive coal but no orders for those grades. With the first touch of real cold weather, however, business will develop on these coals. The weather here for the past two weeks has been unusually cool for this period, but not sufficiently so to develop any business.

On steam coals the conditions are reversed. There is no demand for Carterville steam coals, as these find a ready market in the north.

The demand for the Standard and Mt. Olive steam sizes, however, is very weak, and it is being continually limited. The price of screenings is far below the Government maximum, and in a manner, this has retarded the development of a big tonnage and caused the forcing of the market on these sizes.

There still continues to be a surplus of coal in both the Mt. Olive and Standard fields, with no available market. This does not refer to steam sizes only, as there is a large tonnage of domestic sizes unbilled nearly every day.

The car supply has been better throughout the Standard field the past week and transportation shows up fairly well, but the tonnage is not increased on account of county fairs, which seem to be hitting southern Illinois generally at this particular time. In the Mt. Olive district car supply is better than usual and this field continues to have considerable time placing their tonnage.

In the Carterville and Duquoin fields some improvement has been noted the past week, but not to any great extent. Car shortage continues in this field and transportation has shown little improvement. The railroad tonnage from this field still continues large, and little of the coal moves into this territory. After the first of the month a better tonnage is expected to come along.

The railroad tonnage throughout the Mt. Olive and Standard field still continues good, and were it not for the railroad coal that is moving these mines would be working only half of the time on account of no market in which to place their coal. It is figured at the present time that over 85 per cent. of the coal that is usually in by Dec. 1, is now stored in the homes in St. Louis, and the tonnage may be greater than that.

There are no eastern coals coming in. A small tonnage of Arkansas anthracite and semi-anthracite comes in when loaded in equipment that must come this way. Coke is getting scarce and very little to offer for carload shipments.

The prevailing market per net ton f.o.b. mines is:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump..	$2.55@2.75	$2.55@2.75	$2.40@2.70
3x6-in. egg..	2.55@2.75	2.55@2.75	2.40@2.70
2x3-in. nut.	2.55@2.75	2.55@2.75	2.40@2.70
Washed:			
No. 1.....	3.05@3.20	3.05@3.20	.....
No. 2.....	3.05@3.20	3.05@3.20	.....
No. 3.....	3.05@3.20	3.05@3.20	.....
Mine Run..	2.35@2.50	2.35@2.50	2.20@2.30
Screenings..	2.17@2.32	2.17@2.32	1.50@1.60

Special preparation on Carterville is 10 cents extra.
Williamson & Franklin Co. rate is $1.10.
Other fields 95 cents.

CURRENT PRICES—MATERIALS & SUPPLIES

IRON AND STEEL

STEEL SHEET PILING—The following price is base per 100 lb. f.o.b. Pittsburgh, with a comparison of a month and a year ago:

Current	One Month Ago	One Year Ago
$4–5	$4–5	$3.60

PIG IRON—Below are the present quotations, with a comparison of a month and a year ago:

	Current	One Month Ago	One Year Ago
CINCINNATI			
No. 2 Southern foundry	$36.60	$36.90	$49.90
No. 2 Northern foundry	.....	36.26	56.20
NEW YORK †			
No. 2 X Northern foundry	34.40	34.40	54.25
No. 2 plain Northern foundry	33.90	33.90	53.75
No. 2 Southern foundry	40.70	39.00	52.75
BIRMINGHAM			
No. 2 Southern foundry	33.00	33.00	47.00
CHICAGO			
No. 2 Northern foundry	33.00	33.00	55.00
No. 2 Southern foundry	38.00	38.00	.....
PITTSBURGH			
Bessemer iron *	36.60	36.60	55.95
Basic iron *	32.00	32.00	53.00

* These prices include the freight charge from the valley to the Pittsburgh district. † Delivered Tidewater, New York.

STRUCTURAL MATERIAL—The following are the base prices, f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

	Mill, Pittsburgh	New York Current	New York One Year Ago	St. Louis	Chicago
Beams, 3 to 15 in.	$3.00	$4.245	$5.25	$4.27	$4.27
Channels, 3 to 15 in.	3.00	4.245	5.25	4.27	4.27
Angles, 3 to 6 in., ¼ in. thick	3.00	4.245	5.25	4.27	4.27
Tees, 3 in. and larger	3.05	4.245	5.30	4.27	4.27
Plates	3.225	4.745	9.00	4.52	4.52

BAR IRON—Prices in cents per pound at cities named are as follows:

Pittsburgh	St. Louis	Denver	Birmingham
3.50	4.24	4.85	4.475

NAILS—Prices per keg from warehouse in cities named:

	Mill Pittsburgh	St. Louis	Denver	Chicago	Birmingham	San Francisco	Dallas
Wire	$3.50	$4.50	$5.05	$4.32	$4.75	$5.95	$4.75
Cut	4.00	5.50	.....	4.47	....	6.40	.....

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh	Cincinnati	Chicago	St. Louis	San Francisco	Birmingham	Denver
Standard railroad spikes ⅝-in. and larger	$3.90	$6.00	$4.50	$5.30	$6.70	$6.00	$5.30
Track bolts	4.90	8.90	5.50	Prem.	8.00	8.00	6.30
Standard section angle bars	3.25	....	4.45	Prem.	5.15	....	4.85

COLD DRAWN STEEL SHAFTING—From warehouse to consumers requiring fair-sized lots, the following discounts hold:

Cincinnati	Cleveland	Chicago	St. Louis	Denver	Birmingham
17½%	List	+10%	+15%	+40%	+30%

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill Pittsburgh	Cincinnati	Chicago	St. Louis	Denver	Birmingham
Straight	$5.75	$7.00	$6.50	$6.25	$8.00	$7.25
Assorted	5.90	7.00	6.50–7.00	6.40	8.25	7.50

Cincinnati—Horseshoe nails sell for $4.50 to $5 per 25-lb. box

CAST-IRON PIPE—The following are prices per net ton for carload lots:

	New York Current	New York 1-Month Ago	New York One Year Ago	Chicago	St. Louis	San Francisco
4 in.	$64.35	$64.35	$68.50	$64.80	$63.00	$80.50
6 in. and over	61.35	61.35	65.50	61.80	60.00	77.50

Gas pipe and 16-ft. lengths are $1 per ton extra.

STEEL RAILS—The following quotations are per ton f.o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

	Pittsburgh Current	Pittsburgh One Year Ago	Chicago Current	Chicago One Year Ago
Standard Bessemer rails	$57.00	$38.00	$67.00	$38.00
Standard openhearth rails	55.00	40.00	65.00	40.00
Light rails, 8 to 10 lb.	*3.135 (100 lb.)	83.00	*3.135 (100 lb.)	68.00
Light rails, 12 to 14 lb.	*3.09 (100 lb.)	82.00	*3.09 (100 lb.)	67.00
Light rails, 25 to 45 lb.	*3.00 (100 lb.)	75.00	*3.00 (100 lb.)	65.00

* Government price per 100 lb.

OLD MATERIAL—The prices following are per gross ton paid to dealers and producers in New York. In Chicago and St. Louis the quotations are per net ton and cover delivery at the buyer's works, including freight transfer charges:

	New York	Chicago	St. Louis
No. 1 railroad wrought	$30.80	$31.00	$34.00
Stove plate	26.50	25.00	19.00
No. 1 machinery cast	34.00	29.50	21.50
Machine shop turnings	16.25	17.00	19.00
Cast borings	16.25	17.10	18.50
Railroad malleable cast	31.20	29.00	25.50

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Cincinnati	Birmingham	St. Louis	Denver
$0.12	$0.16½	$0.18	$0.19	$0.17½

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis	Birmingham
Solid	16c.	16c.	15c.
Hollow	24c.	....	....

PIPE—The following discounts are for carload lots f.o.b. Pittsburgh; basing card of Nov. 6, 1917, for steel pipe and for iron pipe:

BUTT WELD

Steel Inches	Steel Black	Steel Galvanized	Iron Inches	Iron Black	Iron Galvanized
⅛, ¼ and ⅜	44%	17%	⅜ to 1½	33%	17%
½	48%	33½%			
¾ to 3	51%	37½%			

LAP WELD

2	44%	31½%	2	26%	12%
2½ to 6	47%	34½%	2½ to 4	28%	15%
			4½ to 6	28%	15%

BUTT WELD. EXTRA STRONG PLAIN ENDS

⅛, ¼ and ⅜	40%	22½%	¾ to 1½	33%	18%
½	45%	36½%			
¾ to 1½	49%	36½%			

LAP WELD. EXTRA STRONG PLAIN ENDS

2	42%	30½%	2	27%	14%
2½ to 4	45%	33½%	2½ to 4	29%	17%
4½ to 6	44%	32½%	4½ to 6	28%	16%

From warehouses at the places named the following discounts hold for steel pipe:

	Black New York	Black Chicago	Black St. Louis
¾ to 3 in. butt welded	33%	43%	37%
3½ to 6 in. lap welded	15%	39%	33%

	Galvanized New York	Galvanized Chicago	Galvanized St. Louis
¾ to 3 in. butt welded	16%	28%	22%
3½ to 6 in. butt welded	+3	25%	19%

Malleable fittings. Class B and C, from New York stock sell at list price Cast iron, standard sizes, 5%.

SHOP SUPPLIES

NUTS—From warehouse at the places named, on fair sized orders, the following amount is deducted from list:

	New York Current	New York One Year Ago	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago
Hot pressed square	$2.50*	List	$1.25	$1.65	$1.05	$2.00
Hot pressed hexagon	2.50*	List	1.05	1.50	.85	2.00
Cold punched square	2.50*	List	.75	1.25	1.00	1.50
Cold punched hexagon	2.50*	List	.75	1.25	1.00	1.50

* List plus.

Semi-finished nuts sell at the following discounts from list price:

	Current	One Year Ago
New York	40%	50%
Chicago	50%	45%
Cleveland	50–10%	50%

MACHINE BOLTS—Warehouse discounts in the following cities:

	New York	Cleveland	Chicago
⅜ by 4 in. and smaller	30%	40–10%	37%
Larger and longer up to 1 in. by 30 in.	15%	20–5%	25—5%

WASHERS—From warehouses at the places named the following amount is deducted from list price:

For wrought-iron washers:

New York..... $2.50 Cleveland..... $1.00 Chicago..... $2.50

For cast-iron washers the base price per 100 lb. is as follows:

New York..... $5.00 Cleveland..... $4.00 Chicago..... $3.50

RIVETS—The following quotations are allowed for fair-sized orders from warehouse:

	New York	Cleveland	Chicago
Steel ½ and smaller	30%	45—5%	37%*
Tinned	15%	20+5%	25—5%*

Button heads, ½, ¾, 1 in. diameter by 2 in. to 5 in. sell as follows per 100 lb.:

New York..$5.65 Cleveland...$5.15 Chicago....$5.67 Pittsburgh...$4.65

Coneheads, same sizes:

New York...$5.75 Cleveland...$5.25 Chicago....$5.77 Pittsburgh..$4.75

MISCELLANEOUS

GREASES—Prices are as follows in the following cities in cents per pound for barrel lots:

	Cincinnati	St. Louis	Birmingham	Denver
Cup	7	7	8½	12½
Fiber or sponge	8	....	8½	20
Transmission	7	7	9	20
Axle	4½	4	3¾	5½
Gear	4½	....	8½	9
Car journal	22 (gal.)	....	5	8½

BABBITT METAL—Warehouse prices in cents per pound:

	New York		Cleveland		Chicago	
	Current	One Year Ago	Current	One Year Ago	Current	One Year Ago
Best grade	95.00	70.00	93.00	70.00	96.00	70.00
Commercial	50.00	40.00	23.00	24.50	25.00	25.00

HOSE—Following are prices of various classes of hose:

Fire

	50-Ft. Lengths
Underwriters' 2½-in.	75c. per ft.
Common, 2½-in.	40%

Air

First Grade	Second Grade	Third Grade
¾-in. per ft	$0.55	$0.30	$0.25

Steam—Discounts from list

First grade.....30% Second grade.....30–5% Third grade.....40–10%

LEATHER BELTING—Present discounts from list in cities named:

	Medium Grade	Heavy Grade
St. Louis	28%	35%
Denver	35–5%	30%
Birmingham	35%	35%
Chicago	45%	40%
Cincinnati	40–10%	40%

RAWHIDE LACING—35% off list.

PACKING—Prices per pound:

Rubber and duck for low-pressure steam	$0.99
Asbestos for high-pressure steam	1.76
Duck and rubber for piston packing	1.10
Flax, regular	.99
Flax, waterproofed	1.21
Compressed asbestos sheet	1.10
Wire insertion asbestos sheet	1.30
Rubber sheet	.66
Rubber sheet, wire insertion	.99
Rubber sheet, duck insertion	.55
Rubber sheet, cloth insertion	.25
Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes	1.21
Asbestos wick, ½- and 1-lb. balls	.75

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York and St. Louis
Galvanized iron rigging	+20%
Galvanized cast steel rigging	List
Bright plain rigging	30%
Bright cast steel	17½%
Bright iron and iron tiller	5%

MANILA ROPE—For rope smaller than ⅜-in. the price is ½ to 2c. extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: ⅛-in., 8 ft.; ¾-in., 6; ⅞-in., 4½; 1 in., 3½; 1⅛-in., 2 ft. 10 in.; 1¼-in., 2 ft. 4 in. Following is price per pound for ⅛-in. and larger, in 1200-ft. coils:

Boston	$0.33½	Birmingham	$0.39
New York	.36	Denver	.35½
Cincinnati	.33½	Kansas City	.34
Chicago	.34	Seattle	.34
St. Paul	.34	St. Louis	.33
San Francisco	.32	Los Angeles	.35

PIPE AND BOILER COVERING—Below are discounts and part of standard lists:

PIPE COVERING

Pipe Size	Standard List Per Lin. Ft.
1-in.	$0.27
2-in.	.36
6-in.	.80
4-in.	.60
3-in.	.45
8-in.	1.10
10-in.	1.30

BLOCKS AND SHEETS

Thickness	Price per Sq.Ft.
½-in.	$0.27
1 -in.	.30
1½-in.	.45
2 -in.	.60
2½-in.	.75
3 -in.	.90
3½-in.	1.05

85% magnesia high pressure..... List

For low-pressure heating and return lines..... 4-ply..... 58% off; 3-ply..... 60% off; 2-ply..... 62% off

LINSEED OIL—These prices are per gallon:

	New York		Cleveland		Chicago	
	Current	One Year Ago	Current	One Year Ago	Current	One Year Ago
Raw in barrel	$1.90	$1.26	$2.10	$1.30	$2.05	$1.20
5-gal. cans	2.00	1.36	2.25	1.40	2.25	1.30

* Nominal.

WHITE AND RED LEAD in 500-lb. lots sell as follows in cents per pound:

	Red				White	
	Current		1 Year Ago		Current	1 Year Ago
	Dry	In Oil	Dry	In Oil	Dry and In Oil	Dry and In Oil
100-lb. keg	14.00	14.50	13.25	13.50	14.00	13.00
25 and 50-lb. kegs	14.25	14.75	13.50	13.75	14.25	13.25
12½-lb. keg	14.50	15.00	13.75	14.00	14.50	13.50
5-lb. cans	.....	.....	15.25	15.50	16.00	15.50
1-lb. cans	.....	.....	.....	.....	17.00	.....

COMMON BRICK—The prices per 1000 in cargo or carload lots are as follows:

Cincinnati	$16.75	Birmingham	$15.00
St. Louis	10.00	Denver	9.50

WIRING SUPPLIES—New York prices for tape and solder are as follows:

Friction tape, ⅙ lb. rolls	38c. per lb.
Rubber tape, ½-lb. rolls	45c. per lb.
Wire solder, 50-lb. pools	46c. per lb.
Soldering paste, 2-oz. cans	$1.20 per doz.

PREPARED ROOFINGS—Standard grade rubbered surface, complete with nails and cement, costs per square as follows in New York, St. Louis, Chicago and San Francisco.

	1-Ply		2-Ply		3-Ply	
	C.l.	L. C.l.	C.l.	L.C.l.	C.l.	L.Cl.
No. 1 grade	$1.33	$1.60	$1.70	$1.95	$2.05	$2.30
No. 2 grade	1.20	1.15	1.50	1.75	1.80	2.05

Asbestos asphalt saturated felt (14 lb. per square) costs $5.35 per 100 lb.

Slate-surfaced roofing (red and green) in rolls of 108 sq.ft. costs per $2.20 roll in carload lots and $2.45 for smaller quantities.

Shingles, red and green slate finish cost $5.50 per square in carloads, $5.75 in smaller quantities, in Philadelphia.

ROOFING MATERIALS—Prices per ton f.o.b. New York or Chicago:

	Carload Lots	Less than Carload Lots
Tarfelt (14 lb. per square of 100 sq. ft.)	$64.00	$65.00
Tar pitch (in 400-lb. bbl.)	21.00	22 00
Asphalt pitch (in barrels)	40.00	45.50
Asphalt felt	72.50	77.00

HOLLOW TILE—Price per block in carload lots for hollow building tile:

	New York Current	Factory Perth Amboy, N. J.	Chicago	St. Louis	San Francisco	Dallas
4x12x12	$0.1025*	.....	$0.07	$0.07	$0.1125	$0.1032
6x12x12	.1350*	$0.1512	.095	.10	.15	.1444
8x12x12	.....	.1836	.12	.14	.....	.1856
10x12x12	.....	.216	.14	.17	.....	.2064
12x12x12	.....	.27	.195	.20	.....	.2888

*Partition tile

LUMBER—Price of yellow pine per M in carload lots:

	1-in. Rough 10 In. x 16 Ft.	2-In. T. and G. 10 In. x 16 Ft.	8 x 8 In. x 20 Ft.
St. Louis	$21—37.05	$23.00—24.50	$26.00
Birmingham	33.00	33.00	28 50
Denver	43.25	35.00	43.00
Cincinnati	45.00	44.00	39.00

STEEL SHEETS—The following are the prices in cents per pound from jobbers' warehouse at the cities named:

	Pittsburgh, Mill, in Carloads	New York Current	New York One Month Ago	New York One Year Ago	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago
*No. 28 black	5.00	6.495	6.495	10.00	6.42	9.50	6.52	9.50
*No. 26 black	4.90	6.395	6.345	9.90	6.32	9.40	6.42	9.40
*Nos. 22 and 24 black	4.85	6.345	6.295	9.85	6.27	9.35	6.37	9.35
Nos. 18 and 20 black	4.80	6.295	6.245	9.80	6.22	9.30	6.32	9.30
No. 16 blue annealed	4.45	5.695	5.645	9.70	5.62	9.70	5.72	9.70
No. 14 blue annealed	4.35	5.595	5.545	9.60	5.52	9.60	5.62	9.60
No. 10 blue annealed	4.25	5.495	5.445	9.50	5.42	9.50	5.52	9.50
*No. 28 galvanized	6.25	7.745	7.695	13.00	7.67	11.00	7.77	11.00
*No. 26 galvanized	5.95	7.445	7.395	12.70	7.37	10.70	7.32	10.70
No. 24 galvanized	5.80	7.295	7.245	12.55	7.22	10.55	7.47	10.55

* For painted corrugated sheets add 30c. per 100 lb. for 25 to 28 gage; 25c. for 19 to 24 gages; for galvanized corrugated sheets add 5c., all gages

COPPER WIRE—Prices per 1000 ft. for rubber-covered wire in following cities:

	Denver			St. Louis			Birmingham		
No.	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex
14	$15.00	$20.00	$35.00	$12.50	$15.50	$33.50	$13.00	$17.40	$36.80
10	25.65	28.90	57.45	27.20	31.00	63.00	21.40	24.40	42 75
8	36.45	40.25	80.30	38.00	42.00	78.00	42.35	44.35	.....
6	57.40	61.70	.....	.....	65.00	130.00	64.60	74.60	.....
4	83.40	88.70	.....	.....	93.00	.....	101.75	106.05	.....
2	126.60	132.80	.....	.....	140.00	.....	151.50	163.00	.....
1	164.15	172.40	.....	.....	182.00	.....	201.00	208.50	.....
0	206.80	206.80	.....	.....	242.00	.....	276.00	285.00	.....
00	278.80	278.80	.....	.....	290.00	.....	317.00	330.00	.....
000	341.65	341.65	.....	.....	360.00	.....	417.00	428.50	.....
0000	417.05	417.05	.....	.....	435.00	.....	516.00	516.00	.....

EXPLOSIVES—Price per pound of dynamite in small lots and price per 25-lb. keg for black powder:

	Low Freezing	Gelatin			Black Powder
	20%	40%	60%	80%	
New York	.....	$0.28½	$0.35½	.....	$2.50
Boston	$0.25¾	.28¼	.35¼	$0.42¾	2.65
Cincinnati	.19¾	.23¾	.29¾	.....	2.45
Kansas City	.21½	.27¾	.34¾	.44¾	2.55
New Orleans	.21¼	.28½	.35½	.45½	2.70
Seattle	.....	.25½	.32½	.....	.....
Chicago	.19¾	.23¾	.34	.44	2.45
St. Paul	.20	.27½	.34½	.....	2.55
St. Louis	.20	.27½	.34½	.44¼	2.35
Denver	.18¾	.26	.33	.43	2.50
Dallas	.24	.31¼	.38¼	.48½	.....

FREIGHT RATES—On finished steel products in the Pittsburgh district including plates, structural shapes, merchant steel, bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished), chains, etc., the following freight rates per 100 lb. are effective:

Boston	$0.27	New Orleans	$0.385
Buffalo	.17	New York	.245
Chicago	.27	Philadelphia	.23
Cincinnati	.23	St. Louis	.34
Cleveland	.17	St. Paul	.495
Denver	.99	Pacific Coast (all rail)	1.25
Kansas City	.59		

Note—Add 3% transportation tax.

COAL AGE

Volume 14 New York, October 10, 1918 Number 15

Hun Propaganda

By Floyd W. Parsons

Recently the *New York Evening World* launched a virulent attack on the coal industry and the United States Fuel Administration. The articles, featured on the front page and written by a woman unfamiliar with coal mining, attempted to deal with subjects that have occupied the attention of experienced mining engineers for many years.

The campaign was disloyal and malicious. Not only were the articles filled with inaccuracies, but the whole attack was based on a false premise. The chief effort of the paper was to convince the public that utilization of the culm banks in the anthracite field offered a solution to the coal problem in New York.

Evidently no effort was made to discover the true facts in the situation. If the *Evening World* had desired to be fair, it could easily have learned that anthracite culm cannot be burned in the average furnace unless it is first mixed with from one to two times the same quantity of bituminous coal. It could have found on slight investigation that months are required to change the common style of furnace to burn these low-grade mixtures of fine coal. And it certainly knows that even if such a change were advisable, the necessary equipment could not now be obtained.

It would have been easy for the author of the articles to have procured correct information from Dr. Garfield, for he has detailed reports on the entire culm situation made by responsible and independent Government officials months ago. The contents of these reports would have been available to anyone seeking to tell the truth. But the paper desired to appear in the rôle of one discovering a great idea, whereas the story is ancient to everyone who knows anything about fuel.

The *Evening World* has stooped to the lowest form of yellow journalism. The efforts of mining men to call the attention of the editors of the newspaper to the mistakes in the articles were met with insolence. Carefully prepared statements sent them were ignored. And still this paper boasts its loyalty, while at the same time it walks hand-in-hand with a writer who refuses facts and advocates a plan that would cause untold suffering if followed.

Last winter the whole nation cried out against the shipment of dirty coal. Now we have among us a paper that advocates the use of our railroad cars to transport a product that is 50 per cent. rock. The hard-coal operators are charged with being conspirators because they insist on loading only the cleanest kind of coal in every car they can get. Dr. Garfield has an active department in his organization that is charged with seeing that no shipments of fuel are made which contain an undue percentage of ash.

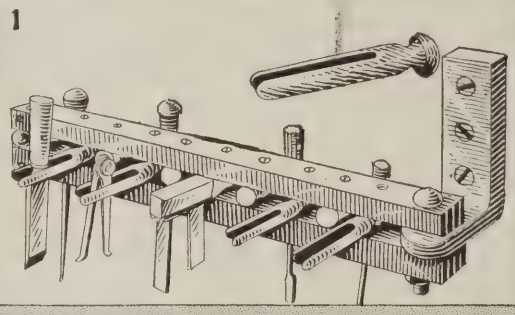
The *Evening World* wants all of this set aside. It demands that miners be taken from the chambers in the mines where they are producing real fuel and be employed in shoveling and hauling a waste product that won't burn until it is washed and mixed with true coal. It demands that the small mine cars, already too scarce, be set to hauling this mine waste, and that power, and time and material be employed in such service instead of being utilized effectively in actual mining operations.

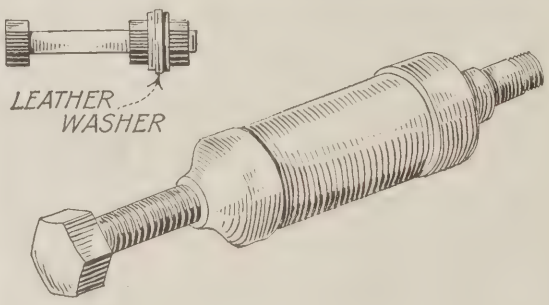
When an organ such as the *Evening World* seeks to be sensational through the perversion of facts in times of peace, it deserves to lose the respect of decent people. But in these days of great trial, when the sons of our miners, mine managers and fuel administrators are shedding their blood and doing their full share in France, the paper that willingly lends itself to the selfish interests of a few disgruntled culm-bank profiteers is consciously or unconsciously rendering direct service to the evil master of the Huns. The editors who print such vicious propaganda without careful investigation are no better friends of the cause of Liberty than the paid soldiers of the Emperor of Germany.

IDEAS AND SUGGESTIONS

1. Clothespins are useful as tool rack.
2. Homemade spacious grease cup.
3. Pipe fitting simplifies shaft leveling.
4. Unique valve seat remover.

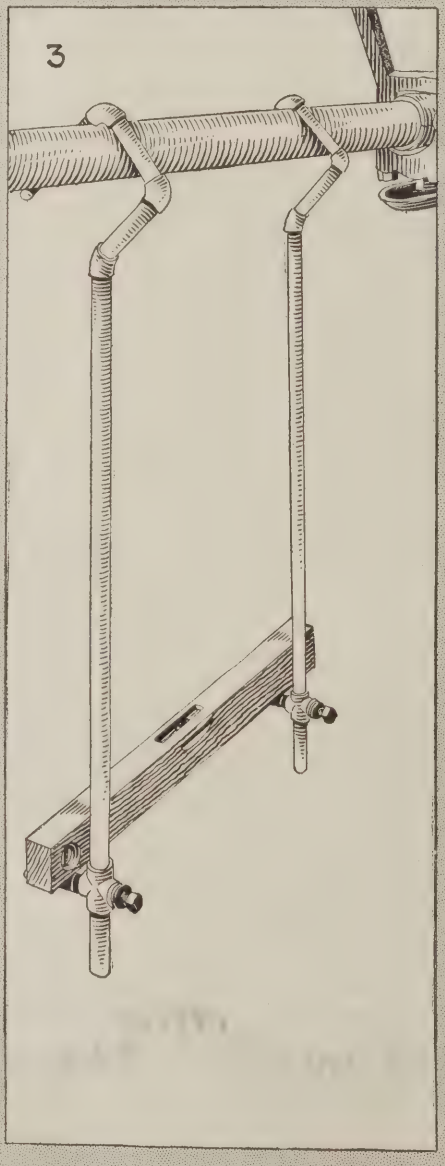
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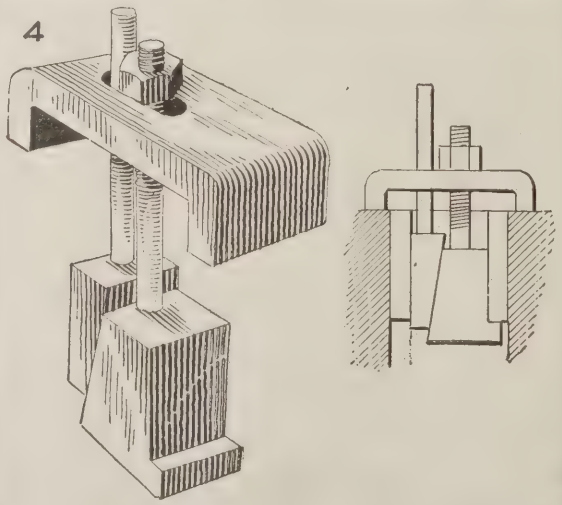


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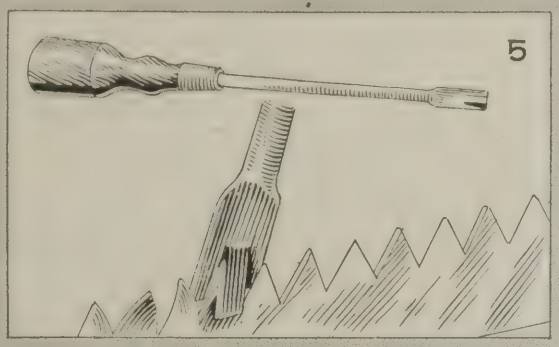
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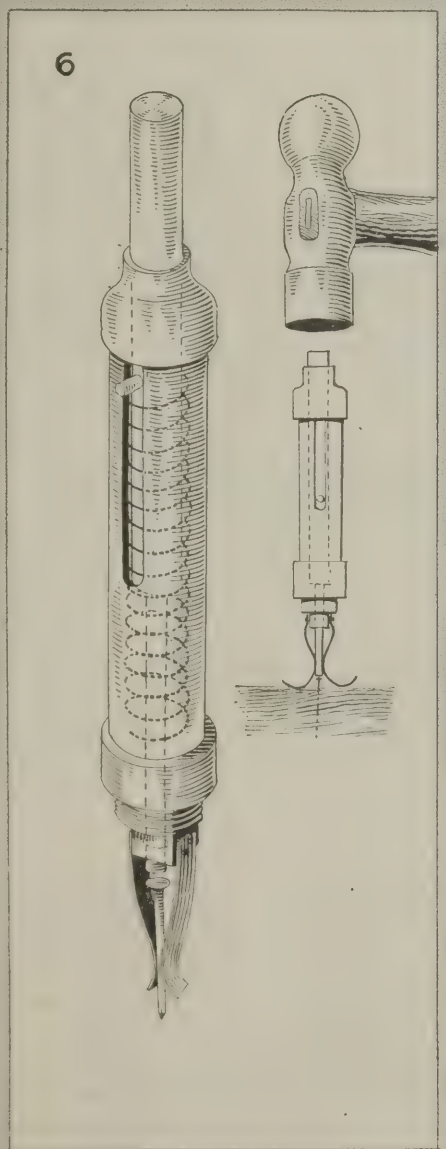
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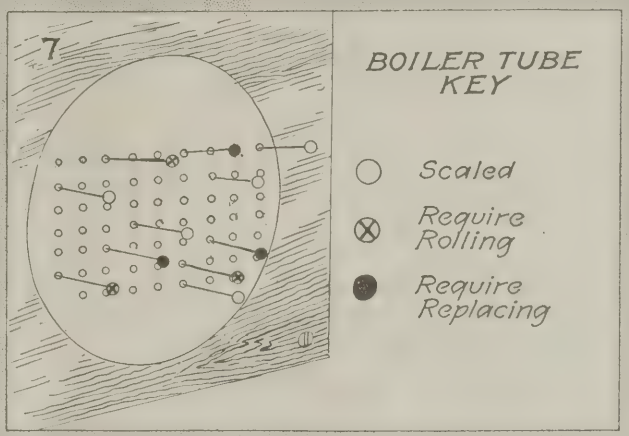


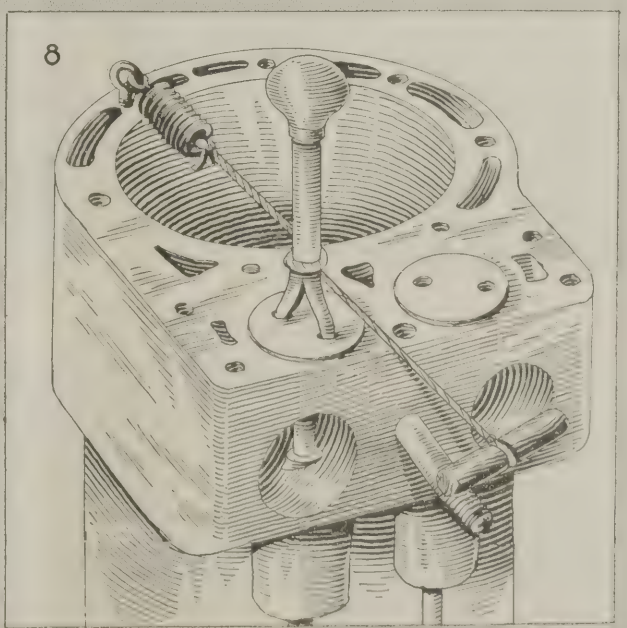
KINKS FOR USE AROUND THE MINE



5. Screw driver also serves as a saw set.
6. How to drive nails in inaccessible places.
7. Colored pinheads indicate condition of boiler tubes.
8. Makes valve grinding an easy job.







Raising Steam With the Waste Products of Yesterday

Silt, Formerly Considered a Nuisance, As It Meant a Disposal Problem to the Operator and Pollution to the Streams of the Farmer, Is Today a Valuable Asset—Burned on a Special Grate It Supplants More Essential Fuel

THE old culm banks in the anthracite region are fast disappearing. The washery is redoubling its efforts, and the products from this method of preparation tend in large measure to force anthracite shipments above previous records. Up to within a quarter of a century ago, the culm banks rapidly increased in size; but since that time a movement to utilize this waste has steadily gained favor, and within a short time these old landmarks likely will have completely disappeared.

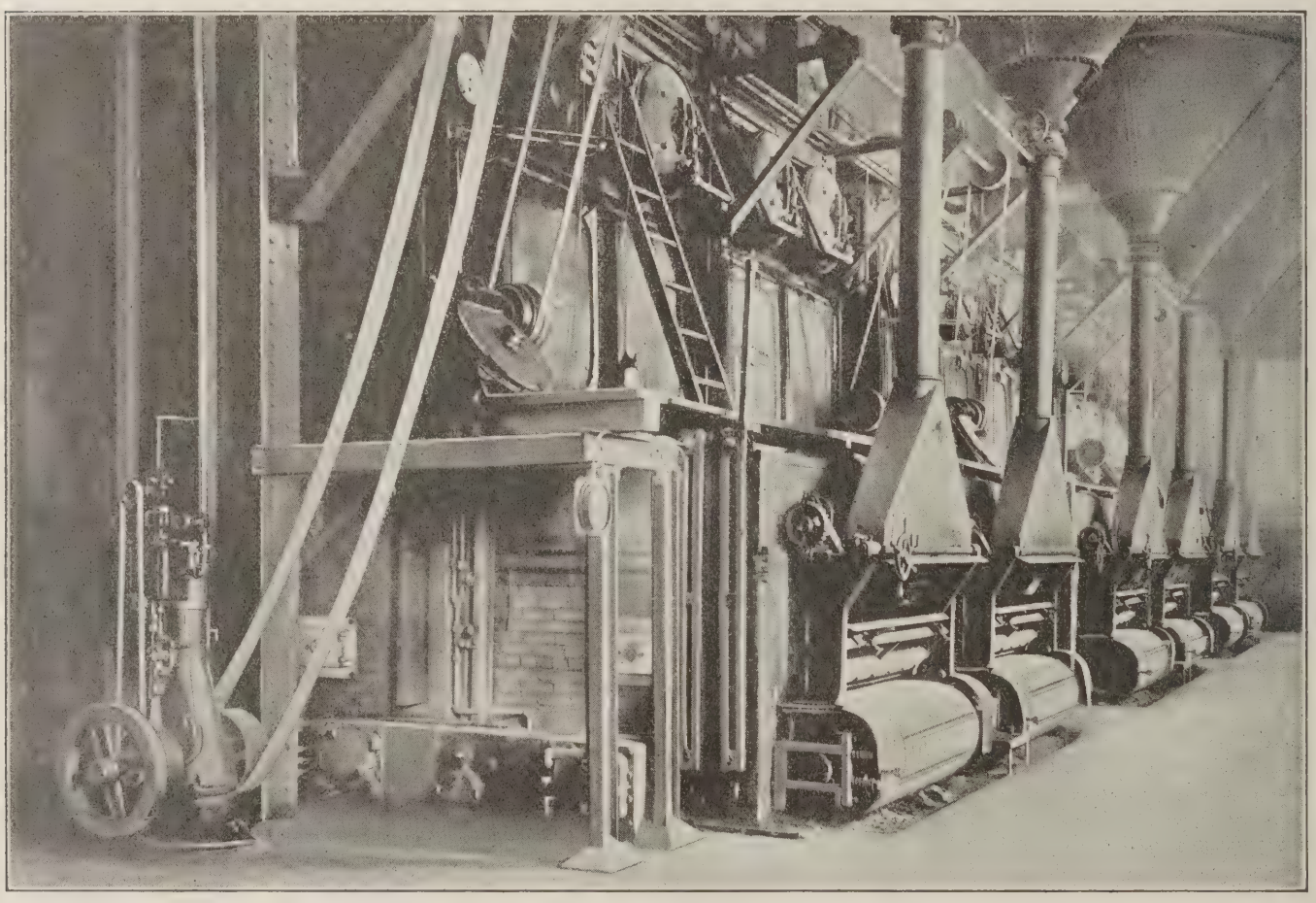


FIG. 1. FRONT VIEW OF BOILER PLANT AND COXE STOKER INSTALLATION

The first practical steps looking toward utilization of the small sizes of anthracite were taken about February, 1890, when a commission was appointed according to an act of the legislature of Pennsylvania. It was the purpose of this commission to investigate the waste of coal mining, with a view to the utilization of such waste. The results of this investigation were reported in May, 1893.

An active member of this commission was the late Eckley B. Coxe, probably the leading mining engineer of his time. Mr. Coxe was the most prominent figure in the management of Coxe Brothers & Co.'s extensive anthracite interests in the Hazelton region of Pennsylvania. He was especially well equipped by temperament, training and facilities at his command to attain results along the lines noted.

Mr. Coxe's study of the subject led him to select as the most important of all the practicable measures of economy, the utilization of the smallest sizes of coal, such as had been permitted for many years to go to waste. With the aid of his assistant, John R. Wagner, a series of experiments was begun by Mr. Coxe upon the burning of small anthracites. The results of these investigations were published in the "Transactions" of the American Institute of Mining Engineers,[1] from which the following is quoted: "Having determined in a general way what seemed to me the proper conditions for

[1]Vol. 22, p. 581.—A paper entitled, "A Furnace with Automatic Stoker, Traveling Grate and Variable Blast Intended Especially for Burning Small Anthracite Coal," by Eckley B. Coxe.



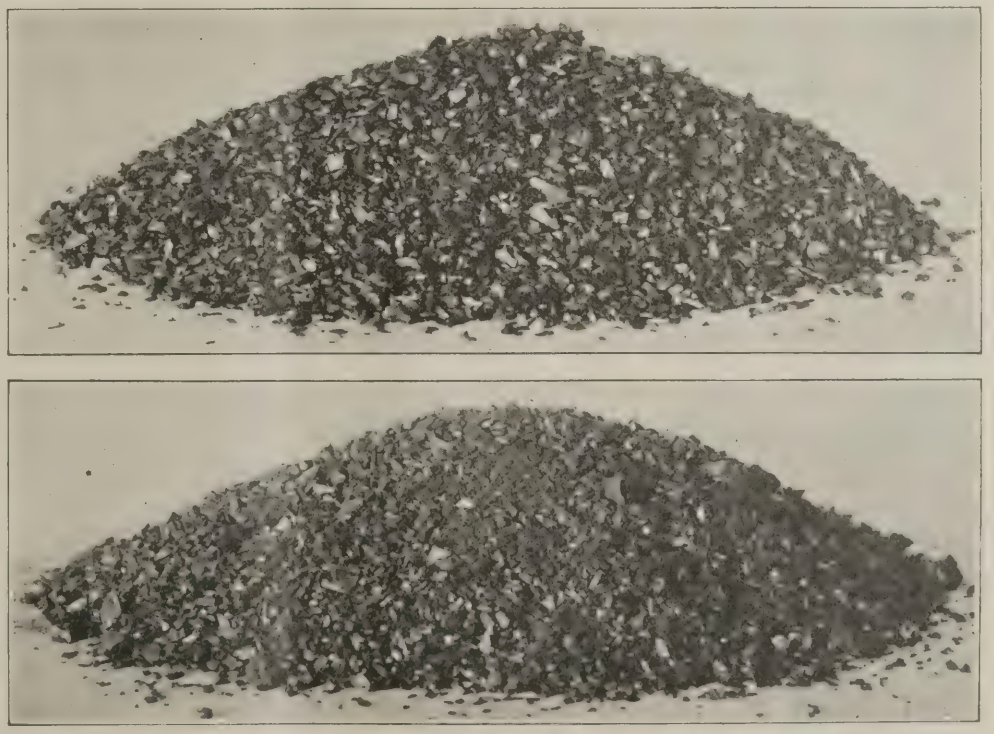
FIGS. 2 AND 3. NATURAL SIZE BOILER FUEL
Fig. 2 (Top)—No. 2 buckwheat (or rice). Fig. 3 (Bottom)—No. 3 buckwheat (or barley)

burning small anthracite economically, I [E. B. Coxe] started to design a furnace which would, as far as possible, fulfill the required conditions, which were: (1) To ignite the coal and burn it up without mixing it with fresh fuel; that is, that fresh fuel would not be added to the already partially consumed coal. (2) To have the furnace so arranged that the combustion would be continuous and uniform; that is to say, that when the furnace was in use the condition of the fire would be practically the same at any hour of any day of any week of the year. (3) To make the work of firing as easy as possible, so that a minimum number of firemen would be employed and that the whole operation of the furnace would be controlled by an intelligent man who would have more use for his brains than for his muscles; the idea being that in a large and complete plant the coal would be brought from the source of supply by elevators or drags and be fed to the furnace without hand labor, and that the ashes would be dumped into a pocket where they could be easily loaded into cars in the same way. No pokers, slice bars or other similar tools should be needed."

In order to meet the foregoing conditions, Mr. Coxe designed and built the first Coxe traveling grate and mechanical stoking furnace, and in 1893 he completely equipped his Oneida colliery with this device. It is stated that the original stokers are still in constant operation in connection with Stirling boilers. It is interesting to note the results of a test made at the completion of this boiler plant. In a continuous test extending over a period of one week, an evaporation of 8.6 lb. of water from and at 212 deg. F. per pound of dry coal was made at 4.2 per cent. over the rated capacity of the boilers. The coal burned was No. 2 buckwheat (rice) containing 5.45 per cent. volatile, 15.5 per cent. ash and 76.95 per cent. fixed carbon.

Unfortunately for the mining industry, Mr. Coxe died in May, 1895. As he had been the designer of the grate bearing his name, and the prime mover in its development, with his death his improvements automatically ceased. In 1903 the holdings of Coxe Brothers & Co., which included the Drifton shops, were taken over by the Lehigh Valley Coal Company.

A brief review of the steps leading to the working out of a practical furnace for burning small anthracite coal is not only interesting but essential to a proper understanding of the situation. The Coxe traveling grate, as first used, would burn efficiently No. 1 buckwheat and rice (previous to 1893 these sizes were considered waste products), but it was not designed to



FIGS. 4 AND 5. NATURAL SIZE SMALLER BUCKWHEATS
Fig. 4 (Top)—No. 4 buckwheat (or bird's-eye). Fig. 5 (Bottom)—Mixture, mostly silt with small amount of No. 4 buckwheat. Fuel used by Delaware, Lackawanna & Western Co. and the Lehigh Coal and Navigation Co. on Coxe stokers

burn economically and at high ratings a coal as small as No. 4 buckwheat. In order to burn this latter size of fuel economically, and at a high rate of combustion, William Lloyd, formerly superintendent of shops for the Lehigh Valley Coal Co., redesigned the stoker.

The Coxe traveling grate now entered upon a different phase of its career. It would be extremely interesting to follow the experimental work of Mr. Lloyd as he perfected his plan for the modified Coxe stoker. It became apparent at an early stage of his experiments to burn the smaller buckwheats that each particle of these fuels was so light in weight that it was necessary to use a modified grate. In order to keep the forced draft from blowing the unburned fuel from the grate surface, a grate was designed which would permit the distribution of air beneath and through the fuel bed in sufficient volume to generate a high as well as an economical rate of combustion. Mr. Lloyd changed the air compartments with their controls in the grate in such a way that it is now possible to introduce forced draft beneath any part of the entire grate surface without appreciably affecting the fuel bed on the remainder of the grate surface.

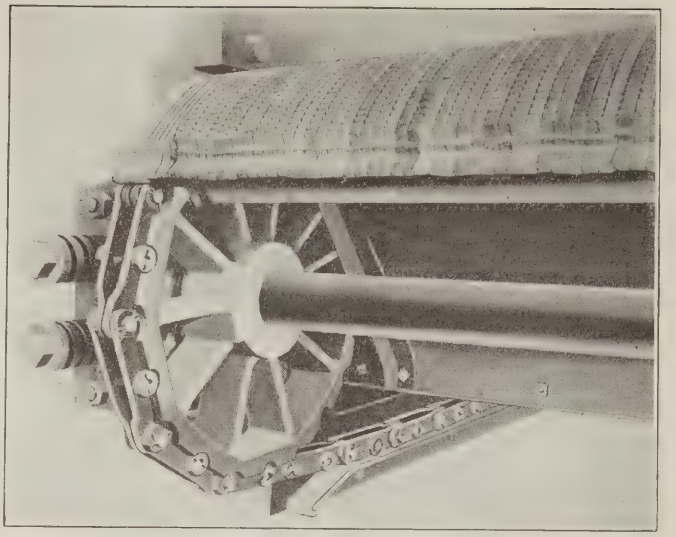


FIG. 6. DETAILS OF KEY ON CARRIER BAR; ALSO CHAIN AND SPROCKET WHEEL

Mr. Lloyd designed a "key," or grate finger, which distributes the air from beneath and through the fuel bed in a most satisfactory manner. The present standard key is a casting 8 in. in length by $\frac{3}{4}$ in. in width, having along one side 15 bosses (grooves) $\frac{3}{32}$ in. deep and $\frac{3}{16}$ in. wide. Across the top of the key are other grooves, $\frac{3}{32}$ in. wide and $\frac{1}{8}$ in. deep, 15 in number on one key with 16 on the keys in contact with it on either side. This staggered arrangement of the top surface grooves of the keys is shown in Fig. 7. A larger detail of the keys is given in Fig. 6. The object of the grooves is to make of the entire grate surface a series of channels which, when the forced draft is applied beneath the grate, subject the fuel bed to a "blanket" of air in large volume but with low velocity at any given point. Because of this uniform air distribution and control it is possible to operate the stokers at a high rate of combustion and high percentages of efficiency and economy.

Considering some of the mechanical features of the Coxe grate, it can readily be seen that the key is one of the important details. In fact, it is the essential feature of the stoker. These keys are arranged on carrier bars, which hold them in place, and are readily moved along the length of the bar in building up the grate. In practice, when keys give out at any time they are readily replaced on the end of the carrier bar, one at a time. The carrier bars extend from chain to chain, the latter being placed one on either side of the grate; the chains run over sprocket wheels and are driven from the end of the grate at the point where the ash is discharged, which is opposite the end where the coal is fed to the furnace. The arrangement of the keys on the carrier bar is shown in Fig. 6, as is also the carrying chain running over the sprocket wheel at one side of the grate.

The assembled grate, practically installed under a water-tube boiler, is shown in Fig. 7, which is a view from the inside end of the grate. The coal-feeding arrangement is shown in place at the other end of the stoker. The chain and double worm gear reduction is shown in duplicate at the left of Fig. 7; the left-hand feed is attached to a completed installation bricked in and ready to operate. The pit for receiving the ash from one of the stokers is hidden from view by the platform used by the workmen installing the furnace. A longitudinal sectional view of a stoker under a Babcock & Wilcox boiler is given in Fig. 8; the method of removing the ashes is also shown. A number of different plans are used in ash removal—by conveyor or scraper lines, by ash cars or by other mechanical means. Hand labor is done away with entirely, or is simplified in modern plants. A simple coal-handling apparatus is shown in the leading illustration; here coal is taken from the conical overhead hoppers to the distributing hoppers at the outside end of the grate by means of pipes.

The present method of draft control on a modern Coxe stoker is the result of years of experimentation. The air space in the grate is from 5 to 7 per cent. of the total grate surface. There is no large volume of air coming through the grate at any one point. Under the grate the air space is so partitioned that the proper amount of air is furnished to each part as needed. Thus the green-coal end of the stoker receives the most draft, and the air volume is steadily reduced until practically no air is supplied at the end where the coal is completely burned.

Turning from structural details to some practical illustration, a striking object lesson is presented at the Coadale plant of the Lehigh Coal and Navigation Co. Here there is a 750-hp. Stirling boiler unit equipped with two Coxe stokers, on which is burned a mixture which is practically silt with some No. 4 buckwheat in it. Two firemen are in attendance during 24 hours of service; one man on each 12-hour shift. Adjoining the Stirling boilers is a hand-fired boiler plant, with a total rating of 2348 hp., which is using rice and barley for fuel. At this latter installation a typical scene was being enacted at the time of the writer's visit to the plant. Eleven firemen were required every 24 hours to keep steam up. The men in attendance were engaged in cleaning fires, shoveling on coal and removing ashes —duties handled mechanically at the stoker installation. The opinion was expressed by the men in charge that the boilers being fired by the Coxe stokers at 200 to

230 per cent. above their rating were delivering more steam than all the hand-fired boilers put together. On the latter an efficiency of 68 to 75 per cent. of rating was maintained. The reason for this might not be so obscure when the difference between the two methods is analyzed. At the hand-fired plant, at one battery of boilers the furnace doors were swung wide open under one boiler while a fireman laboriously cleaned the fire, scraped out the clinkers and then shoveled on the coal so as to almost bank the fire. This condition existed at one end of the battery, while at the other end a fire which had been similarly treated some time ago was just coming to life and active service again. The two intermediate fires were keeping up steam in the four boilers of the battery. A similar unit adjoining made up the other half of the hand-fired boilers.

In the house containing the Stirling Coxe stoker outfit, the solitary fireman in charge was occupied in regulating the speed of the traveling grate and the amount of the draft and coal fed to the furnace. Occasionally he looked after the ash disposal. Normally, on opening the side doors in the brickwork inclosing the boilers and furnace the fire can be seen burning steadily at any hour of day or night; sometimes the flame comes out of these doors when the draft is increased somewhat, but the fuel bed on the grate varies little. The following are a few of the reasons given for being able to obtain high ratings and efficiency with the Coxe traveling grate with a minimum amount of labor:

The fuel bed is always thin, never more than 4 to 5 in. in thickness, thus allowing sufficient air to pass through the bed of burning coal for nearly perfect combustion with a minimum amount of resistance. The fires are cleaned automatically; the fuel is ignited as it enters the furnace, gradually burns down as the grate slowly moves toward the bridge wall, and the burned-out fuel (ash) is discharged into the pit. The forced-draft control and distribution is such that the air can be placed under the grate exactly and only where the fuel requires it for proper combustion, thus eliminating any excess. The speed of the stoker and draft regulation are so simply and easily controlled that unskilled labor can operate the stoker efficiently and at high ratings. Because of the simplicity of its operation one man can attend to a number of stokers.

TABLE I. OPERATING RESULTS OF ANTHRACITE BUCKWHEATS*

750-Hp. Boiler—Coxe Traveling Grate—Average Steam Pressure 125 Lb.	No. 1 Buckwheat	No. 2 Buckwheat	No. 3 Buckwheat	No. 4 Buckwheat	Uncleaned Buckwheat
Average horsepower of test	1,500	1,395	1,200	1,010	495
Maximum horsepower of test	1,750	1,600	1,400	1,100	650
Average per cent. rating	200	186	160	134	66
B.t.u. per pound dry coal	12,250	12,000	11,500	11,000	10,000
Combined efficiency of boiler, furnace and grate, per cent	74	70	65	61	45
Equivalent evaporation from and at 212 deg. F. per pound of dry coal, lb	9.35	8.77	7.7	6.9	4.6
Dry coal consumed per horsepower per hour, lb	3.69	3.93	4.48	5.00	7.5
Dry coal per square foot of grate surface per hour, lb	25	25	25	25	25
Boiler horsepower per square foot of grate surface	6.8	6.36	5.5	4.9	3.3
Grate travel in feet per hour	16.6	16.5	16.2	15.2	11.1
Cost per horsepower per hour in cents	0.87	0.58	0.43	0.27	0.21

NOTE—Last figures correspond to prices at the mines and have to be adjusted to meet the various freight rates.

*Table by William P. Frey, Fuel Engineer, Lehigh Coal & Navigation Co., Lansford, Penn. Published in Fuel Supplement (July, 1918), Vol. 40, No. 7, of Journal of American Society of Mechanical Engineers.

The Lehigh Coal and Navigation Co. has passed the experimental stage as regards the use of Coxe stokers and is equipping other boilers with this type of furnace. The results being obtained by this company on the Coxe

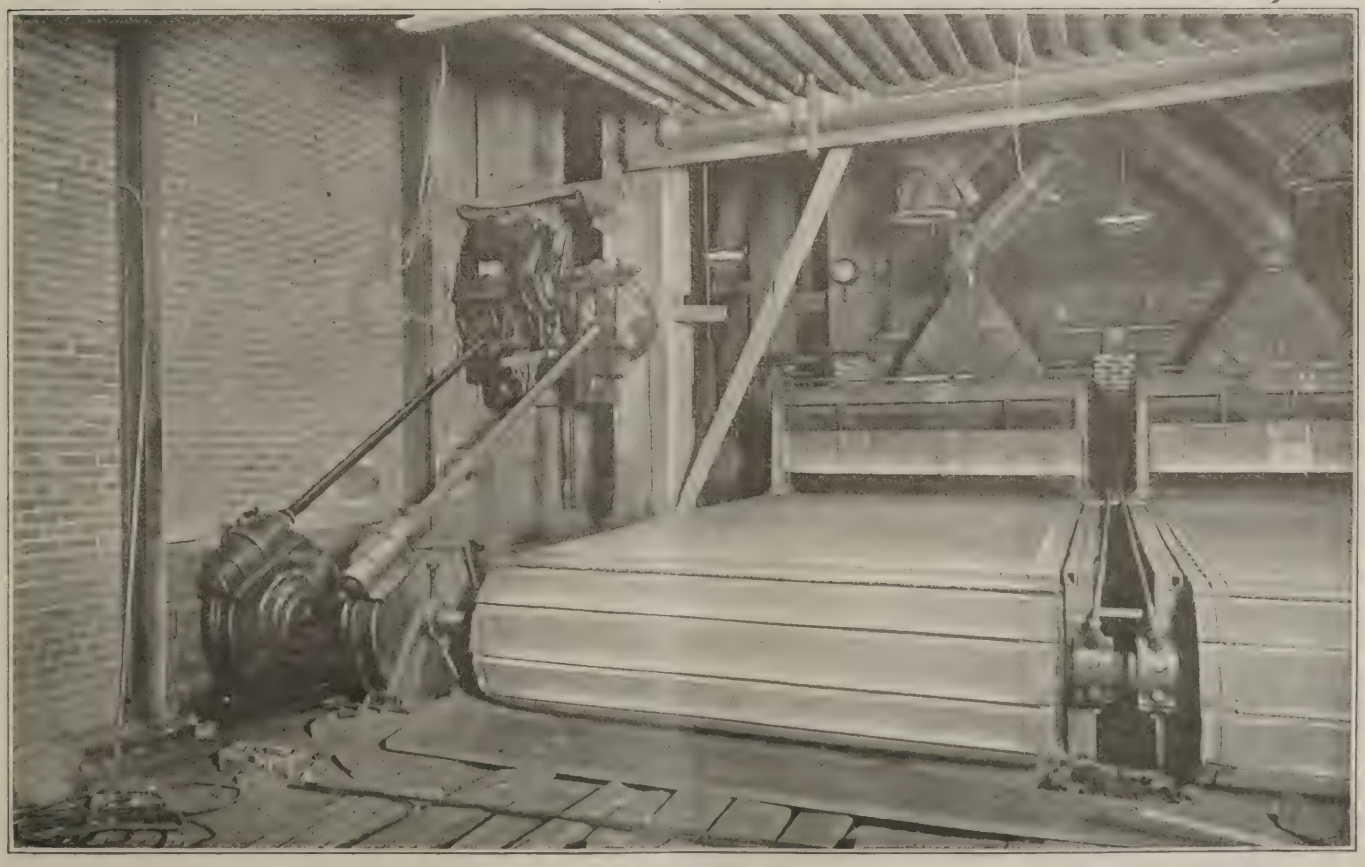


FIG. 7. STOKERS BEING INSTALLED UNDER BOILERS (REAR VIEW); STOKER DRIVE AT LEFT

traveling grate with some of the smallest sizes of anthracite buckwheats are shown in Table I.

In commenting on Coxe stoker practice and the table referred to, William P. Frey, fuel engineer of the Lehigh Coal and Navigation Co., states: "As it was found that a rate of combustion of 35 lb. of dry coal per square foot of grate surface was economical for all sizes, this rate was adhered to [in test recorded] as closely as possible by adjusting the speed of the grates and the air supply. As a rough guide for the boiler per square foot, which means that if the grate runs at 16.2 ft. in the case of No. 3 buckwheat, the bed must be carried 6 in. thick. If it is desired to carry only 4 in., the speed of the grate must be increased as 6 is to 4, or 1.5 times, to keep the same rate of combustion. It has to be understood, too, that 25 lb. per square foot is by no means the highest possible rating. The maximum rating obtainable according to our experience is: No. 1 buckwheat, 40 lb. per square foot per hour; No. 2 buckwheat, 35 lb. per square foot per hour; No. 3 buck-

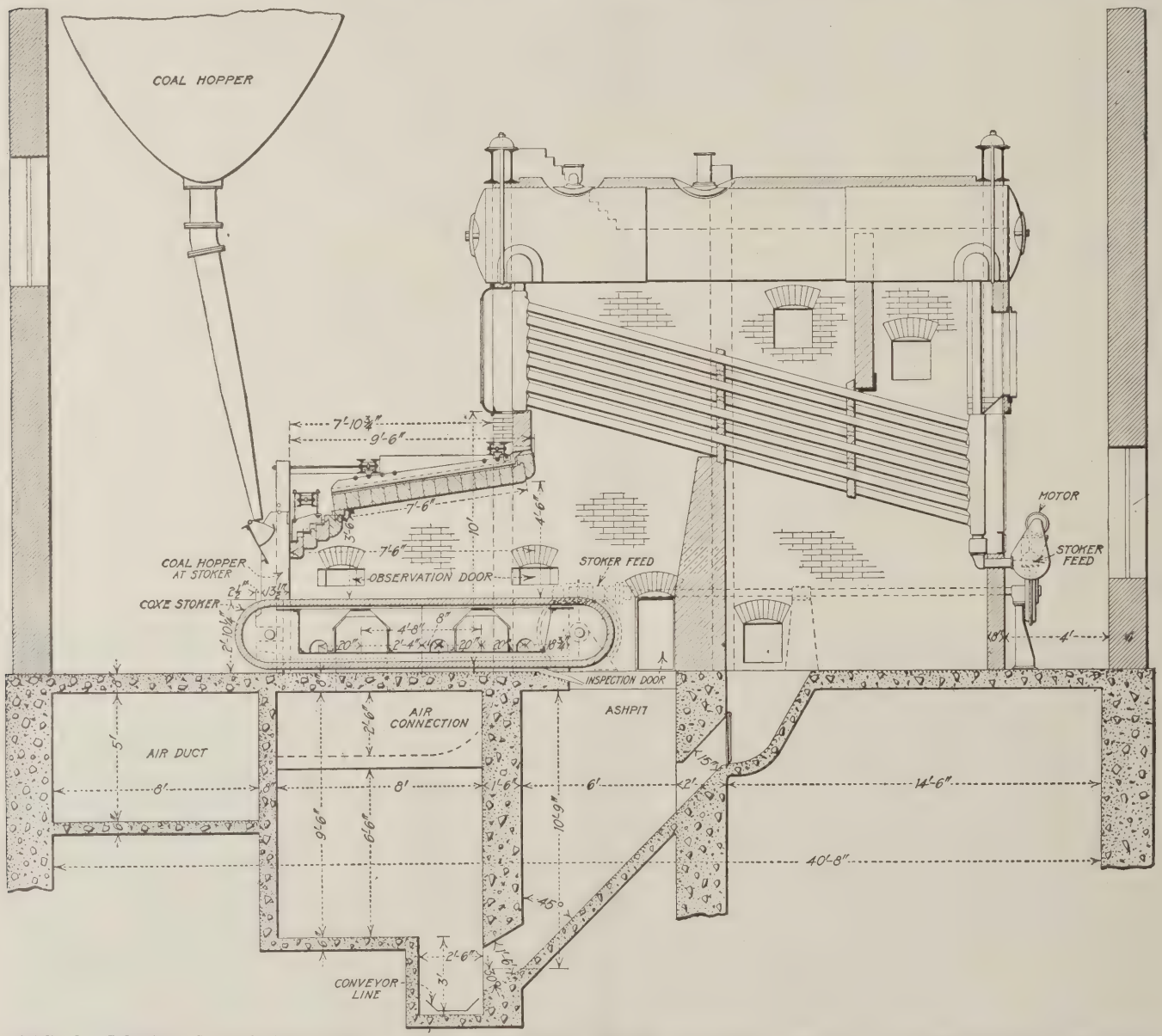


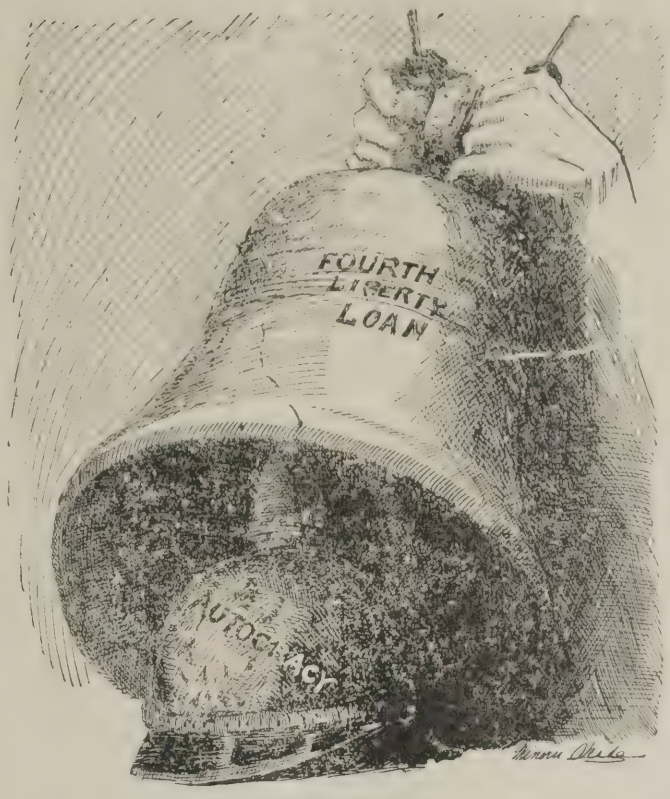
FIG. 8. LONGITUDINAL SECTIONAL VIEW OF STOKER UNDER BABCOCK & WILCOX BOILER, SHOWING METHOD OF ASH REMOVAL AND DRAFT

operatives, the blowers have to be set to deliver 20 cu.ft. of air per maximum horsepower. The air control goes hand in hand with the CO_2 recorder readings (these read 12 per cent. on the average) and the stack temperatures, which are to be kept below 500 deg. F.

"If the stack temperatures are high, the speed of the grate must be increased, the thickness of coal fuel bed reduced and the air pressure under the grate lowered, but the rate of combustion should be maintained as constant as possible. It is important to understand that the figures given in the line in the table—'grate travel in feet per hour'—are relative to 25 lb. of coal wheat, 30 lb. per square foot. per hour; No. 4 buckwheat, 27 lb. per square foot per hour; No. 5 buckwheat and uncleaned silt, 25 lb. per square foot per hour or less. These figures apply to a Coxe stoker with 7 per cent. air space in the grate. Good practice will keep the air pressure in the tuyeres as near as possible to 1 in. at the refuse (ash) end of the grate."

By comparison with the rating given by Mr. Frey, the following data relative to Coxe stokers furnished by John Van Brunt, chief engineer of the Construction Engineering Corporation, of New York City, are interesting: "No. 3 buckwheat can be burned at the rate of

30 lb. per sq.ft. with good efficiency, and as high as 40 lb. per sq.ft. at an expense of 3 to 5 per cent. in efficiency. For No. 4 buckwheat the maximum combustion rate for good efficiency is about 22 lb. per sq.ft.; at the sacrifice of 6 to 8 per cent. efficiency it may be burned at 30 lb. per sq.ft. Silt, or No. 5 buckwheat, can be burned at 16 to 18 lb. per sq.ft. per hour; the ash pit loss is high even at this combustion rate. It is possible to go up to 25 to 30 lb., but the efficiency will drop rapidly; at these higher rates the efficiency would be 40 per cent. or less. All these combustion rates can be maintained indefinitely. Subject to the limitations of the boiler, it is simply a question of providing as much grate surface as is necessary in order to develop as much power as desired." The following statement was made in respect to labor: "If a Coxe stoker plant is properly installed (properly laid out and planned), then one man can handle five or six stokers—that is, 4000 to 5000 developed horsepower. Not including ash handling, a man can look after 10,000 horsepower."



HELP COVER IT

As to the preparation of boiler fuel, Mr. Frey states: "It is evident that it is not only desirable to burn cleaned No. 4 buckwheat, but it is at the same time most economical if ample grate capacity is provided; and there will go hand in hand with the preparation of this size also the washing and concentrating of No. 5 buckwheat. But results show still more conclusively how important it is to use proper methods of firing, and the prime importance of keeping the market free from all fake products of unclean No. 4 and No. 5 buckwheat and uncleaned silt."

A number of the big anthracite companies are using the Coxe grate and reporting most favorably as to its operation. Among these companies are the Susquehanna Coal Co., with 50; the Philadelphia & Reading Coal and Iron Co., 24; the Pennsylvania Coal Co., 14; the Delaware & Hudson Coal Co., 14, and the Lehigh Valley Coal Co., with 6. Furthermore the following statement from an official of the coal-mining department of the Delaware, Lackawanna & Western Railroad Co. is significant:

"In our coal-mining department at present we have 41 Coxe traveling grates installed, six are being installed and 12 are on order. One man can operate ten stokers of the size we are using, and each of the stokers referred to is of proper size for installation under a boiler rated about 300 hp. With the fuel which we are burning we can obtain a capacity of about 150 per cent. and an overall efficiency of about 55 per cent.; this fuel could not be burned successfully with hand-fired operation. The stokers, when using coal which could be hand-fired, would give considerably greater capacity and probably equal, if not slightly higher, efficiency." The coal burned by the Lackawanna company is about the smallest anthracite saved in breaker or washery preparation.

Coal operators formerly believed that coal used about the mines cost nothing, and that in a steam plant only the cost of the plant was to be considered. Now the operator views steam generation as an item of expense involving the use of one ton of anthracite in the production of each eight or nine tons mined. No longer would silt be wasted by diversion to streams, flushing abandoned mine workings or improper stocking. It is not only valuable as raw fuel or in the manufacture of fuel, but by its use at the mines it releases many tons of larger sizes of anthracite better adapted to transportation and for industrial use at points removed from the anthracite field. Thus if silt was used for mine operation purposes, it would release about 8,000,000 additional tons of steam size anthracite that could be diverted to commercial use.

Millions of tons of anthracite silt have been flushed into mine workings, and as large if not a larger tonnage lies scattered about the region in the vicinity of breakers; some of this silt is in shape for recovery. During recent years it has been stocked after it was deposited in settling ponds, and many mines now have a large supply of this stoker fuel readily at hand. One of the large anthracite mining companies stated that it had in sight on the surface, available for immediate use, about ten years' supply of silt for boiler fuel. And each year contributes its quota to this resource of the operators—silt from fresh-mined coal and from the old banks. One admirable way to capitalize this abundant supply of fuel is to burn it on Coxe traveling grates.

On the average the original plant substance from which coal was formed contained about 40 per cent. of oxygen and a comparatively low percentage of carbon. As the process of the formation of coal went on the oxygen was gradually decreased and the proportion of the carbon thereby increased. Anthracite coal contains only about 2.5 per cent. of oxygen and a very high percentage of carbon. With the progress of carbonization, the percentage of the volatile matter also decreases and its quality undergoes a change which makes it easier to burn. Thus, although the oxygen content itself may not directly affect the combustion qualities of a coal it may be regarded in a way as an indicator of such qualities.—*Bureau of Mines Bulletin No. 135.*

A Reciprocating Underground Coal Conveyor

By J. F. K. BROWN
Scranton, Penn.

SYNOPSIS—*Some coal beds have an inclination such that cars may be handled to the rise only with difficulty, yet not enough to permit the coal to slide on sheet iron. In such cases the conveyor here described has been used with much success when other conditions were propitious.*

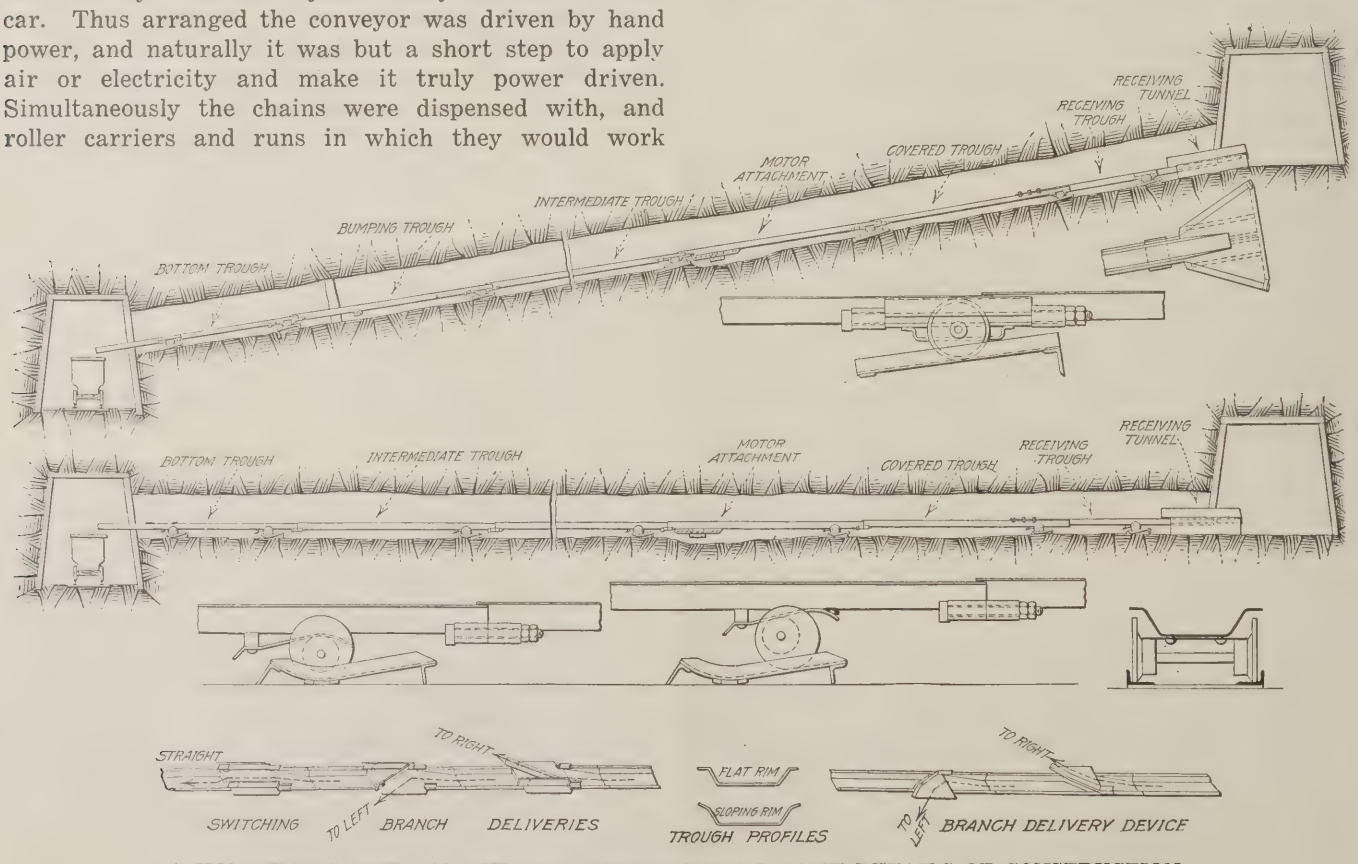
IN THE thin coal beds of the French Pas de Calais field, in Belgium and in Germany, an underground conveyor of a reciprocating type has long been in operation. Although the principle upon which it cperates is not new, its application to underground conditions gave rise to a type of appliance that is popular and has been largely used in the fields mentioned.

The idea originally grew out of the series of sheet-iron plates once used and still in operation in pitching workings, to slide the coal from the faces to the rise to the cars in the level. From that, in beds whose pitch was inadequate to run the coal by gravity, it occurred to someone to lift these plates and hang them by chains to the roadway timbers, and to so set the line of plates thus hung that in swinging them to and fro one end would bump against a tree or wood block at the loading end, the sudden cessation of the motion of the plates causing the coal to continue to slide forward and thus by a series of jerks finally deliver it to the car. Thus arranged the conveyor was driven by hand power, and naturally it was but a short step to apply air or electricity and make it truly power driven. Simultaneously the chains were dispensed with, and roller carriers and runs in which they would work substituted. Thus was evolved the conveyor as it stands today.

Essentially this conveyor works in a similar fashion to an inclined or horizontal shaking screen. The reciprocating motion is imparted to the pans either direct, through a bell crank arrangement, or through a rope arranged triangularly as shown in the accompanying illustrations. Where the inclination is more than 8 deg. this to and fro motion is all that is required, the work of the engine being merely that of pulling the series of pans back up the incline provided by the runways in which the rollers work. On the down stroke the weight of the conveyor and its load is sufficient to impart motion, which is ended abruptly against what is called a bumping beam, the coal continuing its travel along the pans in the direction of the car to be loaded.

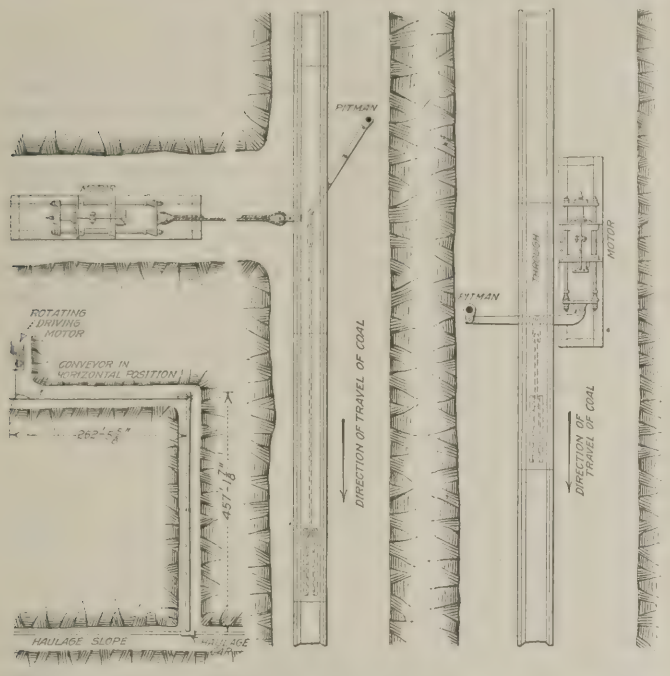
On inclinations which are less than 8 deg. this bumping beam is dispensed with, and while the engine still only imparts the to and fro swing, another motion is given to the conveyor. In this case the roller runways are so arranged that the pans rise slowly on the forward stroke and, synchronizing with the turn of that stroke, fall rapidly away from beneath the material carried, which continues its forward direction.

The conveyor itself consists of a series of shallow pans, about 4 in. in depth and of varying shapes and designs, ranging from 19 and 20 in. down to 15 in. in width. Usually these pans are built in lengths of 12 ft. and fastened together so as to form a total length



A HORIZONTAL AND AN INCLINED CONVEYOR AND SOME DETAILS OF CONSTRUCTION

of conveyor up to 400 ft. In the installations designed for workings with over 8-deg. pitch, the various lengths from the top down are known as the receiving trough, the covered trough, intermediate troughs, the motor trough, the bumping trough and the bottom trough. In the other type of installation they are known by similar names, with the exception of the bumping trough, which is absent. The intermediate trough is the only one which is of constant design, each of the others having



TYPICAL ARRANGEMENT OF CONVEYOR AND DETAILS OF TWO METHODS OF OSCILLATION

some particular difference which fixes its position in the conveyor.

The receiving trough is wide mouthed, being so arranged that a car of coal may be tipped onto it in an upper level. The covered trough takes its name from the fact that the receiving trough is so arranged as to cover it and be capable of being slid up or down the requisite distance so as to accommodate any slight variations there may be from time to time in the distance from the loading point to the end of the conveyor. The motor trough, which usually comes next in order downward, has riveted underneath it a steel angle with a series of holes drilled therein to which the extension of the engine piston or bell crank, as the case may be, is attached. This allows for some variation in the exact position of the motor. Below the bumping trough, commonly the second from the bottom, is fixed the bumping beam. The bottom or delivery trough has two roller supports in contradistinction to the others, which have one each.

All the sections of the conveyor are joined together by strong bolts passing through two lugs, one on each side of each section, each section slightly overlapping the one below. Two nuts bring the bolts and lugs together, the top one being a lock nut. On each section at the top end is bolted the carrier plate, which is curved, the lower end of the section being supported by the section below. On the ground below these carrier plates is placed the runway plate, also curved in the fashion indicated in the illustrations.

The rollers that operate between the carrier and the runway plates consist of an axle and an inner and outer roller of different diameters, and with centers that are not concentric. The outer rollers are approximately 10 or 11 in. in diameter, and the inner ones 4 to 4½, while the center lines are offset about an inch. It is this eccentric arrangement, together with the motion imparted by the engine operating through the curved paths of the carrier and runway plates, which gives the peculiar motion up and down as well as backward and forward that causes the coal to travel in the proper direction. In the installations for pitches of 8 deg. and over the paths of the carrier and runway plates are straight, and are then simply inclined planes.

A neat type of air engine is often used to drive the conveyor. This is a single cylinder built into a triangular frame. It is compact enough to go into the thinnest of beds, and is furthermore of such a shape that the height is the lowest dimension, with the width next, which is as it should be for underground work.

The engine foundations are usually timbers about a foot longer than the engine itself, propped against the floor from the roof and fitted under the frame without adding an inch to the height. The engine has a stroke of from 10 to 15 in. and a piston diameter of 6 to 12 in. In order that the piston may be properly guided during its stroke, and also that the drive of the engine may be from either end, a pair of guide rods pass through projections of the engine bedplate from the piston end to the rear, and where they are joined to the crosshead two springs take up the shock of the change of direction of motion. The inlet to the motor is at one end and is manipulated by a crank passing over the top of the engine. When the piston reaches its full stroke, this crank opens the exhaust port, the return swing of the conveyor brings back the piston and rod, and at the bottom of the stroke air again enters.

This conveyor is employed not only in the longwall faces, but also in rooms, and as part of the transportation system where the pitch is greater than that on which a car can readily be handled; also where the coal beds are low. In the longwall faces the conveyor is built the length of the face and stretches in a straight line behind the men working thereon. As the height of the conveyor is small the coal does not require to be lifted very far, and consequently a machine cut face is rapidly loaded away. In this case the conveyor is loaded anywhere along its full length and the loading trough is dispensed with.

In room and chamber work the conveyor is loaded on the end, the broad shovel-shaped extremity of the loading trough facilitating this. Through sections are added to the conveyor as the chamber lengthens.

An illustration is given of the use of this machine as part of the transportation system. Here the conveyor is shown delivering coal along a section 260 ft. in length, into another section 460 ft. long, making a total of 720 ft. before reaching the car. Both these conveyors are driven from one engine, one conveyor driving the other.

An interesting feature is the capability of this conveyor to discharge material if required at any point along its entire length. This is accomplished by the aid of what is termed a branch delivery device, which consist of a specially built series of plates, fitting inside

the conveyor pan, and arranged on such an incline that the material is raised over the lip of the pan and is discharged either to the right or left as desired. As may be imagined in room work wherever rock is made in the mining, this rock can be loaded onto the conveyor after or before the coal and discharged alongside the conveyor line. This is equally handy in a longwall face where rock is made, as it can then be transported and discharged wherever a pack wall has to be built.

While such an appliance has many advantages and has been a decided success in many coal fields, more than 40,000 ft. being in regular operation, it also has some shortcomings. It requires, for example, an air engine, because although it is possible to apply an electric motor, a motion of the type required is much more easily secured from a reciprocating engine than from a motor, whose motion has to be converted into reciprocation by a system of wheels and levers.

Secondly, the conveyor is only suitable for even floors—that is, floors without undulations. Being one continuous line the conveyor requires to be straight and of regular grade throughout its length. Any depression in the line will cause trouble.

A third defect is the inability of this conveyor to deliver material in the reverse direction. While not essential nor common with most conveyors this is nevertheless quite desirable in many mining sections.

Consumers Mining Co. Development

The Consumers Mining Co., of Harmarville, Allegheny County, Pennsylvania (a subsidiary corporation of the La Belle Iron Works, Steubenville, Ohio), is making commendable progress on the concrete lining of the shafts and also on underground work on the coal property the company acquired near Harmarville last April. The mine is 10 miles from Pittsburgh, near the Conemaugh Division of the Pennsylvania R.R., and about 1500 ft. from the Allegheny River. Prepared coal will be shipped by rail and river to the La Belle Iron Works for coking and steam use. The ultimate capacity of the plant has been planned for 5000 tons per 9-hour day, but the proposed surface installation for the present will be equipped for preparing and shipping 2500 tons per 9-hour day. The contracts for the surface building with equipment have not been awarded; the plans show steel construction, which will be fireproof and as modern as the skill and ingenuity of our foremost engineers can design.

The proposed electric hoist will deliver two skips (of three tons each) of coal per minute into a 1000-ton bin; from this bin the coal is to be mechanically fed to a Bradford coal breaker and cleaner. The slate, pyrites, rock, bony and hard coal of high ash content passing out of the end of the screen will be delivered by cars to a dump; or the bony and hard coal will be separated from the distinct impurities by hand picking, if found in sufficient quantity and quality for steam or domestic use. The coal passing through the meshes of the Bradford screen will be directly loaded onto railroad cars or delivered to coal barges on the Allegheny River. This will be done by means of either a system of belt conveyors approximately 1500 ft. long or by electric carriers. The breaker is so located that a crusher can be installed at some future time directly under the breaker for the purpose of crushing the ½-in. coal to dust preliminary to separating the impurities from the coal by washing or by some other modern method. Experimental washing tests indicate that the coal can be cleaned to a sufficient degree to produce a coking coal of approximately 7 per cent. ash content, and less than 1 per cent. sulphur content; this can be done by removing about 8 per cent. of the impurities mixed with the crushed coal.

The Upper and Lower Freeport seams to be mined are separated by a slate and bone band of from 4 to 12 in. The lower seam averages 36 in. in thickness with an ash content of about 4 per cent. and sulphur content of less than 1 per cent.; while the upper seam averages 48 in. in height, with a variable high ash and sulphur content. R. W. McCasland, superintendent of the coal and coke department of the La Balle Iron Works, considers it impractical to attempt to mine the two seams and deliver on cars separately. The owners propose to build about 50 miners' houses in the near future. The ultimate surface plant is estimated to cost approximately $1,000,000.

Neville Island Coal Plant

The United States Steel Corporation's "Ordnance Department," now under construction on Neville Island, adjacent to Pittsburgh, Penn., is to include a comprehensive coal-storage and handling equipment for boiler and producer coal.

Barge coal from the mines on the Allegheny and Monongahela rivers will contribute a large tonnage. Preliminary plans call for a large storage plant with an open yard 150 ft. in width, 670 ft. in length and means for piling coal 50 ft. high, creating a mass of about 90,000 tons.

The high and low water variation of the Ohio River at Neville Island is 35 ft. To protect the coal from water the yard will be inclosed by extensive concrete walls rising about 9 ft. above high-water mark. For track coal unloading pits will be constructed. A traveling coal-handling trolley bridge of about 154 ft. span will be provided with a 7½-ton bucket; it will take the coal from barges and let it fall on the storage yard, or it will take coal from a storage pile and deposit it in hoppers (of 250 tons capacity) directly over the coal-preparation building.

The coal-preparation equipment will consist of mechanical feeders, rolls, crushers and revolving screens, to size the run-of-mine coal for boiler or producer use. The prepared coal is to be stored in pits, one for boiler use of 2400 tons capacity, or 52 hours normal supply, and one for producer use of 3000 tons capacity, or 40 hours normal supply. A stationary coal-handling bridge provided with one 7½-ton and one four-ton bucket will transfer the prepared coal from storage pits to the bunkers over boilers and producers. An ash-handling and disposal equipment is contemplated, also a water purification installation.

Copper ranks next to steel as the most important war metal. Of a world's production of approximately 3,100,000,000 pounds in 1917, the refineries of the United States produced 2,362,000,000 pounds, or a trifle less than 80 per cent.

How Prices of Bituminous Coal Were Fixed by the Fuel Administration*—I

BY CYRUS GARNSEY, JR., R. V. NORRIS AND J. H. ALLPORT
Engineers to United States Fuel Administration

DURING the latter part of 1916 and the early months of 1917, due to war activities, there was a threatened shortage of coal which resulted in panic among consumers and a rush to obtain coal at any price. As result of this insistent demand for immediate delivery, prices were bid up by the consumers to unprecedented heights; spot coal which had previously been selling at from $1.50 to $2 per ton was bid up to $5, $6, and, in exceptional cases, as high as $7.50 or more per ton. Then when the April, 1917, contract period arrived, contracts could be made only at prices ranging from $3 up to $5 and $6 per ton for the year's delivery. This condition caused such a demoralization of the business, and so much complaint, that some action to regulate prices was considered essential by the National Administration.

In May, 1917, a committee under the chairmanship of F. S. Peabody, of Chicago, was appointed by the Council of National Defense, through Mr. Lane, to consider the whole question of bituminous coal. This committee, with the Secretary of the Interior, Mr. Lane, after numerous meetings and long negotiations with the operators throughout the country announced on June 29 an agreement between the committee and the producers, fixing a tentative maximum price for bituminous coal throughout the country at $3 per net ton f.o.b. mines, to which was added 25c. for selling commission to wholesalers. This plan was based on the idea of fixing a maximum price, high enough to greatly stimulate production, with the expectation that the laws of supply and demand would, with ample production, operate to maintain fair and just prices for coal throughout the country.

With the country plunged into the greatest war of history, it became evident that distinct power should be given the Administration to control efficiently war necessities, food and fuel, needed in ever-increasing amounts, not only by our own country but by our allies, and for our armies in this country and abroad. With this in view, the Sixty-fifth Congress passed House Bill No. 4961, generally known as the "Lever Act," entitled "An Act to provide further for the national security and defense by encouraging the production, conserving the supply, and controlling the distribution of food products and fuels." It was approved Aug. 10, 1917.

Section 5 of the Lever Act authorizes the licensing of "the importation, manufacture, storage, mining or distribution of any necessities"; and Section 25, "to fix the price of coal and coke, whenever and wherever sold, either by producer or dealer." It is further provided in this section "in fixing maximum prices for producers, the commission shall allow the cost of production, including the expense of operation, maintenance, depreciation and depletion, and shall add thereto a just and reasonable profit." "In fixing such prices for dealers the commission shall allow the cost to the dealer and shall add thereto a just and reasonable sum for his profit in the transaction."

[The powers of the Federal Trade Commission as to coal were, with certain minor exceptions, transferred to the United States Fuel Administration by order of the President on July 3, 1918.]

On Aug. 21, 1917, the President announced prices for bituminous coal throughout the United States, specifying prices for run-of-mine, prepared sizes, and slack or screenings, by states and, in a few instances, by districts or by seams. These prices for run-of-mine coal varied from $1.90 to $3.25, and were, in general, a very great reduction from the prices fixed by the Lane-Peabody Commission. These prices were based on average figures on about 100,000,000 tons production, prepared by the Federal Trade Commission, from the very meager data in its possession, generally costs from the larger and lower-cost operations of each district.

On Aug. 23, 1917, Harry A. Garfield was appointed United States Fuel Administrator by the President, and to him was delegated the powers as to fuel, conferred by said act on the President. On the same day, by Presidential proclamation, prices were fixed on Pennsylvania anthracite coal. From this date until early in January, 1918, numerous revisions and adjustments of "the President's prices" were made by the Fuel Administrator, but no general revision was attempted.

Early in January, the Engineers' Committee was constituted, and to this committee was entrusted the making of a general review of costs, and the submission to the United States Fuel Administrator of the results of careful studies of the costs of producing coal throughout the United States. The committee was not then, and never has been, authorized to fix prices on coal; the limit of its duties has been to study and report on methods of price fixing and to determine and furnish costs, leaving to the Fuel Administrator the personal duty of determining the amount of margin to be allowed.

The committee's first work was a study of price-fixing methods which were, or might be, applicable to coal-producing conditions. In arriving at a logical and scientific plan for fixing the price of fuel the following methods were considered:

1. *Straight Cost Plus Method.*—The actual cost at each colliery plus a fixed sum or percentage of profit.

2. *Modified Cost Plus Method.*—The actual cost at each colliery plus a graduated profit decreasing as costs increase.

3. *Average Cost Methods.*—Prices fixed on the average cost in each district.

4. *Pooling Methods.*—All coal sold at the average cost of each district plus a profit, and the returns to each colliery adjusted through a clearing house at a price proportioned to its cost of production.

*Paper presented at the Colorado meeting of the American Institute of Mining Engineers, September, 1918.

Discussion of Advantages and Disadvantages of These Methods

1. *Straight Cost Plus Method.—Advantages.*—(*a*) All producers would receive the same profit, and no one would have an advantage over another in this respect. (*b*) Apparently simple in plan and execution.

Disadvantages. — Impracticable of application, by reason of: (*a*) Resultant multiplicity of prices, with grave disturbance of markets. (*b*) Continual changing of prices due to inevitable variations in each producer's costs. (*c*) Instability of the industry, due to the natural disposition of consumers to purchase the lowest-price coal. (*d*) Inefficiency in operation always resulting from lack of incentive in cost plus operations. (*e*) Material reduction in output and reduction in quality due to the natural tendency to mine the poorer and more expensive coal with a guaranteed profit, and to leave the better and cheaper coal in reserve to be mined on the return of normal conditions. (*f*) Continual increase in all costs incidental to extravagant methods encouraged by guaranteed profits. (*g*) Labor unrest and constant demands for increases due to the knowledge of a guaranteed profit regardless of cost. (*h*) Practical impossibility of arriving with technical accuracy at the costs of each separate operation. (*i*) Impracticability of the Government's policing the mines and securing the same efficient operation and production attained by the individual producer under the stimulus of increased profits. (*j*) Illogical, in that the better planned and managed operations are discouraged, as compared with poor and inefficiently managed properties.

2. *Modified Cost Plus Method.*—This is but a modifi-

FEDERAL TRADE COMMISSION **FILE No.**.....

BITUMINOUS COAL REPORT ON COST, INCOME, AND TONNAGE FOR....., 191
(Period, Month or Year.)

COMPANY MAKING THIS REPORT { FULL NAME..... ADDRESS.....

LOCATION OF MINES
District.....
State.....
County.....

COST

ITEM	LABOR	SUPPLIES	TOTAL AMOUNT	TOTAL PER TON
I. MINE EXPENSE	$	$	$	$
(1) OPERATING EXPENSE:				
(2) Mining,				
(3) Yardage,				
(4) Transportation,				
(5) Ventilation,				
(6) Drainage,				
(7) Dead work,				
(8) Tipple or breaker,				
(9) Washery,				
(10) Miscellaneous,				
(11)				
(12) Total,				
(13) Power,				
(14) Power-house fuel, tons,				
(15) Superintendence and engineering,				
(16) Mine office,				
(17)				
(18) Total,				
(19) Total Operating Expense,				
(20) GENERAL EXPENSE AND FIXED CHARGES.				
(21) Royalty,				
(22) Depletion reserve,				
(23) Depreciation reserve,				
(24) Maintenance reserve,				
(25) Contingent reserve,				
(26) Taxes (exclude income and excess profit) %				
(27) Insurance—General,				
(28) " Liability, or Compensation,				
(29) Officers' salaries and expenses,				
(30) Other general office salaries and expense, %				
(31) Legal,				
(32) Miscellaneous,				
(33)				
(34) Total Gen. Exp. and Fixed Charges,				
(35) Total Mine Expense,				
II. SELLING EXPENSE				
(36) Commissions,				
(37) Advertising,				
(38) Bad accounts,				
(39) Allowances,				
(40) Salesmen's salaries and expenses,				
(41) Officers' salaries and expenses,				
(42) Other office salaries and expenses, %				
(43) Miscellaneous,				
(44)				
(45) Total Selling Expense,				
III. OTHER EXPENSE				
(46) Taxes—Income and excess profit,				
(47) Interest,				
(48) Sinking fund,				
(49)				
(50) Total Other Expense,				
(51) CAPITAL AND MAINT. RESERVE CHARGES:				
(52) Improvements,				
(53) Developments,				
(54) Maintenance,				
(55)				
(56) Total Capital and Maint. Reserve Charges,				
(57) SUPPLIES:				
(58) Supplies on hand 1st of month,				
(59) Supplies purchased during month,				
(60) Total,				
(61) Supplies used during month,				
(62) Supplies on hand end of month,				

INCOME

	AMOUNT
	$
(63) COAL SALES:	
(64) Local sales, at per ton,	
(65) Shipped, at per ton,	
(66) Railroad, at per ton,	
(67) Coke, at per ton,	
(68) Power-house fuel, at per ton,	
(69)	
(70) Total Sales,	
(71) COST OF SALES:	
(72) Total mine expense (Item 35),	
(73) Coal purchased,	
(74) Total,	
(75) Inventory 1st of month,	
(76) Inventory end of month,	
(77) Increase or decrease in inventories,	
(78) Total Costs (Add 74 and 77),	
(79) Gross Profit on Coal Sold (Subtract 78 from 70),	
(80) MISCELLANEOUS PROFITS:	
(81) Powder,	
(82) Interest on pay roll advanced,	
(83) Smithing,	
(84) Heat, light, and power,	
(85) Dwellings and farms,	
(86) Stores,	
(87) Standard-gauge railroad equipment,	
(88) Floating equipment,	
(89) Coke and by-products,	
(90) Other income,	
(91)	
(92) Total gross profit,	
(93) Selling expense,	
(94) Other expense,	
(95) Total,	
(96) Total Net Income,	

COAL TONNAGE. (2,000 Pounds)

	PREPARED	RUN-OF-MINE	SLACK	TOTAL
(97) SALES:				
(98) Local,				
(99) Shipped,				
(100) Railroad,				
(101) Coke,				
(102) Power-house fuel,				
(103) Total Sales,				
(104) Add				
(105) Inventory, end of month,				
(106) Total,				
(107) Deduct				
(108) Inventory 1st of month,				
(109) Purchased coal,				
(110) Total deductions,				
(111) Production,				

(112) Kind of coal, Number days worked,
(113) Name of number of seam, Cause of idle days,
(114) Thickness of seam,
(115) Number of mines,
(116) Remarks:

Approved and Certified Correct: ....., ...
(Name.) (Title.)
This Report Must be Signed by an Officer of the Company.

FACSIMILE OF REPORT WHICH HAD TO BE MADE OUT BY EACH PRODUCING COMPANY

cation of the preceding, and the same discussion applies, modified only by the inclusion of a somewhat greater incentive to the better and more economical operations.

3. *Average Cost Methods.—Advantages.*—A minimum uniform price for each district or, if desired, for the entire country.

Disadvantages.—(*a*) The average cost is necessarily less than the cost of about half the total tonnage. Hence, a reasonable profit put on the average cost would not produce the necessary tonnage. (*b*) The tonnage below and up to the average cost is actually produced by less than 30 per cent. of the operators of the country. Hence, the great majority of the operators producing at above average cost would be put out of business by a price based on the average.

4. *Pooling Methods.*—Pooling may be done on either cost plus, modified cost plus, or on the prices established by the United States Fuel Administration.

Advantages.—(*a*) A uniform price to consumers for sections and, if desired, for the entire country. (*b*) A present lower price to consumers based on weighted average cost. (*c*) A simplification of all present pooling arrangements, as all coal to each pool would have, or could be arranged to have, the same price. (*d*) A return to the consideration of quality instead of cost, as, with all coal at the same price to consumers, the higher qualities would naturally be preferred.

Disadvantages of Pooling Cost Plus on Modified Cost Plus Methods.—(*a*) Continual variation in pool prices, due to inevitable variations in producers' costs. (*b*) Unfair and illogical, in that the better located and managed operations are made to pay tribute to the poor and badly managed ones. (*c*) A general and considerable increase in cost inevitably resulting from any method involving guaranteed profits with a disregard of economy. (*d*) A material reduction in output, due to lack of incentive and resulting inefficient methods, the employment of unnecessary labor, the mining of the more expensive and less desirable qualities of coal for the ultimate benefit of the mines, and the execution of development not immediately needed. (*e*) A slacking of the efforts of employees, which is the usual result of a lack of incentive to the producer, with the resulting lack of interest. (*f*) The installation of an unsound policy tending to encourage the inefficient and discourage the efficient producer. (*g*) The ever-present temptation to allow costs to increase with the hope of readjustment of prices. (*h*) Dissatisfaction to both labor and to producers from the knowledge that other and less efficient operations have higher limits of price.

The disadvantage of pooling on the prices fixed by the United States Fuel Administration are the same as suggested above, without some of the special disadvantages of cost plus methods.

Disadvantage of Pooling in General.—(*a*) A very large capital required to handle such stupendous operations. (*b*) Enormous and extended credit required to finance the producers. (*c*) Lack of organization to handle this new business. (*d*) Undesirability of creating such an organization with its army of additional employees at the present time. (*e*) Inadvisability of putting a new and untried plan into operation at the present time. (*f*) Impossibility of obtaining, with sufficient promptness, the costs necessary to fix pooling prices with the necessary accuracy. (*g*) Interference with present established methods of handling coal, with serious risk of crippling its distribution and unnecessarily creating a shortage.

None of these suggested methods seemed to fill the peculiar conditions incident to price fixing of coal at the mines, and it devolved upon the Engineers' Committee to develop some method better suited to the conditions of the problem.

The Price Fixing Method Adopted

The study of the conditions indicated the necessity of finding a method of price fixing which would fill as nearly as practicable the following requirements: (1) Result in a price fair to the public. (2) Prevent excessive prices or profiteering. (3) Prevent a multiplicity of prices in any district. (4) Encourage legitimate production. (5) Discourage production from inefficient and unduly costly operations. (6) Insure to the producer "the cost of production, including the expense of operation, maintenance, depreciation, and depletion, with a just and reasonable profit," as required by the Lever Act.

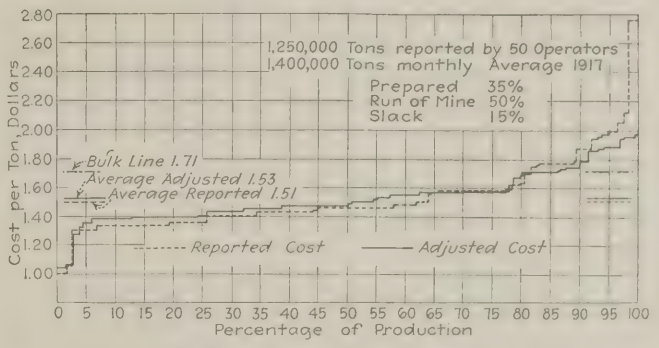


FIG. 1. HOW PERCENTAGES WERE PLOTTED

In arriving at a method promising to accomplish these results as nearly as practicable, the following system was developed. Costs obtained from the individual sheets filed by each operator with the Federal Trade Commission were studied, listed and adjusted for price fixing. These figures, with the percentages of each cost in the total production of each district, were plotted on diagrams, showing graphically the range and extent of variation in each district. On these diagrams a line indicating the sources of indispensable tonnage, christened "the bulk line," is drawn as a base to which the Fuel Administrator personally adds a margin in his judgment necessary for each district.

Advantages of This System.—The method of fixing prices by the "bulk line" principle recognizes the economic syllogism that "the price of any article necessary to a community will be fixed by the cost of producing that necessary portion of such article involving the greatest expense." (*a*) This assures to all producers profits dependent upon their ability and exertions, only limited by the establishment of a reasonable price to the consumer. (*b*) It does not unduly increase the price of coal to the consumer over the minimum price possible under other methods. (*c*) It tends to encourage maximum production and necessary development by allowing to the producer the benefit of reduced costs due to greater production. (*d*) It avoids bad feeling among the producers and among the workmen by allowing a fixed price in each district and not apparently

showing favoritism to special producers. (*e*) It tends to encourage the fit and discourage the unfit. (*f*) The method is susceptible of refinement and extension, making it possible to eliminate undue profits to the producer and adjust prices from time to time to the ultimate advantage of the consumer.

Disadvantages of This System.—(*a*) Considerable profits to the lowest-cost operators. (*b*) A price for coal greater than one based on the average cost, by the amount by which the "bulk line" exceeds such average. This method appeared to be better suited to the conditions than any of the others suggested, and after a careful study by the United States Fuel Administrator, it was adopted.

The Federal Commission had, by authority of the Act of Congress creating the commission, the power to investigate costs, and to require, under penalty, reports of costs of operation. Under this authority the commission sent out to each coal producer listed in the United States blanks requiring a rather complete and detailed statement of costs of operation, and the realization obtained from the sale of his product. These reports were generally available for the months of August and September, 1917, at the time the revision of prices was started, and reports for these two months, studied in connection with later reports, were generally used as a basis of costs for the first studies. It further developed that these two months were, in most instances, fairly representative, as to output, of the average of the year.

Without desiring to impugn either the honesty or the accuracy of the cost sheets as presented, it was found essential to study and adjust them for use as a basis of scientific and accurate cost finding. Besides correcting slips and palpable mathematical errors, a considerable amount of revision was necessary. Many, especially of the small operators, were inexperienced in bookkeeping and submitted cost sheets which, while accurate in totals, were grievously mixed in details.

Supplies.—The item of supplies was found to vary so widely in the same mines in different months that the returns for single months were practically abandoned,

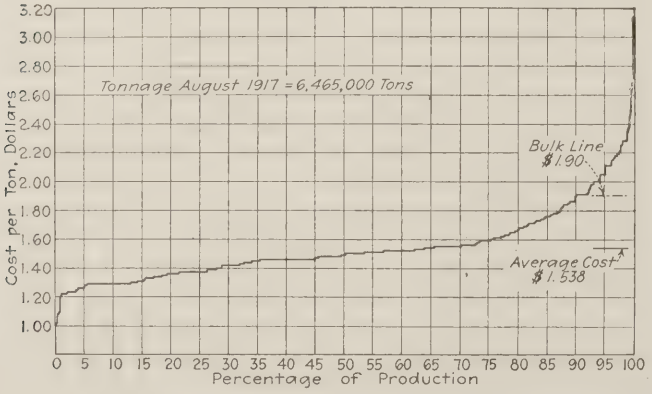


FIG. 2. SHOWS COSTS FOR AN ENTIRE AREA

and the figures were replaced by averages from all reports available, resulting in increases or deductions from the monthly costs as reported.

Reserves.—The item of maintenance was frequently misunderstood, in some instances all supplies and much labor being charged to this account; in others a fixed sum, and in still other cases, nothing at all was charged. Depreciation was often put in as a guess; in some cases it was frankly stated that this seemed a good time to charge off improvements, and such were charged to the limit, and beyond.

Depletion of lands was also an item which appeared greatly to trouble some of the accountants. While generally understood, many very wild guesses, even up to the market price of the product, were found; also, many instances of depletion charges for lands operated on royalty or lease and not the property of the operator.

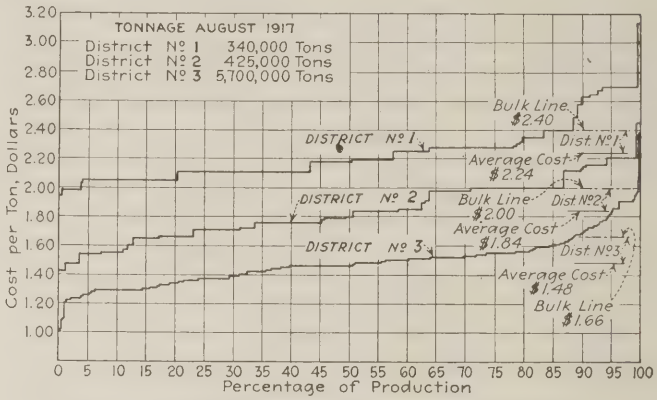


FIG. 3. SHOWS COSTS IN THREE DISTRICTS

Contingent funds noted on the blank were generally omitted but, in a few cases, especially when the need of such funds had recently been felt, most ample allowances were made. After being considered, it was decided to apply in each district amounts obtained by studying the claims of the better operators of such district, after obtaining, from the best available sources, reliable figures as to the cost of lands and amount and value of improvements characteristic of the district.

The question of contingent reserves is a serious one. From a strict cost-accounting standpoint, no cost can be permitted until incurred. Nevertheless, such reserves are essential to an industry involving the great risk incident to coal mining, and with the full knowledge that such reserves are used only for major accidents or calamities, and that ordinary losses regularly incurred are charged to the costs of operation, it was decided to include a small amount for contingent reserve in the general allowance.

Salaries—Executive and even superintendent's salaries were frequently omitted. In many cases of personal ownership, undoubtedly none were paid. It was considered only just to add to such returns reasonable allowances for salaries to place such reports on a parity with the majority of the operations which paid for such necessary service. On the other hand, occasional instances were found of reported salaries so excessive as to require adjustment downward to a reasonable parity with the general practice of the district.

A sliding scale of salaries adjusted, within broad limits, to the monthly tonnage of an operation was finally devised. Any salaries missing or below the minimum allowed were raised to the minimum, and those above the maximum were lowered to the maximum.

Special Charges.—Special charges were generally treated in details, often spread over a reasonable time rather than allowed in a single month. In treating these a careful study of all reports available was made.

Special Records.—The Federal Trade Commission had required special explanations of all charges out of the ordinary, and all these records were available and were carefully studied and had great influence in deciding doubtful points.

Outside Profits.—The profits from farms, dwellings or stores are not properly mining profits, and accounts of these should be kept separate from mining expense. Where it is found that such accounts are separated, no deduction for such profits should be made; but where dwellings, particularly, are so intimately connected with the mining that no separation is possible, it is proper to include their operation with mining accounts.

Fuel for Power.—In general, charges for fuel for colliery power were allowed, and the tonnage divisor was made to include such fuel. In the opinion of the committee it would, however, be advisable to eliminate colliery fuel from both sides of the account and merely to keep a record of the amount used; by this method, the tonnage divisor represents the amount shipped and sold and is susceptible of accurate determination, while the fuel used is approximated, or even guessed at, too often to make the general records containing this item reliable.

Other items requiring occasional adjustment were the inclusion of washing costs, for which an extra charge is allowed, in the mining cost, and the inclusion of labor and supplies used in coking operations conducted by the same operators. In a few instances, the coke tonnage, or a mixed tonnage of coal and coke, was reported and used as a divisor to obtain costs per ton, resulting, of course, in a notably excessive cost

In general, each and every cost sheet was studied carefully by at least one member of the committee, all adjustments were considered by at least two, and only such adjustments were made as were warranted by the conditions and the necessity of placing all costs on the same basis, so as to find a just basis of cost for fixing the prices for each district.

(To be continued)

Advantages of Using Power Gas

By Mark Meredith
Liverpool, England

As power gas is likely to come largely into use in the near future, it is interesting to recall that the first apparatus for its manufacture from coal dust, and for the recovery at the same time of sulphate of ammonia, was designed and patented by Ludwig Mond and built at Brunner Mond & Co.'s Northwich, England, works.

The advantages of using power gas can be summarized as follows: The cheapest quality of coal, even pit-head refuse, can be used; and consequently power can be obtained in addition to valuable byproducts without the use of expensive steam coal. Very little labor, and that of only an unskilled character, is required. The heating value of the gas is equal to, roughly, about 86 per cent. of the total heat energy contained in the fuel from which it is produced, and it can be obtained on a large scale for a mere fraction of a penny per 1000 cu.ft.

What this means will be realized when it is mentioned that one ton of rough slack will provide upward of 150,000 cu.ft. of power gas having a calorific value of at least 140 B.t.u. per cubic foot. The quantity of gas required to produce an indicated horsepower-hour in a large gas engine varies, but may be taken as being about 50 to 60 cu.ft.

One ton of low-grade coal, gasified, and used in a modern gas engine, will produce at least 2500 i.hp.-hr., or 2500 hp. for one hour. That is to say, a ton of this coal converted into power gas will produce about 500 per cent. more power than it would were it burned under a boiler in the ordinary way and the steam used to drive an ordinary reciprocating engine. Taking the price of slack at as high a figure as 12s. ($3) per ton, delivered, the fuel cost of an indicated horsepower-hour obtained by power gas would not exceed one-twentieth of a penny.

It has been pointed out, and rightly, by the advocates of the use of power gas that in every steam plant working with a variable or intermittent load a considerable percentage of the fuel is wasted. Some loss under this head is unavoidable, but it was early realized that the employment of power gas reduces such standby losses to a minimum.

In the early forms of producer the apparatus was provided with a water seal so arranged that the ash, which is the only residue, descended into the water, from which it could be easily removed. The process of combustion was carried out at a comparatively low temperature, which not only prevented the formation of clinkers but provided against the destruction of any of the byproducts.

This result was accomplished by blowing a blast of hot air and steam into the producer. The quantity of steam required when it was desired to recover the ammonia was equal to about 2½ tons for every ton of fuel gasified. Of this about two-fifths was afterward recovered. When the process was first used comparatively little attention was paid to the recovery of the ammonia, and the quantity of steam used in such case was about one ton for every ton of fuel.

In connection with the plant a regenerator was used, through which the gas passed. In this, part of the heat was transferred to the blast of air and steam on its way from the air-heating tower to the producer, the gas being cooled to a corresponding extent before it was delivered to the mechanical washer. Here a system of rapidly revolving dashers kept a fine spray of water passing through the gas, which not only reduced its temperature but cleansed it from dust and particles of carbon. From this washer the gas passed into an acid tower, where the ammonia content was removed by a weak solution of sulphuric acid with which it was brought in contact, in this manner forming sulphate of ammonia.

This solution was passed continuously through the stream of gas until it contained about 35 to 40 per cent. of sulphate. In order to provide for continuity fresh acid was introduced periodically and corresponding quantities of the sulphate liquor removed. This was then evaporated into solid form, after which it was crushed and sold as fertilizer, while the gas was passed into a cooling tower in which it was again thoroughly washed. Modern methods have improved to some extent on this process, but substantially it remains much as it did when it was first brought to the notice of engineers by Mr. Mond.

Origin and Development of the Ventilating Fan

SYNOPSIS — *The mine fan as we know it today had an ancient and humble origin. As the duty imposed by mine ventilation has increased, fan design has been improved to meet the requirements. Today several distinct types exist, each possessing peculiar advantages that render it particularly well adapted to certain circumstances.*

TO PROPEL air by mechanical means is a principle that dates back to antiquity. The methods at first used were primitive and not until comparatively modern times has any machine been devised that could be operated with sufficient economy to insure its commercial success. Also, the necessity for the development of mechanical ventilating equipment has only been brought about by the needs of the people of today. The various problems to which fans have been applied have only been developed during a comparatively modern time, and we find the application of fans, previous to this period, limited to the winnowing of grain and to the propulsion of cooling air in warm climates. Formerly these duties were accomplished by hand-operated fans of various designs, some of which still remain with us.

The most important fact in the development of the fan is that in the early days the only means of power were water, wind and hand. This, of course, limited the use of the mechanical equipment. Water-power was used to a certain extent, but due to the necessity of a favorable natural location it was little used for ventilation, although it was employed in the threshing industry. Wind-power was used quite extensively for various purposes, but since when the wind blew mechanical ventilation was not needed, it had no application so far as ventilation was concerned.

Hand-power was therefore used almost exclusively for mechanical ventilation. This, of course, had its application in warm climates only, and many of the methods used were unique and primitive. It is still quite a common sight in many places, even as near home as the West Indies, to see little negro boys sitting or standing behind members of the family, fanning continuously with large palm fans in order to keep the air in motion.

Another peculiar yet common means of creating an air current is to suspend a large piece of ornamental carpet or other fabric from the ceiling in the center of the room, and extending the full length. This fabric is fitted with a rod which passes through the entire length of the bottom edge. From the center of this rod a small cord is run through a hole in the wall of the room. A servant sits on the outside and slowly pulls the cord, thus swinging the entire curtain back and forth over the heads of the family, whenever ventilation is desired.

With the perfection of the electric motor, steam, gas and gasoline engines came forms of mechanical power not limited to a natural location or weather conditions. Thus there became available a constant positive source of power that has completely changed the early ideas of ventilation and made possible the high type of fan design with which we are familiar today.

It is not surprising that the machines used today for propelling air resemble strongly those used in the development of power from wind and water. The simplest of these machines, and one of the earliest, is the disk fan. This type, primitive as it may be, has a certain gap to fill in duties of fan performance, to which it is especially adapted, and where it gives better performance than even the most modern types of centrifugal machines. This duty is the handling of a large volume of air against a small pressure or against no pressure at all. Under this condition the disk fan will handle more air with less power than any other type, and for this reason we see it used almost exclusively for distributing the air in a room in order to produce a higher rate of evaporation on the skin of the occupants and thus produce a cooling effect.

As soon as a fan is used in connection with any pipe or other apparatus, however, a different condition arises. The disk fan has so much space for back leakage that as soon as it builds up a pressure ahead of it the tendency of this pressure to release itself will cause a flow of air back through the fan. This will increase as the static pressure ahead of the machine increases, until the back leakage equals the capacity of the fan and the blades simply revolve without effectively moving any air.

Disk Fan Will Handle Large Volume of Air

To overcome this, many forms of this fan have been devised, some of which produce positive pressures and seem to operate better when used against them; but in each case the pressure against which the disk fan will successfully operate is so small that for only the most simple and small installations are they considered advisable.

It was found in the use of the disk fan that even when the machine was producing a tremendous back leakage it still handled large volumes of air in a radial or centrifugal direction. In order to utilize this radially directed air, we find ourselves in possession of an entirely different type of fan, which has been called the cone fan. The name of this machine is derived from the cone-shaped plate at the rear of the fan that is used for directing the incoming air in a radial direction. This air is then picked up by the blades of the wheel and given a rotary motion. The momentum of the air, caused by centrifugal force, carries it through the wheel at a considerable velocity and produces a static pressure throughout the entire room in which the fan is placed. This room then becomes a plenum or pressure chamber in which sufficient pressure is created to force the required amount of air through the pipes or ducts leading from the fan to where the air is to be used.

This fan was a decided improvement over the disk

type in that it made it possible to produce a delivery of air against a greater resistance. The greatest pressure available, however, is equal only to the centrifugal pressure of the wheel, and this in turn is transmitted over so great a room surface that the entire velocity pressure or momentum effect of the air is lost and a comparatively small pressure is available for producing a flow in the outlet pipe or duct.

The constant demand for ventilation, however, called for a fan having a large capacity of air against a considerable pressure and requiring a minimum power to drive. A tremendous stride was made in this direction by taking the cone fan wheel and encasing it in a steel plate housing having two straight sides, with inlets at the center, and a scroll sheet encircling the rim, patterned after the well known logarithmic spiral. This machine is usually built with eight blades and produces a large delivery against a positive pressure. It requires only a moderate expenditure of power. Special designs of this fan have been known to operate against 16 to 18 oz. of pressure and still deliver a large volume of air, although the power consumption then became enormous. The most important fact that can be stated about this old reliable type of fan is that its efficiency is high.

Advantages of Steel-Plate Fan

The steel-plate fan is built with either curved or straight blades. The earlier fans were all straight bladed, and even now the high duty fans, such as pressure blowers, have straight vanes with which higher efficiencies are obtained. The theory is that to obtain the proper centrifugal force the force must be in a radial direction. Due to the fact that the wheel has some slippage, or gains on the air a little, the blades were curved back to allow the air to pass back on the wheel and still travel in a radial course. As the air nears the tip of the wheel the component of pressure in the radial direction is thus increased. This results in a greater capacity to overcome resistance, but the power required to operate it is about the same. The same results can be obtained with the straight-blade fan by driving it a trifle faster.

As soon as we pass from the steel-plate machine to the next and latest step in the evolution of the fan, as applied to ventilation, we have no longer a centrifugal fan, but an air turbine, differing so radically from the older types of paddle-wheel machines that the entire principle of air delivery is changed. This type is known as the multiblade fan, of which type the "Sirocco" is probably best known.

The multiblade fan develops an enormous air delivery, accomplishing this by means of a large number of shallow blades. As mentioned in the theory of the steel-plate fan, the air should have a straight radial movement from center to tip of the blade, and even in a perfectly frictionless case the maximum speed or velocity at which the air would leave the tip of the wheel would be equal to the peripheral velocity of the wheel itself. As the steel-plate fan, however, is only about 60 per cent. efficient, the maximum practical velocity of the air leaving the wheel is only 60 per cent. of the peripheral velocity of the wheel.

In the case of the multiblade fan, however, the movement of the air over the blades has three distinct stages. The first is when it is picked up by a lip or scoop at the inner edge of the blade. This lip picks up the air and starts it in a radial direction and at the same time produces a component pressure in that direction, which materially overcomes the tendency for back leakage. Once caught in this scoop the air is passed to the second part of the blade and into its second stage. The second part of the blade is practically radial and the rotation of the wheel causes momentum, due to the centrifugal force carrying the air into the third stage. The third stage is accomplished by decidedly curving the outer edge of the blade forward in the direction of the rotation of the wheel. It is evident that in the movement from the second to the third stage the air must travel faster than the wheel itself. Since the point of the blade is ahead of the radial point, the velocity of the air leaving the wheel must be greater than the peripheral velocity of the wheel itself.

The speed of the air can be increased by increasing the forward curvature of the blade until the theoretical limit is reached, at which point the air would leave the wheel at a velocity equal to twice the velocity of the wheel itself. Assuming that the multiblade and steel-plate fans are of equal efficiency, the practical velocity of the air in the multiblade fan would be 60 per cent. or twice the peripheral velocity of the steel-plate wheel.

It is evident, therefore, that for a certain air delivery, since the velocity is greater, the area required may be reduced. This permits decreasing the diameter of the wheel used, with a corresponding decrease in the size of the casing. Hence in this type we obtain a smaller fan, which will accomplish the same results as the older steel-plate machine.

So far, no account has been taken of the power required, and we can simply say that an air-horsepower is an air-horsepower in any case, and the power consumption would only be governed by the actual efficiency of the fan itself. The multiblade, however, has a particular advantage in the smaller percentages of restriction.

In conclusion, each of the fans considered in the foregoing possesses a particular adaptation to the various forms of ventilation, which makes each indispensable. Since conditions vary, no hard-and-set rule can be laid down for any given type, each particular case requiring individual attention to determine the proper fan required.

Generally speaking, the disk fan is suitable where a free delivery or only slightly restricted duty is required; the cone fan is suitable where the pressures exceed the limit of the disk fan and where price prohibits the use of a blower. The steel-plate and multiblade fans may be considered together as being applicable to ventilation in general, the preference being shown the steel-plate machine where space is of minor importance, and to the multiblade fan where space is of prime importance.

A saving of coal equivalent to 350,000 tons annually already has been effected by the Fuel Administration in its conservation campaign among the steam power plants, it is stated officially. This saving has been effected through the inspection of 300 plants. It is the intention to inspect each of the 250,000 steam plants of the country. The saving is declared to be the result of applying more efficient firing and operating methods.

Waste Due to Excessive Ash in Coal

THE J. G. White Engineering Corporation of New York, with the permission of the National Research Council, is distributing its report to Gano Dunn, chairman of the Engineering Committee of the Council, on "Clean Coal and the Effect of High Ash Upon Thermal Efficiency, Amount of Boiler Plant and the Amount of Transportation Equipment." Although this report is dated Jan. 16, 1918, so pertinent and timely even now are the facts set forth that it is here reproduced practically in its entirety. The report follows.

AS FAR as possible, the elimination of slate and other ash-forming impurities in coal, before delivery to railroad cars, will prevent serious economic waste in its utilization and transportation. It is difficult to completely cover this subject in a short report, because of the widely varying uses to which coal is put; but since the major portion of the coal mined in this country is used for the generation of steam, the actual proportion being about 67 per cent. of the total coal output, a discussion of this economic waste in the generation of steam will cover the most serious losses. The losses in other uses of coal will be similar, but of a different degree. These wastes may be briefly summarized as follows:

1. Reduction in Heating Value of Coal Due to Presence of Ash—The presence of ash in coal not only reduces its heating value, but as the percentage of ash increases the percentage of combustible lost with the ash also increases, thus greatly reducing the boiler efficiency and hence lowering the economic value of the coal. (See Fig. 1.)

2. Increase in Coal Consumption for a Given Power—The reduction in boiler efficiency greatly increases the amount of coal that must be purchased to produce a given amount of work. This is a direct financial loss, since the consumer is not only paying for unnecessary ash, but is losing good fuel which is carried off through the boiler grates with the excessive ash. (See Fig. 2.)

3. Influence of High Ash on Boiler Capacity—The presence of excess ash seriously reduces the boiler capacity, because sufficient coal cannot be burned on the grates to do the necessary work. This is possibly the effect which is felt most seriously by the consumer, because he finds it impossible to get sufficient steam from his boilers to do the work demanded of them and is compelled either to reduce his output or purchase additional boiler capacity. (See Fig. 3.)

4. Increase in Transportation Equipment Due to High Ash—About 85 per cent. of all the coal mined in this country is carried by the railroads, hence unnecessary ash means an unnecessary task imposed upon these carriers. Each per cent. of avoidable ash adds to the work of the railroads about 5,000,000 tons of unnecessary freight per annum. Some shipments of coal contain 18 or 20 per cent. noncombustible. Such coal requires 65 per cent. more cars and locomotives than a reasonably clean coal of say 10 per cent. ash. (See Fig. 4.)

The heating value per pound of combustible (that is, ash- and moisture-free coal) of all coals approximates 15,000 B.t.u. There are some variations from this figure, but as a general average it is about correct. The variation in the heating value of coal is consequently largely due to the varying percentage of the ash—the effect of moisture being less important except in a few cases of unusual moisture content. If we could obtain an ash-free coal, we should expect a heating value of about 15,000 B.t.u. per pound. The heating value by test of any commercial coal is reduced approximately in proportion to the increase in the percentage of ash, but its value as a heating agent is reduced more rapidly.

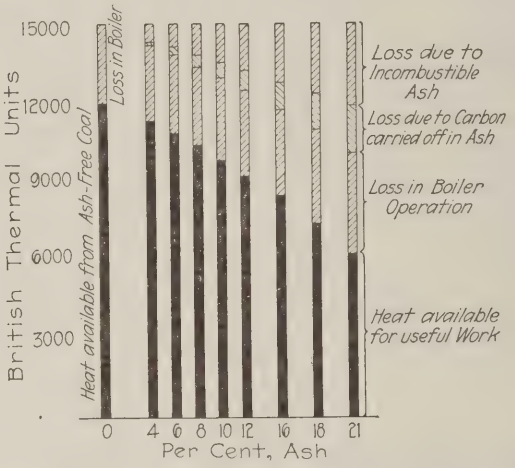


FIG. 1. REDUCTION IN HEAT VALUES DUE TO PRESENCE OF ASH IN COAL

The percentage of ash has a distinct influence on the boiler efficiency. As the quantity of ash increases in percentage, it becomes more difficult for the fireman to completely burn the combustible. With a low percentage of ash and good firing we expect the ash removed from the boiler to contain approximately 25 per cent. of its own weight of unconsumed combustible. As the percentage of ash increases, the percentage of combustible lost in the ash also increases rapidly. With coal containing a high ash percentage, it is rarely possible to reduce the percentage of combustible in the ash to less than 50 per cent. of the weight of the ash.

This reduction in heat value is shown diagrammatically for varying percentages of ash in Fig. 1. The column at the left represents the heating value of ash-free coal, those at the right the relative values for coals containing varying percentages of ash. The upper stratum of each column represents the loss due to the fact that the ash is incombustible. The second stratum shows an additional loss due to the presence of unconsumed combustible contained in the ash taken from boiler grates. The next stratum represents the loss due to the fact that steam boilers cannot be operated at 100 per cent. efficiency. The lowest stratum, therefore, represents the relative commercial values of coal containing varying percentages of ash.

On the basis of Fig. 1, Fig. 2 has been plotted. This shows the pounds of fuel required to produce one boiler horsepower with coal of varying percentages of ash with careful operation. It will be noted that for the best coal with 4 per cent. ash there is required approximately 3 lb. of coal per boiler horsepower-hour, and that with

10 per cent. ash, less than 3½ lb. is required. Beyond this point the increase is rapid until for 21 per cent. ash the coal consumption amounts to 5.45 lb. per boiler horsepower-hour; 80 per cent. more than with 4 per cent. ash and about 60 per cent. more than with 10 per cent. ash.

The increase in the ash content of coal seriously reduces the capacity of steam boilers. The excessive quantity of coal required to deliver a horsepower with poor coal, as shown by Fig. 2, makes it impossible to consume sufficient coal on the grate to deliver the necessary boiler horsepower. Central stations today are in a serious condition because they find that their station load is increasing, but that the quality of coal has much decreased, necessitating the operation of a larger number of boilers. They find that whereas their boiler houses, two or three years ago, were of sufficient size to handle all ordinary increase in power demands, now, because of the poor quality of coal, they provide the steam necessary to carry the station load only with extreme difficulty.

Up to within the past two years it was considered good practice to operate central station boilers at 200 to 250 per cent. of their rated capacity during peak periods. In the same stations it is now difficult to operate the boilers at more than 150 to 160 per cent. of their rating, and sometimes at even less. It is therefore necessary for these stations to place more boilers on the line, and in many cases they have been compelled to purchase additional boiler units at unusually high prices.

This phase of the subject is illustrated in Fig. 3, which shows the number of 500-hp. boilers required to generate 300,000 lb. of steam, equivalent to a peak load of 15,000 to 20,000 kw. With coal containing 6 per cent. ash or less 8 boilers can be made to do this work. If the ash runs higher than 6 per cent. 9 boilers must be operated, above 10 per cent. 11 boilers would be required, and above 18 per cent. 19 or 20 boilers are required. This situation is so bad that practically every large central station today has no spare boiler capacity, unless spare boilers have been purchased and installed within the past two years. They are compelled to refuse new business and must often keep boilers in service that should be undergoing cleaning and furnace repairs.

The effect upon industrial plants is similar to that

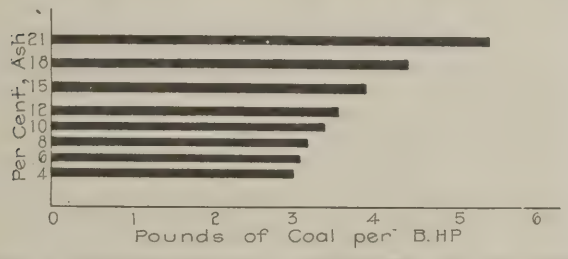


FIG. 2. POUNDS OF COAL CONSUMED TO PRODUCE ONE BOILER-HORSEPOWER

experienced by the central stations, but in a different degree. Industrial plants do not operate their boilers at the high ratings experienced in central station practice, but they do not as a rule carry so large a percentage of spare boiler equipment as do the central stations. They therefore find it necessary to operate their entire boiler equipment, or curtail production, and their boilers are kept in service for longer periods than is good practice. It is impossible to take the boilers out of service long enough to properly clean them from scale and to properly repair baffles and brickwork in the furnaces. The consequence is that the boiler efficiency is seriously reduced until they are in such poor condition that they must be shut down for cleaning, at the expense of production. With reasonably clean coal this situation would not exist.

There is a difference between preventible and nonpreventible noncombustible in coal. The nonpreventible

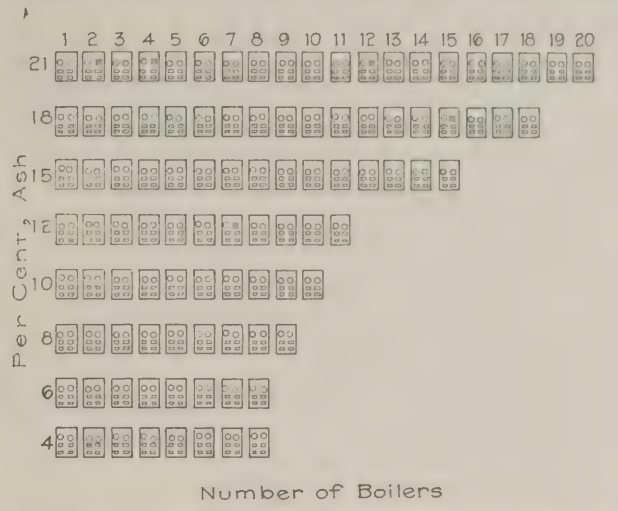


FIG. 3. NUMBER OF 500-HP. BOILERS REQUIRED TO GENERATE 300,000 LB. STEAM PER HOUR

ash is so thoroughly incorporated with the structure of the coal that it cannot be separated mechanically. This minimum ash content differs in each mine.

By preventible ash is meant the slate and other impurities which can be separated by careful preparation. This minimum ash varies from as low as 2 per cent. in some cases to as high as 33 per cent. in other cases. The average for the country is probably about 9 or 10 per cent. The percentage of ash in the coal from various states, together with the output for the year 1915, is given in Table I. Over half the coal mined shows an ash analysis of 9 per cent. or better. The percentage for the country if averaged in proportion to each state's

TABLE I. TONS OF COAL MINED IN 1915 AND THE PER CENT. OF ASH IN THE COAL FROM THE PRINCIPAL COAL PRODUCING STATES

	Coal Mined per Annum Tons (2,000 Lb.)	Average Per Cent. of Unavoidable Ash
Pennsylvania	158,000,000	9
West Virginia	77,000,000	7
Illinois	59,000,000	13
Ohio	22,500,000	10
Kentucky	21,400,000	9
Indiana	17,000,000	11
Alabama	15,000,000	12
Colorado	8,600,000	16
Virginia	8,100,000	8
Iowa	7,600,000	13
Kansas	6,800,000	13
Wyoming	6,500,000	6
Tennessee	5,700,000	15
Other states	29,500,000	12
Average for the country		9.9

production is about 9.9 per cent. We may therefore consider 10 per cent. as a fair average for clean coal for the entire country.

There will be mined this year probably 600 million tons of coal, and 85 per cent. of this coal will be transported by the railroads; hence, for each per cent. above the average 10 per cent. the excess ash will add to the work of the overburdened railroads 5,000,000 tons of useless freight.

Fig. 4 illustrates diagrammatically the increased trans-

portation equipment necessary for handling coal with a high percentage of ash. The number of cars shows the relative number necessary to carry coals of varying degree of ash. The shaded cars represent the percentage of carrying capacity which has heating value, the light cars, the useless freight. It will be noted that in some shipments as much as 40 per cent. of the cars carry worthless material, or in other words coal containing 21 per cent. ash requires 65 per cent. more cars than coal containing 10 per cent. ash.

In all these charts it will be noted that the trouble

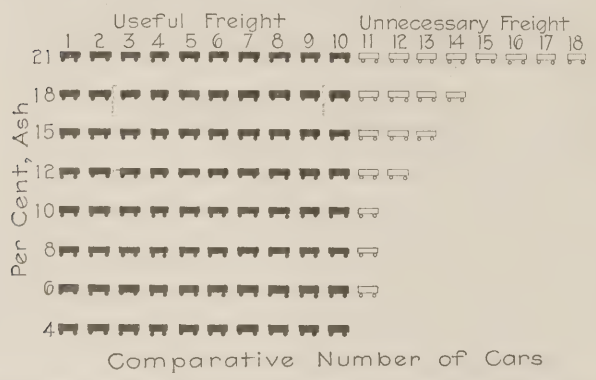


FIG. 4. INCREASED CARS NECESSARY FOR TRANSPORTATION OF HIGH-ASH COAL

from ash is not excessive until we pass 10 to 12 per cent. content. If, therefore, we might limit the percentage of ash to the average of 10 per cent. we would reduce our transportation equipment to a practical minimum; we would be able to operate all boilers at a reasonable efficiency and would reduce the number of boilers operated to a little over one-half of the number required for the dirty coal (that is, 18 per cent. ash or over) besides making a saving in money that cannot be accurately estimated.

Stripping Coal with a Grader

By C. P. Burton
Aurora, Ill.

A method of stripping coal which is rather out of the ordinary, though it is proving successful, is being employed by H. H. McDowell, of Pleasanton, Kan., who is stripping coal for the Star Coal Co., of Kansas City, at Worland, Mo. The removal of overburden from the coal is being accomplished with the aid of a Western elevating grader.

The land to be stripped is a rectangular tract of 80 acres about 700 ft. long. It would be hard to find a more difficult piece of earth-moving for an elevating grader. The average cut in the pit now being stripped is 16½ ft. with a maximum of 21 ft., and the material is tough gumbo and hard shale, overlying 35 in. of coal.

For stripping, Mr. McDowell is using a Western standard elevating grader, drawn by a Reeves tractor, loading into Western 1½-yd. dump wagons, three horses to a wagon. The cut is being made with one side perpendicular and the other, toward the adjoining box pit, with a slope of ½ to 1. He finds eight wagons the proper number for economical work, and under favorable conditions can move from 750 to 800 cu.yd. of material in a 9-hour day.

In his plans Mr. McDowell has divided the remainder of the tract into five box pits about 700 ft. long. The first of these pits, now being stripped, is 72 ft. wide at the top and 60 ft. at the bottom. The next pit has a bottom 40 ft. wide; the third, 75 ft.; the fourth, 40 ft., and the last, running to the edge of the property under lease, is 60 ft. wide.

These five box pits will not be stripped in continuous succession but alternately, the two inside pits, each 40 ft. wide at the bottom and 700 ft. long, being left until the last. When he comes to strip the two inside pits, by using a longer elevator on his machine he expects to be able to cast fully two-thirds of the material. This will be an inexpensive operation and will reduce his yardage cost materially.

Legal Department

Dangerous Places of Work.—The general rule of law that an employer is bound to use a reasonable degree of care to provide his workmen with reasonably safe places of work has no application to classes of work consisting in making a dangerous condition safe, as where a mine timberman undertakes to reset timbers which have been knocked down by a runaway coal-cutting machine and is injured by a fall of slate while replacing a prop. (Kentucky Court of Appeals, Charles vs. Elkhorn Mining Co., 200 Southwestern Reporter, 461.)

Taxation of Coal Lessee's Interest.—An instrument granting the right to mine coal underlying land within a specified period and providing for the payment of semi-annual royalties conveys a taxable interest in the real estate, under the laws of Illinois, and not a mere license. By express provision of an Illinois statute the right to mine may be conveyed by deed or lease, and such conveyance is to be regarded as so separating such right from the land as to make it separately taxable. (Illinois Supreme Court, Simmons Coal Co. vs. Board of Review of Fulton County, 118 Northeastern Reporter, 753.)

Negligence of Mine Foreman—A Pennsylvania coal-mining company was not liable for injury to a miner resulting from a fall of slate from the roof of a passageway being constructed under the supervision of the mine foreman, where the company had no knowledge as to the existence of the defective condition of the roof and that condition had not existed long enough to charge the company with constructive notice of it, although the mine foreman's attention had been called to the fact that the place was unsafe and he failed to remedy it or to provide warnings against it. The mine foreman being given full charge of the inside workings under the Pennsylvania Bituminous Coal Mine Act of June 11, 1911, the operator is not liable for negligence in the performance of the foreman's statutory duties. (Pennsylvania Supreme Court, Cossette vs. Paulton Coal Mining Co., 103 Atlantic Reporter, 346.)

Liability for Injury Caused by Roof Fall.—If plaintiff, who was injured through fall of rock from a roof under which his duties required him to pass, was a foreman in charge of the work at the particular place, with full authority and charged with the duty of doing all things necessary to make the place reasonably safe, by timbering or by removing loose earth, he is not entitled to recover. But if, as claimed by him, he was merely a timekeeper, and it was the duty of other employees to look after the safety of the mine, and to remove all obstructions and dangerous elements, than he is entitled to recover damages to cover any injury arising through failure of the defendant operator to provide him with a reasonably safe place in which to work. (Oklahoma Supreme Court, Sandals vs. Mizpah Mining Co., 168 Pacific Reporter, 808.)

The Coal Industry's Part in the War

BY GOVERNOR JOHN J. CORNWELL
Charleston, W. Va.

SYNOPSIS — *Substance of an address delivered by the Governor of the State of West Virginia at a large meeting held at White Sulphur Springs, W. Va., on Sept. 15, for the purpose of stimulating coal production.*

IN THE incipient stages of our war preparation the fuel situation had not become acute and, indeed, on the surface there was no indication that it would become so acute as we found during the winter months that followed. Up to a short time before that the coal market was running wild and was uncontrolled. Just immediately prior to that the price had been fixed by the President, and there was no little dissatisfaction manifested among some of our people, either openly or quietly. The seriousness of the war situation had not then dawned upon the majority of our people, nor had they got a glimpse of what tremendous efforts our Government and our people were to make to bring this war to an end.

Many people thought all we would do in this war, at that time, would be to loan some money to the Allies and furnish them supplies. Others thought we would go further and send our fleet abroad, but despite the fact that our first registration had occurred in June, and at that time the great cantonments were being completed and arrangements were already on foot to take into them the first increment of the selective army, notwithstanding all this there were few people, indeed, who imagined that within one year from that date we would have in France nearly two million soldiers; that we would have there the biggest port in all Europe for our exclusive use, a port built and established with American men, American material and planned by American engineers. Nor did they imagine that we would have built, within one year from that, more than 600 miles of double-track standard-gage railroad over there; that 2000 of our big locomotives would be operating on that railroad and that 40,000 American railroad men would be astounding the European people with their energy and their skill in operating and maintaining the railroad. Nor did they see that more than 150 great shipyards, reaching all the way from Portland, Ore., and Seattle, Wash., clear around to Portland, Maine, would be dropping ships into the water every few moments at the end of that year.

ASTOUNDING RECORD MADE IN SHORT TIME

But all these things have come to pass in one short year. Today we see and know two things: First, that the accomplishments of the past eighteen months are record-breaking. No country under the shining sun ever made such stupendous preparation in so short a time. In fact never before in the history of the world did any country attempt to fight a war on such a large scale 2500 miles from its base of supplies. That this country is not only well along in its preparation but that it is actually a factor, and a very great factor, in the struggle, the story of the fighting over there that comes to us day by day fully attests.

Our preparation has been an achievement of which the country may be proud, despite some mistakes which are inevitable always under such conditions; but the valor, the courage, the dash and the tenacity of our soldiers in France constitute and will continue to make a record superb, glorious and imperishable, of which every American will be proud as long as he lives.

ONLY THOUGHT NOW IS TO WIN THE WAR

Today we understand much better the task that lies ahead of us than we did in July, 1917. Our attitude is quite different than it was at that time, when many coal operators deeply resented the Government's interference in the price of coal, believing that they should be left to sell coal for all they could get and ship it wherever they pleased. Today we realize that monetary profit is a subordinate, a really inconsequential thing, except as it may enable one to give financial support as well as support in the way of furnishing coal and other material.

I doubt whether all of you even now comprehend the danger that confronts the country the coming winter from the fuel standpoint. It may just as well be understood that if there is not enough fuel to keep all the factories and all the mills going (and it is certain that there will not be), that the Government must and will close all those that are not absolutely essential to the support of the war program. Indeed in this crisis no man has any right, any moral or legal right, to go on using men and consuming fuel and material manufacturing luxuries and non-essentials. The country must be placed on a strictly war basis, and while that is going to cause inconvenience, cause embarrassment and perhaps cause loss to some people, it is inevitable. We can't win this war even now with part of our people working at it and the rest of the people grabbing for labor and material to make non-essentials for profit. So the Government will determine—must determine—who is to consume your coal.

What does a shortage of coal mean to the Government? What does it mean to our Army? What does it mean to our boys from West Virginia who are over on the firing line in France? It means the Government will not be able to get all the ammunition over to Pershing and to our boys which they need, and if we are short of ammunition it means a greater loss of life. To repeat the language of a prominent speaker: "From now on it is munitions against casualties. If you keep this in mind, you will have the background for the sternly drastic attitude of the Government during the next six months in clearing the way for filling Pershing's orders.

"We are facing a catastrophe. It is not one of those catastrophes which make such a noise that every one knows when it happens. It is a silent tragedy. We can not fill Pershing's orders in full, because the United

States can not make sufficient steel this winter. A shortage in steel results almost entirely from lack of coal. Keep this in mind and then look forward to the events of the coming spring. We shall have the drive. We shall succeed, but some time in February or March, or whenever the time has come, General Pershing will sit down with a pencil in hand, will figure up the exact deficit in the filling of his orders for munitions.

"With military formulas now well recognized he will figure in place of those munitions how many extra men must be put into the battle to be killed. This is no fanciful statement. It is now possible to treat the question of munitions or of casualties as interchangeable quantities. So many thousand American youths must be thrown into the hopper for every thousand tons of munitions which are short."

Why Coal Production Must Be Speeded Up

My God, men! What an awful thought that is! Do you get it? Can you grasp that thought and carry it back to the men in the mines and get them to realize that we are already short of coal; get them to realize that that shortage of coal will prevent our Government from filling Pershing's orders for shells and bombs and hand grenades; get them to realize that in place of that ammunition and these shells the Government can't supply, more men, more boys must be put into the army to be killed—all because we have not produced enough coal? Can you bring the men who dig the coal to understand this and to realize the seriousness of it?

If the West Virginia miners only understand these things I know they will dig and load coal as they never did before, for they will be working to save the lives of their own sons. The man who would not work longer and harder under these circumstances does not deserve to be called a man.

Most, if not all of you, I take it, come from the fields that produce the smokeless coals, coals used by the Government itself direct on its ships. When the Government clamors for more coal and asks for the speeding up of production, some of your employees and some of you may wonder where they take all the coal you give them and what they are doing with it.

Well, when one knows the increased number of naval vessels that consume it, that is easily understood. The story of the extension of our navy is not being widely told, but it is an amazing story. From some 50,000 men in the American navy when the war began the force has expanded to more than 600,000. From 250 fighting ships of all classes it has expanded to more than 2000. The Navy Department is building right now more destroyers than there were in all of the fleets of the world when this war began. In 28 days after the declaration of war our speedier ships reported for duty alongside with the English ships in the North Sea, and they circle the waters of Germany by the hundred. So the demand of the navy for coal is tenfeld what it was when war began. Then in addition to that the Government itself is producing a merchant fleet at an unprecedented rate.

I know there was much delay, apparently, much discussion and no little criticism of the fleet program—I mean the merchant fleet program—in the beginning. But you know what is going on now. American shipyards are producing tonnage faster than England, though England lives by ships and has been the great maritime and the great shipbuilding country of the world. We have already outstripped her. The new merchant ships need coal and they must have it, otherwise it were better they had never been constructed. Your smokeless coals, therefore, are absolutely essential and directly or indirectly essential to the Government's program.

And the demand will increase. It is going to get greater and greater. Every little while a new battleship or a new destroyer is placed in commission. Every few minutes a new merchant ship slides down the ways, takes to the water and is quickly fitted up and commissioned. That must go on and on, for if the German machine does not crack and crack and break in the meantime, one year from now instead of having a million and three quarters of men in France we will have an army of four or five million men over there.

To take them over, sustain them and supply them, our merchant fleet must be more than doubled. When that happens the demand upon you for coal will be doubled, at least be very greatly increased. Of course, many of these new vessels are fitted up as oil burners. Every effort is being made to relieve the pressure as much as possible upon the coal men, but that pressure will get heavier and heavier.

Now, how are you going to meet it? Operators have said to me, "How can I produce more coal when you are taking men out of my mines for the army?" I am not unappreciative of your problems. I am not unaware that you have a very difficult one, but it is unquestionably true that all kinds of production can be greatly increased by speeding up, if all the people can be made to realize that that is necessary. Canada gave an illustration of what can be done in a crisis. Canada sent 600,000 men to England, financed the expedition and loaned money to the mother country in the bargain, and then the Canadian people at home turned to and produced 25 per cent. more than ever before. When Canada sent 600,000 men overseas, that is equivalent to this country sending 9,000,000 men. To equal Canada's effort we should send 9,000,000 men to Europe and then increase our production 25 per cent. Are we capable of doing it?

Patience and Precept Absolutely Necessary

It is true that Canada's production was largely agricultural and that the men on the farms and in the vast wheat fields were not hampered with an eight-hour day contract. But my thought is that you men who own and operate these coal mines can do a great deal toward impressing upon the men who dig and load coal the seriousness of this situation, and can do a great deal toward inspiring them to make whatever sacrifice may be necessary to meet it. I realize that you can not do that by merely issuing orders. I realize that you will have some unreasonable people to contend with and some stubborn and vexatious cases to handle. But there are two things that will go a long way toward getting the desired result. The first is patience, infinite patience. The second is a good example.

The superintendent or the mine boss who has all the patience of Job, who will keep sweet all the time and be reasonable, having regard for the rights and feelings

of other people, for the men who work, that man can get results, I believe. If he will speed himself up and double his own efforts, that too will, in my judgment, have a good effect. A good example is the best of all teachers.

We have heard a great deal about the shortage of labor during the past year. As a couple more million men are drawn into the army we will necessarily hear a great deal more about it. The labor shortage would have been greatly relieved at any time within the past year and would be greatly relieved now, were labor stabilized. The turnover in labor has been something tremendous.

The payment of high wages at ammunition plants and other places where there were rush jobs have attracted labor from normal employment. The unsatisfactory living conditions cause many of the men to leave the job which they had traveled a long way to obtain. Fully 20 per cent. of the labor of the country has been continuously and perpetually riding on railroad trains or shifting about from place to place. While that has not been true in the coal fields to the same extent, it has had its effect there, I am quite sure.

There are several reasons to hope that this part of the trouble will be gradually eliminated. First, the Government has established its labor bureaus and is gradually eliminating the private employment agencies which were encouraging the shifting of men from one plant or place to another. Second, with the completion of the construction of a great many plants and the putting of them into operation, thousands of men will be released. Third, the closing of plants of non-essential character, which is inevitable. Fourth, the increased number of women who will take positions in many industries and factories of the men who will go into the army or take up work which a women can not do.

Good Living Conditions Essential

But there is something the employer can do to stabilize labor, something many of them have already done, those who are holding their labor. That is, to make the living conditions just as tolerable as is possible; make them not only tolerable but attractive, so that if a man has a family he will be willing to continue to reside there and raise that family with an opportunity to educate his children and live amid attractive surroundings. Therefore, should not the operators and the state join hands in working out a program for the future where the health and the happiness of the worker are subjects of especial attention?

In the years that have gone the coal operator had a harder time to find a market for his coal at a profitable price than he had to find men to dig the coal. The West Virginia operator has had a peculiarly hard lot. Notwithstanding he had the best coal in the world, he has been discriminated against by railroad differentials and has been unfortunate, too, because the operators of other fields have been able, through their more active or more unscrupulous press agents and congressional representatives, to put the West Virginia operator in an unfavorable light before the public. Therefore you have had your handicaps to bear and you entered this war under very unfavorable conditions. Your vigorous and patriotic support of the Government and your cheerful acquiescence in every regulation has, however, put you on a new footing before your fellow citizens and before the officials of your Government.

This war has cast a tremendous responsibility upon you which you are meeting in a patriotic way. You will not be able to perform miracles, but by patience, through energy, through diplomacy and through a willingness to match the sacrifices of the men on the other side of the water, you will meet the situation as far as human effort and human ingenuity can meet it. The country's demand and its need for coal is unbounded and will continue to be during the war. There will simply be no limit to it. On the other hand, the limit of production of steel and of munitions and supplies for our army will be the limit placed by the amount of coal that can be produced.

Today there is but one thing before us—*win the war,* save the lives of as many of our men as possible and get them home as soon as possible. Of the vast army at home none in it can do more to speed up that great day when our boys return triumphant than the coal operators and the coal miners. Stop the supply of coal and disaster will befall our army. With that situation confronting you we have a right to expect every coal man to do his duty.

Generation of Electrical Energy

Much confusion exists about the term "generation of electrical energy." Strictly speaking, this expression is incorrect because "energy" can neither be created nor destroyed. Energy, as defined technically, means capacity or ability to do work. There is a certain definite amount of energy in the universe and this total amount can be neither increased nor decreased.

Hence, when one speaks of the "generation of energy," what he really means is the transformation of energy. Thus, while energy cannot be generated, it can be changed from one form into another. The energy of a stream of water can be transformed into electrical energy by the application of a waterwheel and a dynamo. But the latter machine has not created electrical energy; it has, due to the assistance of the waterwheel, merely changed the kinetic energy of the falling water into electrical energy.

Now consider the generation of energy from coal. The energy in coal is due to heat transmitted to it by the sun centuries ago, and which has been stored up in this material ever since. Now when this coal is burned under a boiler, heat energy is derived which is transferred to the water in the boiler. Thus steam is generated. Considerable of this heat energy is wasted through radiation losses, losses up the stack, and by condensation.

Next the heat energy in the steam is carried to the engine or turbine. In this machine this heat is transformed into mechanical energy. Then in the electric generator, which the engine or turbine drives, the mechanical energy is again transformed, but this time into electrical energy. Finally, the electrical energy is again transformed into heat energy, within some electric-lighting device, in the conductors which carry the electric current, or by friction of some sort or other. Or it is changed into mechanical energy through the medium of electric motors.



Summary of Traffic Conditions

A Fuel Administration summary of the traffic situation is as follows:

"Eastern Region—Coal car shortage in Ohio due to scarcity of power, which is being corrected. The regular car supply at some other points now having the attention of the Car Service Section. Some coal congestion in New England, both water and all-rail, due to lack of unloading facilities.

"Tidewater—Vessel supply more than ample; transportation conditions good.

"Lake Situation—Vessel supply interfered with by storms and ample coal at docks.

Coke—Car supply good. Shortage of labor limiting production, especially in the South.

The Navy Department's report says: "Coal supply better than had been stated and indications are that the Department is starting winter months with better protection in regard to supplies on hand than last year."

Shows Unjust Discrimination in Coal Mining Industry

Unjust discrimination between competitors within the coal mining industry by the present revenue law are set out clearly in a tabulation submitted to the Senate Finance Committee by Rush C. Butler, general counsel for the National Coal Association. The tabulation, which shows the capital of the reporting companies per ton of annual production, based upon the returns made to the Treasury Department, is as follows:

	Companies Reporting			Capitalization per Ton Produced			
Capital per Ton Production	Number	Per Cent. of Total	Their per Cent. of the Production Reported	Low	High	Average	Exemption on Basis of 10 per Cent. of Capitalization
Under $1.....	41	10.38	19.6	$0.047	$0.963	$0.65	$0.065
Between $1 and $2.	156	39.49	27.6	1.022	1.968	1.43	.143
Between $2 and $3.	105	26.58	21.9	2.00	2.957	2.14	.214
Between $3 and $4.	34	8.61	6.3	3.072	3.979	3.46	.346
Between $4 and $5.	25	6.33	13.8	4.21	4.887	4.65	.465
Over $5.....	34	8.61	10.8	5.04	13.93	8.21	.821
Total.....	395	100.00	100.0	.....	.....	$2.72	.....

Capitalization of companies in first three groups, representing 69.14 per cent. of production, is $1.42 per ton.

Capitalization of companies in last three groups, representing 30.86 per cent. of production, is $5.88 per ton.

Companies reporting produce 143,894,309 tons.

Mr. Butler also brought out the following points: "The reasons for an extraordinary exemption on the mining industry are numerous, but two will suffice at the present time: First, because the mining industry is extra-hazardous and only invites capital that is willing to take extra chances, which, in turn, is entitled to a larger percentage of profit; and, second, the extra exemption should be allowed for the coal industry, because of the fact that the coal industry pays a higher percentage of its net profits by way of a Federal tax than any other industry. I cannot make this statement, however, authoritatively, but I have been so advised by representatives of the Treasury Department. It would, therefore, seem that if all industries are to be on a comparative basis, there is just occasion for the Treasury Department's recommendation that a special exemption applicable to the mining industry be made."

A brief signed by J. H. Wheelwright and J. D. A. Morrow, president and secretary respectively of the National Coal Association, and by its committee on Revenue Legislation, has been submitted to the Senate Committee on Finance. The brief covers: (1) A proposed revision of the definition of invested capital; (2) a proposal that borrowed capital be not excluded from invested capital; (3) a proposal that the excess of current cost over and above prewar cost of installations of plant, equipment, etc., be amortized at the rate of 50 per cent. per annum for a two-year period.

The brief also urges the favorable consideration of the Treasury Department's recommendation, which is referred to above by Mr. Butler, for the following reason: First, that the coal industry is said to have paid a higher percentage of its net income by way of Federal taxes for the year 1917 than any other industry, thus clearly indicating that the coal industry as an industry carried more than its share of the burden of Federal taxation; second, that the hazards of the business are relatively much greater than the hazards incident to almost any other industry.

Berwind-White Co. Receives License

The settlement of the license question with the Berwind-White Coal Mining Co. is the subject of the following announcement by the Fuel Administration:

Owing to the fact that a vast majority of the coal sold by the Berwind-White Coal Mining Co. is produced by that company itself, or by companies which it controls, it was under the impression that it was not required to obtain a distributor's license under the President's proclamation of Mar. 15, 1918. When the company's attention was called to the fact that under such proclamation licenses were required by all companies which distributed any coal whatever which was not produced by themselves, it promptly applied for a license.

After a full investigation this license has now been granted, upon condition, however, that the company refrain from charging any purchasing agent's commissions on any coal distributed by it prior to the date on which such license is granted, and the company is preparing reports of all coal, other than that produced in its own mines, which it has distributed since Apr. 1, 1918, so that its distribution business may be subject to the same control regulation and investigation that it would have been if the company had applied for and obtained a license on that date.

Would Ship American Coal to Italy

Great Britain will be unable to furnish Italy with as much coal this winter as was the case last winter, according to information presented to the Senate by Senator Owen of Oklahoma. The fuel situation in that country is represented to be so desperate that Senator Owen urged, on the floor of the Senate, that coal be sent from this country.

Must Have Larger Coke Output

Coke production in the United States must be increased at once by a minimum of 30,000 tons a week if the war program of the Government is to be carried out. A greater increase is desirable, and may soon be needed, but the call for 30,000 tons more each week is immediate and insistent. It is a literal fact that failure to supply this increase is going to be paid for in American lives in the big drive of the allied armies against the Germans.

According to figures given by W. S. Blauvelt, Director of the Bureau of Coke, United States Fuel Administration, the coke capacity of the United States is 1,350,000 tons weekly. Production is running at approximately 1,170,000 tons weekly and the minimum requirement is 1,200,000 tons weekly. Chief among the factors of the shortage is the labor situation in the coke yards, to which is ascribed three-quarters of the deficit.

More labor is needed, and 100 per cent. efficiency from the labor now employed is likewise required to meet the situation. Operators in the Connellsville field, at a recent meeting, adopted a resolution that "furnaces shall not bank" for lack of Connellsville coal and coke. This has been followed by a general appeal to coke workers throughout the country, by means of pay envelope folders, to make this resolution apply to every coke oven in the United States.

Labor is short in many coke yards, and in some places it is only by the voluntary exertions of other workers that coke can be loaded at anything like capacity. An instance of this occurred recently at the yards of the Wisconsin Steel Co., in Benham, Ky., where about 200 men engaged in other lines volunteered for work one Saturday evening and loaded about 1000 tons.

In other cases there is failure to load at anything like capacity because full-time service is not being given. It is hoped to impress workers, in such cases, with their patriotic duty to work steadily every week, just as it is hoped to recruit men for the depleted payrolls in other yards.

The importance of larger coke production, and the patriotic obligation resting upon every coke worker, are to be driven home wherever possible. The facts in the coke situation speak for themselves. It is a simple truth to say that more good coke means more steel, more shells and fewer casualties. Iron depends upon coke, which is another way of saying that the shells and guns, the helmets and bombs used by our soldiers depend upon a steady and ample supply of coke. So do the ships to carry these supplies abroad and so do the rails and locomotives which carry the supplies across France to the battle front.

In the case of byproduct coke, there are additional essentials which depend upon large and continuous output, for byproduct ovens supply the bulk of the explosive material used in American shells, in addition to tar for surfacing military roads or the roofing of military buildings, and the bases for many medicines and disinfectants used in tremendous quantities in military hospitals.

High Output in Kentucky, Tennessee and Georgia

For the second week in succession bituminous coal production was broken in the Harlan field of Kentucky, Tennessee and Georgia during the week ended Sept. 21, according to a report received by James B. Neale, Director of Production, U. S. Fuel Administration, from Howell J. Davis, Production Manager for the district. Output during that week was 338,820 tons, an increase of 10,286 tons over the previous week, when the record was 328,534 tons. This latter figure was itself a record, the previous high mark for the coal year having been 306,941 tons.

Garfield Appoints Director of Education

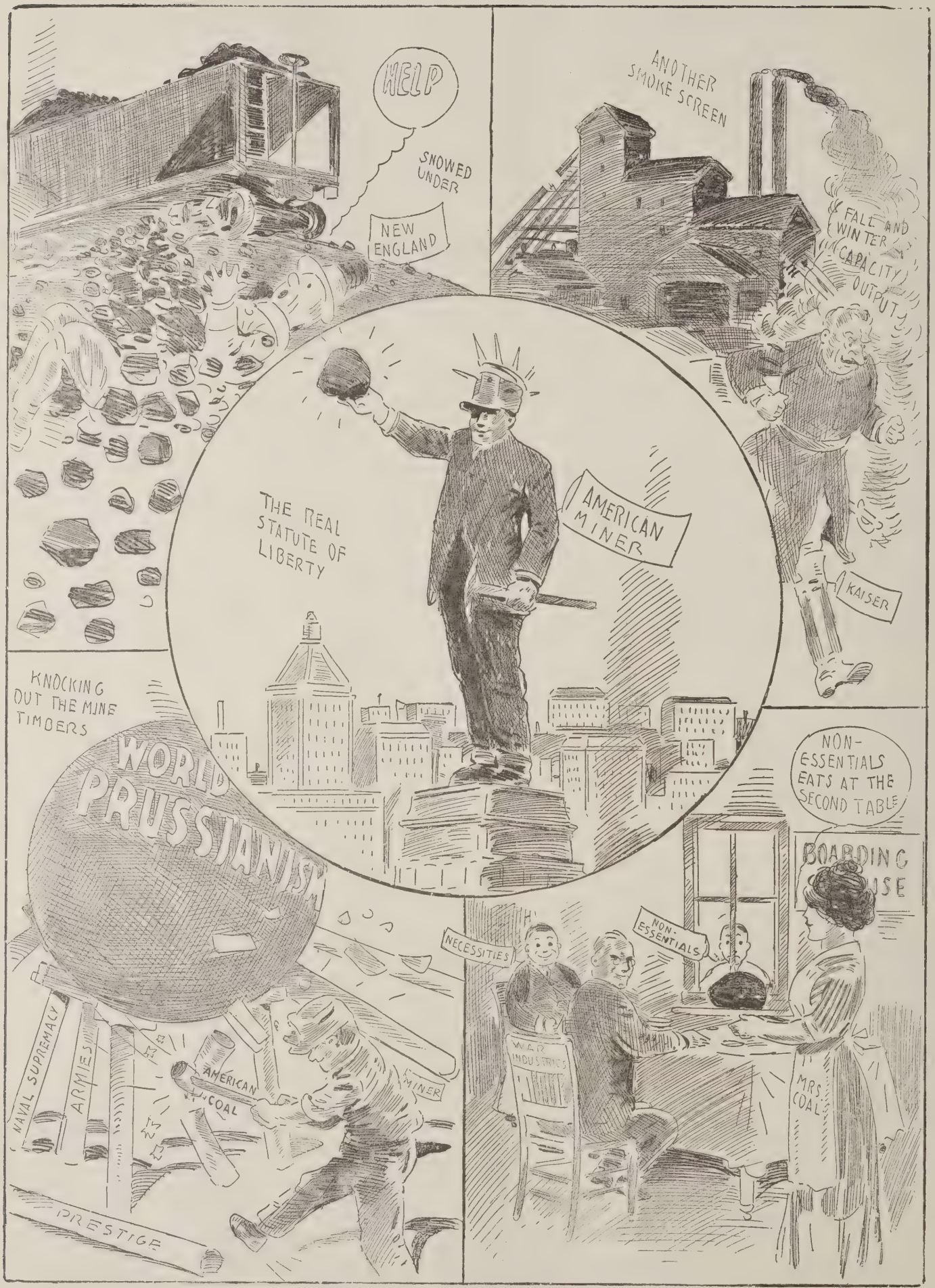
Fuel Administrator H. A. Garfield, on Oct. 3, appointed C. E. Persons, of San Francisco, Director of Education of the Fuel Administration. Mr. Persons has been connected with the Western Division of the Associated Press for seven years, and for the last three years has been news editor of that division. At the request of Dr. Garfield, the Associated Press has released Mr. Persons for this work.

No exception to the lightless night order is to be made during the Liberty Loan drive, the Fuel Administrator has ruled.

James H. Allport has been made a member of the license board of the Fuel Administration. He succeeds Noah H. Swayne, 2d, resigned.

C. C. Anderson, of Boise, Idaho, has been appointed fuel administrator for his state. He succeeds Frank R. Gooding, who has resigned to enter the race for the United States senatorship.

Mechanical labor-saving devices relating to mining are to be studied intensively by a committee consisting of S. A. Taylor, of the Fuel Administration, and George J. Salmon, of the Bureau of Mines, and Grant Hamilton, of the Department of Labor.



How the High Lights in the Coal Situation Strike the Cartoonist

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

Up to the present no revision has been made in the mine labor scales of the anthracite region, but it is likely that action will be taken soon. It must be remembered that coal mining is a permanent industry whereas the munitions industries, using that expression in its broad sense, are in part temporary. Is the large price paid to the munitions workers for war service to be duplicated in the mining fields for an indefinite period? It would seem that if we are going to let a permanent industry enrich itself by such wages the increase should be distinctly of the nature of a bonus and not a permanent increase.

All excessively high wages can be maintained only by an unfair restraint of trade and can only be kept of value by preventing, after the war, a flood of labor from other industries; for a high wage and no chance to work is clearly of no value to anyone. Clearly any attempt to keep others out of any industry is unfair and undesirable. It is going back to the old order of things, the medieval order. Certain people will be "free," as in ancient time, to enter the "mistery" of mining because their fathers or their wives' fathers were in the business. Or else the "freedom" will be for sale and we will have the miner occupying the position of the "liverymen" of a feudal city. All who pay certain large dues to the union will be permitted to enter it, and all who refuse will have to keep clear of the mines This is the inevitable result of keeping the wage rate higher in one industry than in another, as has been amply proved in the window-glass industry.

MAY READILY RE-ESTABLISH LABOR AUTOCRACIES

Freemen or liverymen, or whatever you may call them, are merely memories or functionless survivals of a dead past. They represent, however, an evil principle that can easily be reëstablished if the possibility is not watched. The public does not want the right to work in any industry restricted by anyone. Nor does it want to see wages reduced after the war, and for that reason it does not desire to see the wages in permanent industries boosted above the market value of labor.

Several men in the Gallitzin region of central Pennsylvania, all miners, have been arrested for continued drunkenness. Every miner will be glad to see that pressure is being brought to bear on these men who discredit miners as a class and the industry as a whole. Each payday these men, numbering about 20, would "go on a drunk" and remain idle for several days—idle when their country called for their services and men at the front were not getting the support needed for speedy victory at minimum cost.

ARRESTED MINERS FOR CONTINUOUS DEBAUCHES

The men seized were mostly employees of the Taylor & McCoy Coal Co. of Gallitzin and were arrested, at the suggestion of the company, by Chief of Police Lees and Railroad Officer Schlosser. The Gallitzin miners are of all countries, Americans, Russians and Austrians predominating. The report does not say anything as to the nationality of those arrested.

The Spanish influenza is stopping all meetings in Pennsylvania and consequently preventing those important sessions at which the miners are urged to speed production. The health authorities believe it is more important to output that men should be kept in health than that they should receive the patriotic stimulus these meetings afford.

There is still trouble in western Pennsylvania with the overenthuiasm of some of the officers of the draft, where doubtless it is hard to fill the quota without depleting some of the many essential industries of the district. R. W. Gardner, the manager of production for the Pittsburgh district, states that several local draft boards are exceeding their authority by placing coal miners in class 1.

He says that he is about to appeal to district draft boards to give such men deferred classification and that, if necessary, he will carry the matter to the highest authorities. He adds that there is a loss of 18 to 20 per cent. in coal production by reason of the frequency with which miners lay off work, sometimes for periods of two or three days in one week.

WANT PRESIDENT TO MAKE POINT MARION DRY

Point Marion is still a sore spot with the operators in the Monongalia field of West Virginia, in which area should be included the Scotts Run section. After payday several miners of this part of West Virginia leave the state for Point Marion, Penn., and for some time thereafter they spend their earnings in riotous living. The University of West Virginia authorities, who have large numbers of soldiers in training, are prepared to combine with the operators in demanding a closing of the saloons at Point Marion, but not because there has been any trouble with the soldiers, as these good fellows stick closely to their studies and need no legislation to keep them in due restraint.

The Point Marion liquor dealers are said to be making big money out of their traffic, as much as $10 a quart being charged for whiskey. The President has full power to take the alcoholic sting out of the Point Marion scorpion and it is to be hoped he will do it.

In the Winding Gulf district the spirit of whole-hearted Americanism is to be found at its best. A Baptist minister, the Rev. Dr. Coleman, has even entered the mines to load coal, urging upon himself that we should be "doers of the Word and not hearers only." Dr. Coleman is certainly "some doer." He loaded 12½ tons the first night and the next night, instead of decreasing his efforts, he loaded out two tons more. He says he not only wants to supply coal for the Navy but to feel "just as his parishioners feel after a hard day's work."

TO BUILD A FIRE TO BURN DESPOTISM TO ASHES

The Right Rev. P. J. Donahue, Roman Catholic Bishop of Wheeling, has issued a summons to all the mining members of his diocese to produce coal as "true men and patriots." He says: "Your country calls you as never before. Coal is king. You are his willing subjects. Today he is the greatest power of all. I believe that, in the Providence of God, our beloved land is now the divinely appointed agent to keep the torch of Liberty flaming brightly amid the terror and the horror and the blackness spread like a pall over the face of the earth. We, the heirs of freedom, are freedom's last hope."

He then urges them that "every additional ton will build a fire to burn despotism to ashes. Every car you load helps to hasten the death knell of Kaiserism." The Bishop calls on foreign miners to eliminate the celebration of holidays and requests the clergy to actively use their influence to increase the coal output.

Illinois is deeply interested in the Fourth Liberty Bond campaign. The union has voted to buy $500,000 worth of bonds, where it will be done not being as yet decided. The miners having done this collectively, are determined to do as well individually. A subscription of $100 per member is the goal set by the union leaders of that state, and Patrick F. Murphy, chairman of the committee on coal and labor organizations in Sangamon County, announces that several unions have already made their quota on that basis within

the area over which he has worked. In the Third Liberty Loan campaign, 100 per cent. subscription was sought, but most of the subscribers took a $50 bond.

The miners at Duquoin, Ill., have promised that they will not strike so long as the war lasts, making the vow with raised hands at a mass meeting, at which C. M. Coleman, a sapper of the Canadian Army, who had served 26 months on the western front, spoke. He told them that every 80 lb. of coal was equivalent to a 16-in. shell.

The meeting was held at the close of the session of the Southern Illinois Mine Superintendents' Association, Dr. H. C. Honnold, of Chicago, the head of the Illinois division of the United States Fuel Administration, being present.

Now that the Government has taken over the Moffatt road in Colorado, the miners of the Routt County coal fields are flocking back, because they feel assured that there will be work through the winter, and all the mines will be operated to capacity. There seemed to be a question whether under private management the road would be kept open during the severe winter months.

The troubles in Canada seem drawing to an end, though in British Columbia the outcome has been a subversal of authority under which the miners' fiat becomes law. A commission should have determined what course should have been adopted in the operation of the mines.

The Department of Labor is trying to round up all the former members of the coal industry who have drifted to less important occupations. They will ask them for the country's sake to get back into the harness. A circular letter has been sent to all the 3500 locals of the United Mine Workers by Director General Densmore. The campaign is being handled by the Mining Division of the United States Employment Service, consisting of James Lord, the president of the Mining Department of the Federation of Labor; E. B. Chase, general manager of the Berwind-White Coal Mining Co., of Philadelphia, Penn.; and William Diamond, former statistician of the United Mine Workers.

The Spirit That Will Win the War

Everywhere there has been a shortage of men to handle the coke at beehive ovens. It has been necessary at the mines of the United States Coal and Coke Co. in Gary, W. Va., to bank several ovens for this reason alone. In Connellsville, Penn., the matter has been almost equally difficult to solve. Imitating the French declaration at Verdun, "*On ne passe*," They shall not pass, the Connellsville coke operators have proposed the slogan, "They shall not bank," in reference to the iron and steel furnaces which are operated on the coke that has made Connellsville famous.

In every pay envelope appears an enclosure running: "*Furnaces shall not bank* for lack of coke—then *our soldiers shall not die* for lack of guns and shells."

From Benham, Harlan County, Kentucky, we hear that the Wisconsin Steel Co. has been wrestling with this trouble. It was solved by the simple expedient of requesting all employees to load coke on one Saturday night, Sept. 21. The solution was practical and successful by reason of the admirably patriotic sentiment of the men employed. The photograph shows how many responded. There is no indifference evidently in the little town of Benham.

The village has more than 400 coke ovens and the product they make is essential to the operations of the Wisconsin Steel Co., at Chicago, Ill. Owing to the number of men who have entered the service, it is hard to get the full coke tonnage, without employing men who are engaged normally at other work. The men who volunteered on that memorable Saturday were, during the day, miners, machine men, motormen, couplers, trackmen, pumpmen, machinists, carpenters, officemen, engineers and foremen. The list of occupations as given should be extended if accuracy is sought, for every employee who could handle a fork was crowding the coke piles and working like a man possessed.

Entering into the spirit of military service, the men before going to the ovens formed in parade and were led by the Benham white and colored brass bands. They marched to the coke yard 200 strong and loaded more than 1000 tons of coke. The ladies of Benham and the Benham Boy Scouts, Troop No. 1—for it was a community effort and the women and boys formed an important part—provided sandwiches and coffee.

"This is," says F. B. Dunbar, the proud superintendent, "the same patriotic crowd who subscribed $700 in the first Red Cross drive, $2500 in the second Red Cross drive and purchased $38,000 of Liberty Bonds. They also have organized a war chest and each employee pays from 5c. to 10c. per day into the war fund, which is to be equally divided between the Red Cross and the Red Triangle. Each family in this town receives monthly the Red Cross magazine and also the *Association Men*, which is published by the Y. M. C. A. We have a service flag with more than 100 stars. This is the spirit that will win the war. We are proud of Benham."



THE FURNACES AT CHICAGO NEEDED COKE, THESE MEN FROM THE BENHAM COAL MINES WENT OUT ON SATURDAY

Secretary Wilson on a Wage Increase

Early in September when the question of increasing wages for the anthracite mine workers was agitated Fuel Administrator H. A. Garfield wrote to Frank J. Hayes, president of the United Mine Workers of America, as follows:

"While I find it impossible to go to the President with a request that wages be raised contrary to the spirit and understanding of the promise made to him last October, I have not hesitated from the beginning to say that I shall give careful heed to the investigation now under way by the Department of Labor of the cost of living and of the relative wages paid in all fields of industry. The principle of equalization of wages between mine workers and the workers in other fields to which you call attention is sound. It is also reasonable and right that account should be taken by me of the findings of the Labor Department Committee."

Secretary W. B. Wilson wrote to Dr. Garfield as follows:

"At the conference last night with the representatives of the anthracite miners and yourself, I made the following statement and suggestion:

"'A lifetime in the labor movement, keen observation of its ups and downs, has led me to the conclusion that the greatest asset that the labor movement has—the one thing that has gradually brought it to be a power in our country and in other countries of the world—has been its recognition of the obligation of its contracts. Whenever a contract is made for a given period of time, whether that contract be good or bad, the labor movement is strengthened if its members religiously live up to its terms. I know of no other one thing that has done as much to make the United Mine Workers of America the power in the mine industry that it is today as the fact that it has stood by its contracts.

"'Once those contracts have been made they have been lived up to, and that has been done sometimes when it meant serious discomfort to do so, especially at times when the very fact that the union was living up to its contracts was used as a weapon to defeat certain portions of its membership. In face of that kind of record and the benefits that have accrued from it I feel with Dr. Garfield that you should religiously live up to the agreement and promises entered into even if the only basis for this course was the material benefits that would come from so doing. But a higher, greater, better benefit, the spiritual benefit, comes from a knowledge of a duty properly performed.

"'Now although this is true and you have made a contract and made promises in connection with the contract there still remains the significant fact that there is seemingly a sufficient discrepancy between the wages that are paid to you and the wages that are paid to those engaged in munition manufacturers and in bituminous mining to induce a movement from your mines to these other industries such as will be injurious to the country in view of the difficulties it is now giving. That is a condition that the whole country is interested in correcting.

"'In correcting it, however, we ought to have a care not to create a condition that would reverse the process and create an undue drift from other industries into yours.

"'At the desire of the President and to secure more stable conditions in industry we have built up within a week or so a board, the title of which has not yet been decided upon. I presume it will be looked upon and considered possibly as a general wage board. It is a board that is to be composed of two representatives from each of the wage adjustment boards that have been created by the Federal Government. The purpose of that board is to review the contracts or proposed wage adjustments that may be arrived at by any one of the adjustment boards so that when they are finally announced they will not be of such a character that they will disturb the labor conditions under the jurisdiction of the other boards.

"'With that situation existing I want to make this suggestion to Dr. Garfield, that he immediately call a conference of the representatives of both sides in the anthracite mining industry with the representatives of the Fuel Administration; that with the facts already available and those that may be available before the conference takes place or is closed, the conference endeavor to arrive at a wage rate that will be just and fair, compared with that paid other industries, and will not result in workers drifting into your industry from other industries or out of your industries into other industries; and that when you have arrived at what seems to you to be a proper wage rate it be submitted to this general wage board for its consideration before being approved by Dr. Garfield so that it will know and you will know that your wage scale is not out of line with the general wage conditions of the country." In accord with this plan a meeting of the Conciliation Board with some union men was held Oct. 3, representatives of the Fuel Board being present.



NIGHT AND LOADED IT. THEIR BAND WENT WITH THEM, THE LADIES AND BOY SCOUTS SERVING REFRESHMENTS

EDITORIALS

Let Us Have "Business as Usual"

A BANNED expression is "Business as Usual," but it will serve well in the campaign against influenza. We must not let this disease interfere with our production and reduce the earning power of our men. Production is attained in part by hard work, but, at least equally, by hard-headed foresight. Many a man with eye too fast set on the main effort overlooks the possibility of attacks on his flank which will overthrow all his direct efforts.

Such flank attacks on production have already been made by ignorance of the important part coal plays in the war, by the failure of supplies, and by the delays in repairs; but influenza seems to menace a weak point at which we may, if we do not watch, suffer an even more considerable setback. Let us watch and ward against it and cause everybody to know the danger of this attack and so be ready to make the sacrifices which combating it successfully will inevitably require. Let us convince everyone that the victims of the disease cannot disregard it with impunity. Such disregard will jeopardize the lives of neighbors and fellow workers and will seriously threaten the life of the person who thus strives to regard the disease as unimportant and negligible.

The mine doctor must be energetically supported by the efforts and money of the operator. The coal industry has repeatedly urged that it could not protect its men and secure their welfare because there was no profit in mining coal and no funds were available for any but the most obvious and unquestionable essentials. If now that the industry is conducted at a profit we fail to spend the money necessary to keep disease away from our mine villages or to isolate what disease finds lodgment there, we shall not only fail to make the money which would otherwise come to our hand but also prove untrue our reiterated contention that a happy mining camp is one where the owner is making a provident return on his investment.

Now is the time for the operator to show his leadership and his great powers for good. There are leaders a-plenty in every mine village, but too often the man in control of the plant is not the leader of the men employed in it. He should recognize the opportunity which his position gives him and assume the leadership that should be his.

Congress has clearly visualized the importance of the menace from influenza. It has voted $1,000,000 to the United States Public Health Service that it may have funds adequate to combat the disease. Every mine owner, superintendent, mine foreman, engineer and mine worker should be studying this epidemic and learning all he can about it and how to prevent it from spreading. Those whose business it is to attend to the sanitation of villages should immediately obtain all the information they can from local or state health authorities or the United States Public Health Service.

It is a national duty to keep well, for to keep well is to maintain production and to sustain our national cheerfulness and poise. Only by health can we keep our home fires burning brightly. Health has more to do with morale than has almost anything else, therefore let us keep in health that our business of war waging may continue "as usual."

"We've Started Something"

THE townspeople were assembled at the city hall to say farewell to a draft levy. John and Susie, brother and sister, aged 8 and 6 respectively, had come hand in hand to see their uncle Joe march away. Susie's eye became fixed on the W. S. S. sign on the city hall lawn.

"John," she queried, "What do those letters W. S. S. mean on that sign over there?"

This was several months ago, and John had not the slightest idea of what the letters meant. It would never do, however, to be "stumped" by a girl, particularly by his younger sister.

"Why, Susie," he replied promptly, "I thought everybody knowed that! That's easy! W. S. S. means 'We've started something.'"

This country has indeed "started something"—Cantigny, Chateau Thierry and the St. Mihiel salient form a good beginning. The Hun is commencing now to realize the strength and mettle and purpose of the enemy he so vehemently scorned and derided a few short months ago.

It is, however, far too early yet to boast of victory or flatter ourselves over the successes already achieved. The German war machine is still unbroken; the will to dominate the world and the destinies of mankind is still virulent; hell-bred, beer-soaked *Kultur* is still rampant. Those who have lived and flourished by the sword have not yet perished by the sword. The fires of hate and greed still burn furiously. The principles in the defense of which this country entered the conflict have not yet been fully vindicated.

The United States is calling upon its people to lend of their substance in the nation's defence. To us here at home the war is something vague and remote. We have not ourselves seen with our own eyes the work of *Kultur*. Had we been able to do so the entire amount of the Fourth Liberty Loan, vast though the figure is, would have been oversubscribed within 24 hours.

If we citizens of America—proud to be men among men—saw our aged fathers and grayhaired mothers crucified upon the doors or fences of what had been their homes, or dragged away to industrial slavery in a foreign land; if we saw the hands of our sons severed from their wrists in order that they might never be able to defend themselves against a merciless and unprincipled oppressor; if we saw our innocent little ones carried about our streets impaled upon German bayonets;

if we saw our wives and daughters dragged off to a slavery worse than death, to at best be the playthings and toys of German officers, or carried into the front line trenches and there tortured by means and methods unspeakable in order that their shrieks of agony might lure the opponents of *Kultur* into effective range of machine-gun fire—if we could see these things would we hesitate to subscribe to the Fourth Liberty Loan?

All of this and infinitely more is a stern reality in Belgium and northern France—and only the accident of geographical location and our ability to oppose might with might protects our own land. Our two million men, more or less, now "over there" have given and are giving an excellent account of themselves. They will soon be followed by millions more. But all of this vast man power will be useless unless these boys are supplied with tanks, guns, shells, rifles, cartridges, automobiles, horses, airplanes, etc., without stint. Money quite as truly as men is what wins wars.

"We've started something," and we can and must and will see it finished. A certain family group of seven men in Germany must learn a definite lesson in English. That lesson is the meaning of the historic American phrase "unconditional surrender."

Buying bonds will help them learn it quicker.

Want Pay for What Others Endured

NOTHING has been done thus far to change the wage of mine workers in the anthracite region, but it seems almost inevitable that some change will take place. The large wages given to munitions workers and shipbuilders are causing the mining industry to lose its men and lose some of the loyalty of those who stay on the job. It must be remembered that the big wage paid to these munition and ships men is to compensate them for the discomfort, real and imaginary, and for the expense actually incident to changing one's occupation and place of living. The cost of living and residence also is high where these wages are paid.

The miner who has stayed at home has saved much by remaining steadily at work, by not paying his good money away for moving expenses, by remaining as a skilled hand instead of entering another business at which he would be a common laborer, by paying reasonable rent, and in many other ways. To leave home or to move one's family is not worth while unless large earnings accrue. No one knows how long munitions will continue to be made, but just as soon as they are no longer needed the volunteers for work in munitions industries will be disbanded, and the savings, if any, will be frittered away in returning to the home town or in seeking for work where men have become far more plentiful than jobs.

The munitions wage is a dynamic wage; it is intended to move men. The mining wage is a static wage, intended to hold them. Unfortunately, the dynamic wages have had such kinetic energy that they have taken men from both essential and nonessential industries.

The increase in the bituminous coal regions made at the close of the year was granted in the main because work was so irregular that it was hard to keep starvation from the door. Now, that work is steady and it is hard to keep the men at work, the reason for much of that increase is not apparent. But as a permanent revision was made to accommodate a temporary condition, the bituminous miners are still receiving compensation for a hardship which they no longer endure. And now the anthracite miners, viewing the larger pay in bituminous mines, demand that they receive compensation for a hardship that they never endured recently or at any time within a decade and a half.

Thus the anthracite miners want pay for moving expenses though they have never moved, for the temporary character of their work though their work is permanent, for change in occupation though their occupation has not changed, and for slackness of work though they have had full-time operation. They desire pay for the sacrifices that others have made, to repay expenditures that they themselves have not disbursed. After all, what is more natural? How many of us are there who, when we passed the queue of men drawing their semi-monthly pay at a neighbor's mine, have not wished that we might range ourselves with the rest and get pay for services we never performed.

When John No Longer Defers to You

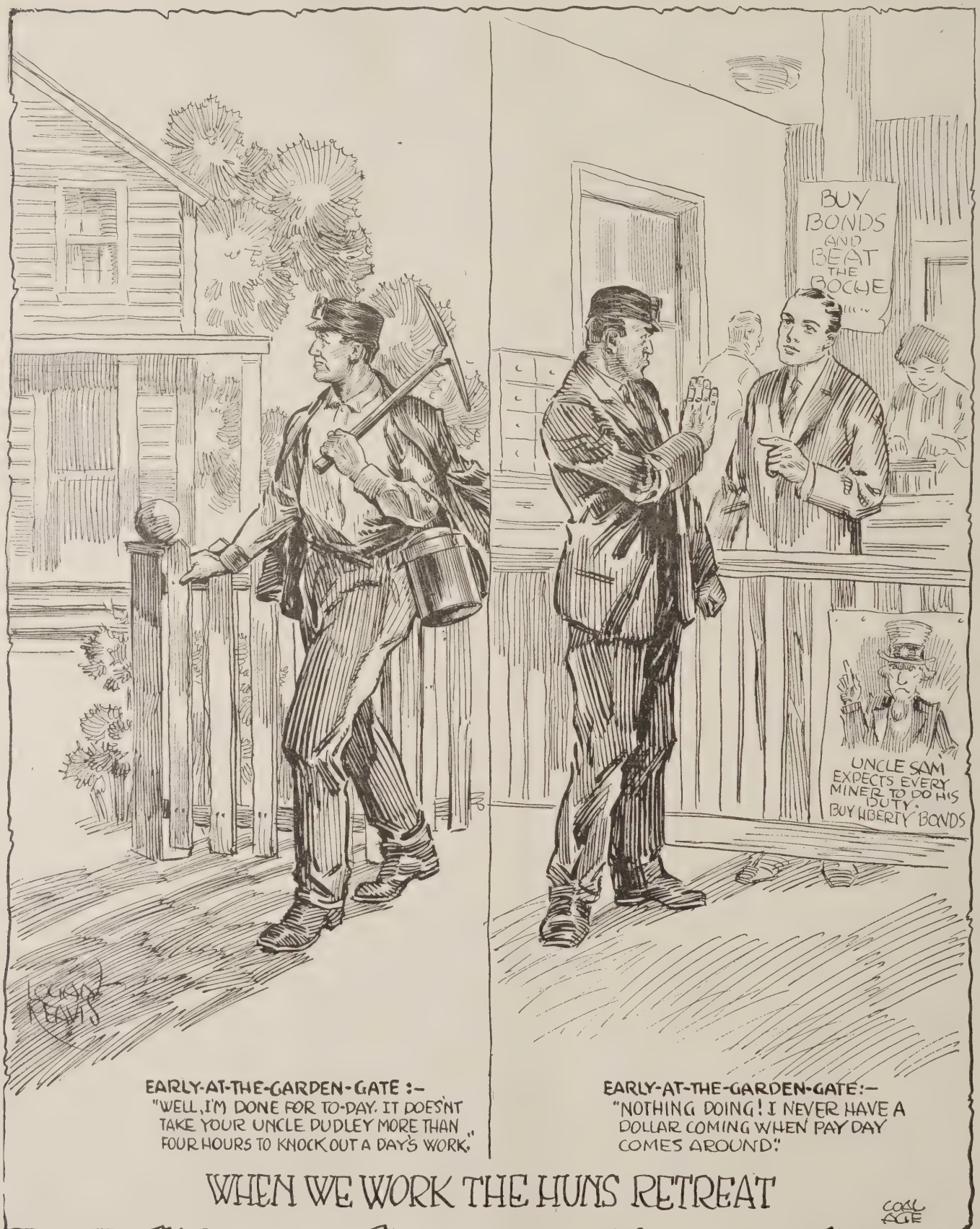
SOME have said that after the war the workman will come into his own. It is hard to say what is meant by this mysterious utterance, but shallow thinkers regard it as being of the highest importance. Certain it is that the working man always had a vote which was as potent as that of his employer. In any industry the workmen could always outvote the owners. No one has suggested yet that each employee should have two votes and the employer one. So, clearly, there is not going to be any great change in the political make-up of the United States.

But it is quite likely that the workingman will no longer defer to the judgment of his employer as freely as he has in the past. Already the worker has largely ousted the employer from the leadership which the employer formerly held without much question. The workman has leaders who come from outside and pay scanty deference to the men who own the plant and those who are paid to run it. These leaders, however wrong they may be (and they are not always wrong), however dishonorable they may be (and they are not always dishonorable), are always shrewd men. They have taken the leadership and in many cases have the worker's ears and his eyes.

The only way to meet the difficulty is the democratic way. The humblest worker in the mines, whether native or foreign, has a good keen intellect; and he will respond to the wiser head in the contest of wits. He is determined to know why he should vote a certain way and conduct himself in a certain manner. Let us have our reasons ready.

But let us studiously avoid a campaign of vituperation. The labor leaders are quite generally good clean fellows. A good clean warfare will tend to make them better and cleaner and straighten those who tend toward a less honorable course. For the operator to abuse and misrepresent them will be for him to accept those courses of action which he has most bitterly condemned. But if he places the truth fairly and squarely, before his men, and does it with good judgment, a degree of zeal and steady persistence, his work will tell and he will have nothing to fear.

"Early-at-the-Garden-Gate" Couldn't Buy His Share of Liberty Bonds



Who slacks at his work will be slack in buying Liberty Bonds

DISCUSSION BY READERS

The Miner and Safety

Letter No. 1—In anticipation of the recent meeting of the National Safety Council, at St. Louis, *Coal Age* invited its readers (Aug. 15, p. 324) to offer any suggestions or contributions relating to the safety of coal miners. It was urged that the readers of *Coal Age* "cover the whole field of mining safety and mining welfare." It was stated that one's duty to the industry and to the Nation should lead him to communicate to others whatever ideas he may have worked out in his brain, with a view to increasing the efficiency and safety of mining work.

In the issue of *Coal Age*, Sept. 12, which was devoted wholly to the safety and welfare of miners, L. R. Thomas, section foreman, Woodward mine, at Edwardsville, Penn., page 518, has drawn attention to the fact that it is the experienced miner who is the most frequent victim of serious accident, because of his foolhardy disregard of the precautions that he knows should be taken to insure safety.

Mr. Thomas has expressed my sentiments exactly. It is the practical miner, who knows it all and does not need the instructions of his boss, who disregards the simplest precautions for safety and, as a result, is injured or killed. The instance given by Mr. Thomas is a pointed illustration of that fact.

It is common to speak of the large number of foreigners who come to our mines seeking employment, as "greenhorns." But it is the "greenhorn" who listens to the instructions of his boss and obeys them. For this reason, he is safer, today, when working in the mine than many experienced miners, although there are many of the latter class among the foreigners, men who have been in this country a number of years.

In answer to the instructions of the foreman to do some posting or pull down a loose piece of slate or set sprags under his coal, the old miner answers, "Me verstay; me see; me know." The foreman passes on to the next place and this experienced miner continues his work, paying no heed to the instructions given him. It is not strange that his disregard of necessary precautions eventually costs him his life. But, that is the way of all miners, whatever their employment, from a greaser up. Their reply to the instructions of the foreman is always "Me verstay; me see; me know."

In the interest of safety, I have served as a moving-picture actor for the Coal Industries Films Co., which has caused me to take particular notice of some of the cartoons recently published in *Coal Age*. Kindly allow me to present the following sketches, illustrating the pleading necessity for a miner, regardless of his previous experience, to take the instructions of his boss kindly and obey them.

The first sketch shown illustrates a miner leaving his home in the morning and halting for a few moments to listen to the pleadings of his wife to be careful about his work in the mine that day. The wife reminds him that the little one she holds in her arms will be looking and calling for him at night. The father kisses the child and promises to obey all instructions. What is the result?

In the second sketch the same miner is observed standing a post under a loose piece of slate overhanging the face of the coal in his room. His laborer stands back and watches him. By thus posting his room he not only fulfills the "Safety First" promise given his wife in the



morning, but avoids the accident that befell his less careful neighbors who worked in the adjoining room.

These men, as indicated in the third sketch, took a chance, neglected to set the needed post and started to load their coal without examining and testing the roof above them. The result is that one was caught in the fall that took place a short time later. The unfortunate miner is shown in this sketch partly covered by the fallen slate.

In the fourth and last sketch is shown the return of these two miners to their homes, the one assisting to carry the stretcher on which his neighbor, the dead miner, is carried back to his sorrowing wife and children. The contrast is strong. These miners were neighbors, at home and in the mine. Both were experienced miners; but, while the one obeyed the instructions given him, the other relied on his experience as a miner. The sketches tell the whole story.

Permit me to suggest, in closing, that the cartoons relating to coal mining can be made more natural. They will then impress the miner more with the truth they are intended to convey. M. H. G.

Leckrone, Penn.

Value of the Mining Engineer

Letter No. 1—A short time ago there appeared in *Coal Age* (May 4, p. 823) an article bearing on the value of the services of a mining engineer, to the coal operator. If I remember rightly, that article was written by an inspector, who emphasized the absolute need of a comprehensive and accurate mine map based on surveys regularly made each year. Allow me to comment briefly on this matter, to show how some of the supposed difficulties in the employment of an engineer can be overcome.

Many small operators, in the past, have disputed the necessity of employing a mining engineer to enable them to operate their mines successfully. Their claim was, first, it would be expensive; second, the mines were too small to require the services of an engineer.

These fallacies are being gradually dispelled, and the technical man or engineer, today, is in demand, by all companies small and large. It is true, however, that a small operator is not able to employ an engineer constantly and several plans have been suggested to overcome that difficulty.

In some instances, the engineer's time is contracted for at stated intervals when he is required to make the necessary surveys and construct a map showing the various features of the mine, the property owned or leased and the surface improvements. While this plan has worked well in a few instances, it has been found inadequate at times.

Another plan, not so generally followed, is for the operators in a certain district to hire an engineer to serve them entirely, the engineer being required to devote prescribed portions of his time to each company. It is agreed, however, that all the companies have the privilege of consultation, at any time desired.

Advantages of a Coöperative Arrangement

While this latter arrangement has its advantages, some have criticised it by saying that the engineer would have his favorites and be partial to some of the companies, to the detriment of others. Such a claim would seem to be frivolous and hardly worthy of consideration, reflecting as it does on the integrity of the engineer. There are, no doubt, men who gain admission to all professions, which they serve to degrade by such dishonest, unprofessional and partial practice.

Speaking from my own experience, after working under both of these plans, the latter appeals to me as being far superior to the former. By its adoption, the operators in a district get together and employ an engineer who promises to give his entire time to their interests, while they agree among themselves as to what portion of the engineer's time each will require for the execution of their surveys and maps. The balance of the time the engineer spends in visiting the various properties, inspecting the workings and giving such advice and assistance as may be required to solve their local problems. In the performance of this work, the engineer keeps in touch with the conditions in each mine, and the problems, in each case, are constantly before him.

In contrast with this plan, that first mentioned has the disadvantage that one operator alone contracts with the engineer for a specified amount of his time, each year. It is true he gets the man's time; yet, does he gain in the end, over the other plan in which he can consult with his man at any time, while securing a due proportion of his services, according to agreement? In the first instance, the engineer probably has outside interests that are more profitable to him and demand the most of his thought and energy; but he accepts the operator's contract to keep him employed.

One great disadvantage in the plan first mentioned is the fact that the engineer sees the mine but once in a great while. In the interim, he is apt to have forgotten many details and the peculiar conditions affecting the work. For those who cannot afford to employ an engineer on their regular staff, the first mentioned plan is certainly better than none; but in a district where such an arrangement is possible, the second plan will be far more satisfactory and give better results in the end. F. L. Serviss, Sr.

Golden, Colo.

Americanizing the Foreigner

Letter No. 5—Fresh from the big cities teeming with life and energy, grimy with coal soot but vibrating with the giant heart-beats of a great nation, I came three months ago into this peaceful valley among the great hills. What a contrast from the region I had left behind, far from the coal fields! But I came here with the thought that I might work to better advantage in helping to win the war.

Until last winter, when all the great manufactories of the country were shut down for lack of fuel, the coal industry had been a closed book to me. Since coming into the coal fields, however, my associations have brought me into closest contact with this great arm of American industry. It occurs to me that, as a stranger, unhampered by prejudice or habits, it may be that my observations may help those who are studying the labor situation in its relation to the output of coal.

Mention has already been made in *Coal Age* that, in mining camps where men own their own homes, conditions are much more satisfactory than when they are compelled to live in company houses. This appeals to me as one of the chief factors in coal production. Its truth was impressed forcibly on my mind, a short time since, when a committee of women were around soliciting Red-Cross funds. It was between paydays and, although these negroes and foreigners, many of them, had earned as high as $200 for a two weeks' pay, they had no money to give.

Although well housed, on premises that were neat and orderly, the general attitude of these peoples was both listless and shiftless. Looking at them, I could not but feel that had they had the privilege of buying little houses and lots that they could call their own, it would be a great incentive to them to work and stay in one place; there would not then be the desire to depart and seek work elsewhere.

On the other hand, in a mining camp where the coal company own the entire colony, there is no hope of the men accumulating anything. The man who came from Europe, seeking freedom, political and otherwise, braves poverty and the perils of the unknown, for the sake of his principles. Such a one soon feels the yoke of the restrictions of this mining camp and drifts away to the big cities where he seeks employment affording greater opportunities.

Only a few days ago a miner came into our commissary, and, while serving his wants, I engaged him in conversation. He was a clean-cut Hungarian. He told me he was leaving the next day for Chicago, where he could attend night school and study English, which would greatly improve his chances. He told me that the average foreigner, notwithstanding the general belief to the contrary, was a downright intelligent person. He argued that, lacking intelligence, these men would not have the courage to throw off the yoke of Europe and come to a strange country. He added that when foreigners come over here and contempt is shown them as a class, not to say individually, it arouses resentment, which is natural.

While frankly admitting that there were exceptions to the rule, my man was strong in the belief that the more intelligent of the foreign element were essential to every industry, particularly mining. When he left I reflected on the truth of his last statement. Industry everywhere needs brains; but strong backs and weak minds are not essential to any operation. My conclusion was that the more intelligent a worker is the more eager he is for advancement. The thrifty miner is not content to live in any other than his own home, be that ever so humble.

The Labor Problem of Today

The most difficult feature of the labor problem, and the hardest to solve, is the relation of the American element to the foreign element. Although living within a stone's throw of each other and in daily contact, they are quite separate. They meet in the mine or in the commissary but the foreigner is generally morose and unfriendly. Practically the only time when they display enthusiasm is on one of their holidays.

Seldom does one observe any attempt on the part of the American population to mingle or become friendly with the foreign element. Replies to my inquiry state that this has been attempted but without success. However, my own experience when approaching a foreigner with careful tact is that he is easily won. My conclusion is that, in the large majority of cases, they are not approached in the proper way but have been handled as a class. Their educational advantages have been very limited, and when the supply of labor is equal to the demand the foreigner is often neglected.

Let me urge that it is the American element, as much as the foreign element, in our mining camps, who need waking up to the necessity of putting their shoulders to the wheel, in a way that is necessary to the success of any industry, war or no war. Honest efforts must be made to teach these new citizens how to become good Americans. Much has been done along this line in the public schools; but how much could those efforts be furthered if American mothers and school children would welcome into their mothers' clubs the foreign mothers in their midst. Patience and good-will are required to make them understand our purpose, which is to bring them to appreciate American ideals and standards. After all, it is the home that breeds either satisfaction or discontent.

Social service work in these homes, I know, has been attempted in the past with varying success, but it must be continued with patience and perseverance. Although foreigners are loath to mingle with Americans in a social way, they will attend public gatherings; and if a few earnest women would get together and form mothers' clubs I feel sure much good would be accomplished. The entertainment at the schoolhouse is always successful in drawing different classes of people together, and filling the house with a social throng.

When the foreign miners see that a real spirit of coöperation exists, they will be drawn to love this country of their choice. and they and their children will be Americanized and the foundation of great things will be built. At the same time, the miner will better understand his work in the mine. As long as there are a few intelligent foreigners in any group, and there always is, these are a source of encouragement to the worker.

Let coal companies do more welfare work, establishing and maintaining night schools for the teaching of English. This is constructive work and will accomplish its purpose. It will prove a real benefit to the company, but that is incidental. The true purpose is patriotism and love of country.

J. Tague.

Holden, W. Va.

Exemption for Coal Miners

Letter No. 1—Owing to the shortage of labor, in coal mining, the suggestion has frequently been made that this class of labor should be exempt from the operation of the draft law. It is gratifying to know that a number of *Coal Age* readers who are contributing to these columns express themselves as opposed to such a plan. I was particularly pleased to read the letter of Ostel Bullock, *Coal Age*, Sept. 5, p. 462, in which he gives good reasons why there should be no class exemption for coal miners.

There is no question but that the draft law has already called many good miners from their work in the mines and sent them to the front to take part in the great struggle for democracy. The point I would emphasize here is that a ruling granting exemption to coal miners, at the present time, would be apt to cause hard feeling among the relatives and friends of those miners who have already been called to service, many of whom, we regret to say, will never return.

Now, regarding the situation from a patriotic angle, we must agree that there is no patriotism in urging a claim for the exemption of miners as a class. While it is true the mining ranks have been depleted by reason of the draft, it is likewise true that all other means to produce the required tonnage of coal should be exhausted before attempting to discriminate in favor of the mining classes. As Americans, we stand as a unit as soldiers and workers in every craft producing the necessities of war.

Observation makes clear that there are many able-bodied men working in nonessential trades and indus-

tries. These should be forced into other occupations that are necessary for the prosecution of the war. It is true that they would make poor miners at first, being inexperienced in that line. Like the soldier, they would have to be trained, but this would not be as difficult a task as may be supposed. Many men having no more experience than these have gone into the mine and succeeded.

In my opinion, it will be necessary after the war to train new men for mining work, and we might as well begin to do that now. Let me urge, then, that we do not favor the exemption of coal miners because they are miners, but let us all stand shoulder to shoulder and be loyal to the call of our country.

Perryopolis, Penn. R. W. LIGHTBURN.

Hindrances to Coal Production

Letter No. 3—Among the many hindrances to the production of coal that have been suggested in the letters written on this subject, perhaps few are of greater influence than favoritism in the management of a mine. Instances in my own observation impressed me with the thought that this is a great factor in the discouragement of ambitious mine workers, whose zeal in the work is greatly lessened thereby.

As years come and years go, the men of the mine have their memories that rush over them, perhaps, even to a greater extent than is true of workers in other industries. In some ways it is amusing, but, in others very discouraging, especially for the young man who has progressive ideas and hopes for his own future advancement.

Here, for example, is a young man progressive, thoughtful and ambitious. An idea comes to him that he submits to his foreman as a suggestion for bettering the conditions in his particular branch of the work. The suggestion may not appeal to the foreman, who, in a condescending way, replies, "I will see to it," and that is the last the young man hears on the subject.

Is it not surprising there is no incentive to sincere coöperation when an honest effort of a thoughtful man meets with such a reception on the part of his boss? Today we are all striving to reach the goal of success, and it requires concentration of thought and the coöperation of all workers.

A Foreman's Favorites Sure To Follow Him

Only recently, an instance occurred that showed clearly the ill-results of favoritism on the part of a foreman who was transferred from one shaft to another, in the working out of the plans of the company. The foreman previously in charge, in that mine, was a man of few words but full of pep. He was accustomed to allow his assistants many privileges, while he watched their every move and gave an attentive ear to any suggestion that meant another car of coal on the shaft bottom. Following a good day's run, he would meet his men at the bottom of the shaft, complimenting those whose efforts deserved recognition and cautioning others who needed to speed up. There were delays that were unavoidable in this, as in other mines, but these he passed slightly over.

It was not many days after the change of foreman that new faces began to appear on the shaft bottom. They were men whom the new foreman had been accustomed to treat with special favor in the other mine. A little later, almost everyone who was a favorite in the other mine had found a place here and was working under his old foreman from whom he received the same privileges as before. The result can easily be imagined as to the effect on the mine workers of longer standing, some of whom were displaced to make room for the newcomers and all of whom missed the friendly and helpful words of their old foreman.

There are foremen who are desirous of showing their authority on all occasions, but the time is fast passing when such men can successfully manage a mine. Such a foreman must now step down from his high perch and listen when a complaint is made that he can adjust with satisfaction to all and without discharging a man who is probably the innocent victim of prejudice or the jealousy of a fellow worker. The following incident will show how the failure to make such an adjustment cost one foreman the loss of a good worker:

Having recently studied on a plan to increase the output in my district, I put it up to the men with the result that one man and his laborer turned out 144 cars of coal in a month, and several others did nearly as well. It happened, however, that the man just mentioned had a little trouble that hardly amounted to anything. The foreman listened to his complaint but refused to adjust the matter, turning the man down flat. Knowing that he could secure work anywhere, the man loaded his tools and quit.

Practical Results of "Playing Favorites"

Now, compare the result. The foreman at once gave the place to a favorite, who, in 27 days, loaded only 90 cars of coal, a decrease of 37½ per cent. in the output of that one place. This instance is only one of many that are occurring daily in our mines and which are the direct results of favoritism on the part of many mine foremen.

A few days later, the miner who had quit his place came around for his pay. The superintendent met him and asked him to come back, telling him everything would be all right. On the strength of this, the next morning found him at the mine ready to go to work. The foreman, knowing that he could not set aside the authority of the superintendent, took the man into the mine and showed him one of the worst working places there. He knew well that the miner would quit before he would work the place, which would give him, the foreman, an opportunity to override the authority of the superintendent.

It can readily be imagined that the superintendent knew that the foreman was playing favorites. It was a matter, however, that he did not feel warranted in going further to adjust, which would mean taking the matter up with the management and result in a possible cause of friction between himself and the foreman, whose right to authority in the mine is generally recognized.

Let me urge, then, that it is time for mine foremen to set aside the old method of handling men and cease to play favorites. Let us be progressive and coöperate with our men, who will give better work in the knowledge that they can get a square deal in return.

Plymouth, Penn. JOSEPH R. THOMAS.

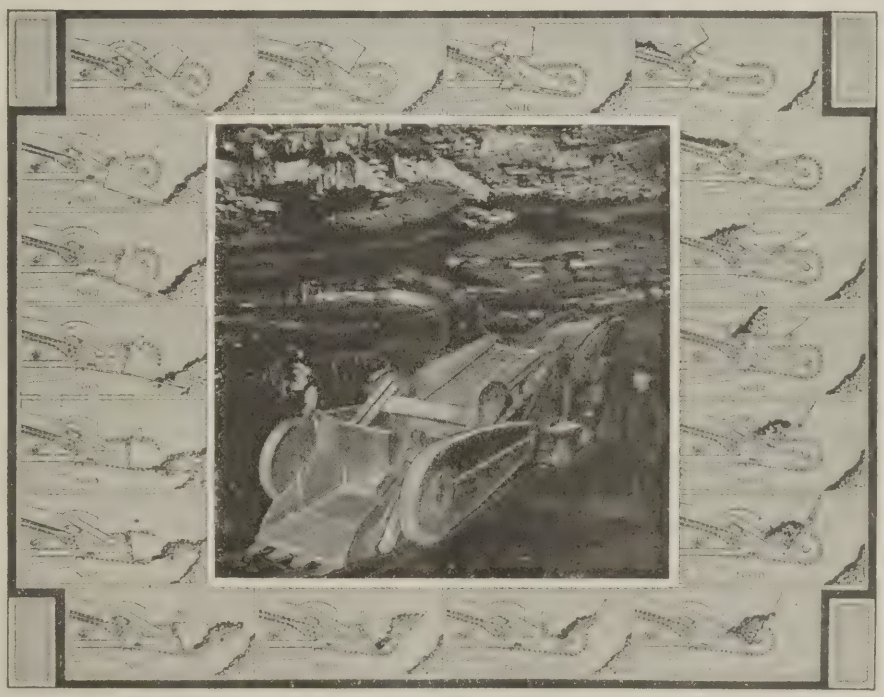
INQUIRIES OF GENERAL INTEREST

Face Coal Shoveler and Loader

Kindly permit me to refer to the inquiry relating to "Improved Coal Equipment," *Coal Age*, Sept. 5, p. 465. In answer to the question asking for the most up-to-date coal-loading machine, the Jeffrey machine is mentioned as being the only one designed for loading coal at the face. While it is true that the Jeffrey loader is a light and portable machine that has given good satisfaction where it has been installed, allow me to ask if mention should not have been made of other devices and machines used for this purpose. INQUIRER.

———, Penn.

Passing over, for the moment, the numerous types of conveyors and scrapers employed for this purpose, it is true that the shoveler and loader designed and manufactured by the Myers-Whaley Co. should receive attention. This machine has been largely known as a "shoveling machine" and has been used in quarries and underground work where loose material of any kind needs to be shoveled up and loaded into cars. The Myers-Whaley machine differs from other loaders in the fact that no hand shoveling is required. In the case of conveyors and other types of loaders, the material must be shoveled into the machine to enable it to be loaded into the cars, while this loader is equipped with an automatic mechanical shovel, so constructed that it is able to scoop up material of any size that will enter the shovel and load it into the car.



The machine operates equally well on rough or smooth pavement, and there is less breakage resulting in the shoveling of coal than when the work is performed by hand. Not only can the machine be used to shovel material from the floor but it will spade into a heap of material, at any point above the floor. Also, the material can be discharged immediately behind the machine, in line with the shoveling, or on either side of the track, as desired. Incidentally, it may be mentioned that the conveyor that elevates the material and transports it to the car serves also as a picking table, for the separation of any slate or rock that might be mixed with the coal. The accompanying figure shows the Myers-Whaley shoveler and loader at the face where the coal has been shot down and is being loaded into a mine car.

In view of the severe conditions under which this shoveler and loader must operate, great care has been taken in its design and construction. The best obtainable material is employed and every movement and detail simplified. The machine is built for strength, durability, economy, and efficiency. All castings are of steel and forgings have been used wherever possible. The conveyor is so designed that the surface subject to abrasion, by the material, is made of steel bars, leakage being prevented by the belt to which the bars are bolted. Lubrication of all principal parts is effected through pressed-steel compression grease cups mounted on the bearings, in most of which brass and white-metal renewable linings are provided. This shoveler and loader is operated by one man. The power employed is either electricity or compressed air, depending on the conditions of equipment at the particular mine where the loader is to be installed. Like other loaders of this type, the machine runs on a track but may be equipped with traction wheels. It is self-propelling, forward or backward. A feature that should be mentioned in connection with mine work is the fact that there is no difficulty in operating the machine on straight or curved tracks.

In its construction, the machine is built in three sections, the main frame is mounted on a truck and carries the motors for its operation. Attached to the forward end is a swinging jib equipped with a specially designed shovel, which scoops up the material and, turning over, deposits it on a conveyor that acts as an apron over which the material is carried to the rear conveyor that transports and deposits it in the car.

The power consumption of the No. 4 size machine is 0.22 kw.-hr., per ton of material loaded. In continuous loading, this machine can handle from 200 to 400 tons in an 8-hour shift and can work in a 6-ft. headroom.

EXAMINATION QUESTIONS

West Virginia Examination (1918), Mine Foremen and Firebosses

(Selected Questions)

Ques.—State the law in regard to safe travelingways. Why are manholes necessary? In your opinion, why are so many men injured by falls of roof—by mine cars? What should be done to eliminate this?

Ans.—The mining law of West Virginia (Sec. 21) requires that a travelingway not less than 5 ft. high and 3 ft. wide, be maintained at the bottom of a hoisting shaft, to enable men to pass around the shaft, without going under the cage.

Sec. 31 of the law specifies that a safe and available roadway, properly drained, shall be available for the passage of men, at all times when the mine is in operation, to enable them to reach one or the other of the two outlets to the surface.

Manholes should be provided on all haulage roads where men are obliged to travel, and at the foot of all slopes or inclines to enable men to seek refuge from moving cars or trips. Injury from falls of roof are largely due to the neglect of mine workers to make their places safe by timbering, or to the insufficient timbering of roadways and travelingways. Also, to the neglect of miners to properly inspect and timber their working places before starting to load their coal into the cars.

Injuries from the movement of cars are due largely to the failure of the management to provide separate travelingways for the men to reach their working places, and requiring them to travel haulage roads where there is insufficient clearance room at the side of the track, and refuge holes are not available. Accidents of this nature are also due to the failure of drivers to sprag their cars when descending grades, or to the location of a door at the foot of a grade, or to the disobedience of mine regulations and rules by men who persist in riding loaded cars and trips passing out of the mine.

In order to reduce to a minimum the number of accidents occurring in the mine, a closer inspection of all mine roadways, travelingways and working places is necessary, and the enforcement of strict rules and regulations relating to safety; also, the maintaining of an ample supply of timber required in the mine and providing every appliance that will make the mine safer for work.

Ques.—If you were traveling in an air current of high velocity, with a safety lamp, and you suddenly came in contact with an explosive firedamp mixture that filled the lamp with flame, and you had no means of smothering it, explain how you would protect yourself from danger.

Ans.—This question assumes a condition that a careful and competent fireboss would rarely meet. It is difficult to understand how a man, traveling in an airway where the current has a high velocity, would suddenly meet with an explosive mixture that would fill his lamp with flame, except the gas was coming from a strong feeder in the entry or was issuing from a room. It must be assumed that the man in question is traveling with the air, as otherwise the gas would be diffused in the air current, and its presence would have been detected by any good fireboss on his first entering the airway.

However, if the gas encountered was coming from a strong feeder or issuing from a room, a cautious fireboss, approaching such feeder or room and observing that he had entered a strong body of gas, would at once lower his lamp and retreat against the air, taking the precaution to shield his lamp from the force of the current. To do this he might be obliged to walk backwards holding his light in front of him to protect it as much as possible from the moving air.

Ques.—In your judgment, how often should the abandoned parts of a mine be examined?

Ans.—The frequency with which the abandoned parts of a mine should be examined will depend on their extent and character, as well as upon the amount of gas generated in them. Where there is a considerable abandoned area that is subject to constant roof falls, and the place is generating gas, daily examination should be made to ascertain its condition. Such places should be thoroughly ventilated to prevent the accumulation of large bodies of gas, which would be driven out onto the entries by a sudden fall of roof. On the other hand, a limited abandoned area that is in fairly good condition and not endangered by accumulating gas would only require an occasional examination, say once a week or as often as may be necessary to keep track of its condition.

Ques.—In making the examination of abandoned places, should you find an accumulation of explosive gas therein, what method would you adopt to remove the same or make those portions of the mine safe?

Ans.—Before attempting to remove the gas, care should be taken to ascertain that there are no men working on the return of the current. If possible, the work of removing the gas should be done after the men have left the mine. No open lights must be permitted in that section of the mine. The quantity of air passing should then be increased as much as possible. Following the air current, the men employed in performing the work should proceed with caution, making frequent tests of the air as they advance. Brattices should be erected to direct the air so as to sweep away the gas. It would be well to use as few safeties as possible, depending on electric mine lamps for light. The safety lamps should be well guarded against a rush of air caused by a possible fall of roof. The fireboss should employ only experienced men to assist him in performing the work.

COAL AND COKE NEWS

Harrisburg, Penn.

It is doubtful whether the present Liberty Bond campaign will reveal anything more remarkable than the fact that in less than the first two days of the campaign every one of the more than 16,000 employees of the Lehigh Valley Coal Co. pledged a subscription. What makes the record all the more extraordinary is the fact that this great force of employees made a 100 per cent. subscription in the preceding campaign. In singling out this company's working payroll for special commendation, there is no intention to undervalue the achievements reported by other coal corporations. Special reference is made to the Lehigh Valley because of the great number of its employees and because of their diverse nationalities, many of them being subjects of a country with which we are at war.

Charles M. Means, manager of the inspection section of the Federal Fuel Administration, states that he will put a special field inspector in the western part of the State at an early date with the object of cleaning out producers who are loading "dirty" coal.

Following a luncheon of about 30 coal jobbers of the Pittsburgh district on Oct. 1, what is known as the Pittsburgh District Coal Jobbers' Association, a branch of the National Coal Jobbers' Association, was formed and a constitution and bylaws to govern the organization were adopted. Temporary officers elected to conduct the meeting were Charles S. Bygate, president and William Carothers, secretary. The objects of the organization are to benefit and protect its members in handling coal in the Pittsburgh district as jobbers, distributors and purchasing or selling agents, to facilitate coal sales and deliveries and to improve methods of conducting trade and commerce in coal, and to encourage increased production.

Uniontown, Penn.

Fuel production records for the Connellsville regions were again advanced for the week ended Sept. 28 when the output totaled 744,842 tons. That figure is 16,528 tons above the output of the previous week and is 8221 tons in excess of the region's previous high record of Sept. 14. Had not electric power given interrupted service, there would have been no loss in coke of 4137 tons, which would have sent the weekly output past 750,000 tons. Coke shipments were 333,137 tons.

While the Baltimore & Ohio R. R. still has its car shortage in rather pronounced form, the shortage during the week was reduced to 30 per cent. The Pennsylvania system, however, is maintaining its good record, reporting placements for 100 per cent., both coal and coke. Barring unforeseen developments, that record is likely to be maintained indefinitely; at least so long as good weather prevails.

All efforts next week will be centered on the region's fall fuel drive. Eight hundred thousand tons is the total, which is 75,000 tons higher than the average for the region. The plan of the production committee is to strike a pace at 800,000 tons and maintain it until next spring. Quotas will be issued to every mine, and plant representatives of the production department will apportion an equal part of the increased output to invididual miners.

Fuel Administration officials in conjunction with transportation officials are bending every energy to provide favorable conditions next week, so that the loyal workers may be unimpeded by outside influences in their patriotic efforts to put the coke regions over the top. There is no doubt in the minds of fuel officials that the record will be reached by diligent application of the workers if those conditions can be controlled.

Charleston, W. Va.

A large loss of tonnage in the Fairmont region during the month of September has been due to execrable car service. The supply for the last week of the month was no exception. It grew worse as the week drew to an end. On Friday there were only 1418 cars in the district, and of that number only 597 had been placed in time to begin loading. The day before that there were 1500 cars, but only about 1000 were placed in time to begin loading. Friday seemed to be an extremely unlucky day for the region since a shortage of electrical power made it impossible for some of the mines to operate, and in some instances mines were forced to shut down.

The Pocahontas and Tug River districts, because of speeding up and a better car supply, produced 5797 tons more the last week in September than were produced the week preceding. In all 7337 hours were put in, the result being a total net tonnage production of 438,810. The chief cause for gratification was in the reduction of the tonnage lost through labor shortage. Tonnage lost from car shortage is now almost negligible, being only 944 tons, but mine disability caused a loss of 17,893 tons. The amount of coke manufactured was not so large as the last report showed, being only 46,946, or about 3000 tons under the previous week. Two million tons production is the goal for the Pocahontas and Tug River districts during October.

Miners in the New River district wound up the last week in September by a gain of 5568 gross tons over the previous week, the total production for the week being 154,668 gross tons. Car service in this district was about 100 per cent.

The Winding Gulf district produced 119,107 gross tons during the last week in September. The operators and miners are aroused to what is needed and with Foch's drive and the Liberty Loan drive gaining momentum, the entire personnel of the industry are determined to do their part. Measured in net tons the gain of the New River and Winding Gulf districts amounts to 23,404 net tons. In the Winding Gulf as in the New River district there is the fullest co-operation between the industry and all railroad operatives. In this particular district the car service is all that could be desired.

The Kanawha district continues its steady gain. Last week in September the total production was 217,809 tons, which represents a gain of 20,000 tons over the preceding week. The car supply was all that could be desired, the number of hours lost because of insufficient cars being 322. The total time required to get out the above tonnage was 6042 hours. The loss in time due to labor defection was only 579 hours.

Birmingham, Ala.

Greatly increased production of coal in the Birmingham district is looked for in October, with estimates of the output during the month of between 400,000 and 524,000 tons weekly, based on the efforts being made by every interest involved in the industry to bring about the largest possible output.

M. J. Sanders, director of Mississippi and Warrior River transportation, has promised that the Warrior River barge line will be in operation before Oct. 15, thus affording facilities for the moving of 20,000 tons of coal, which will be floated down the river to Mobile and New Orleans every 30 days. Within two months the system will have been so enlarged that twice that amount of coal can be transported monthly, relieving the car shortage and enabling the roads to handle an additional amount of coal to points inland.

The two seaports which are the chief consumers of bunker coal from this district, Mobile and New Orleans, report that although a great amount of bunker coal has been carried to those places by the railroads, there is still room for a further supply, and indications are that shipping interests will require a great additional supply to fill their demands during the next three months, the rush season.

There is need for coal at coke ovens in the district also. Some complaint has been heard of the quality of coke lately, as well as the quantity produced. Delay in finishing one of the largest coal washers in the district hinders production to an appreciable extent, but no remedy is available, both material and labor being scarce.

Several wagon mines in the Cahaba Valley are beginning to bring in coal in quantity, two trips a day being made by some of the wagons. Two to four and five tons of coal a day are being handled by each wagon.

Victoria, B. C.

Nichol Thompson, Fuel Controller for British Columbia, and the coal mine operators of this Province have received notice from Ottawa, Ont., that regulations providing for the more uniform distribution of coal needed for industrial uses in Canada have just been approved by the Governor-in-Council at the instance of the Canadian Fuel Controller.

They provide that all mine operators in Canada and importers of industrial coal in this country shall rotate delivery of coal among their customers in proportion to their requirement, so that no one shall at any time have advance supplies on hand while others are under-supplied.

A preference list of coal consumers is also outlined in the regulations. Those preferred consumers include railways, military and government buildings, public utilities, retail dealers and manufacturing plants chiefly engaged on war contracts. These must be given preference in supply over all other users in the order named.

Drastic provision also is made against the unnecessary hoarding of coal on the part of industrial users and heavy penalties are provided. Those whose operations required large advance stocks at the end of the present coal year must obtain special permission from the fuel administrator. Provision is made whereby mine operators and importers may require certified statements from their customers as to the tonnage of coal on hand and required for each month, so that an equal distribution may be made of all coal mined and received in Canada.

PENNSYLVANIA

Bituminous

Washington—J. W. Emery has sold to the Mingon Coal Co. the coal underlying a tract of land containing 181.876 acres belonging to Mary A. Leyda, Helen K. Leyda and Ross A. Leyda.

Pittsburgh—The Pennsylvania Bituminous Mine Inspectors Advisory Association, whose membership comprises the 30 mine inspectors, held a meeting at the Seventh Avenue Hotel, Oct. 4. The purpose of the meeting was to discuss mining matters and how they could best aid the United States Fuel Administration in keeping the coal clean and to help increase the production.

Connellsville—Edward A. McCoy, of Broad Ford, has purchased a farm of 106 acres in Lower Tyrone township with a portion of the coal underlying it, from J. Fred Kurtz and W. D. McGinnis, and has started mining operations there. The farm originally belonged to William Hay and S. Wowatski, who sold it to Messrs. Kurtz and McGinnis. The transaction with Mr. McCoy involved the sum of $8000.

New Castle—More than 1800 acres of coal and limestone land in Big Beaver township, valued at approximately $175,000, is included in a purchase made by the Crescent Portland Cement Co. of Wampum. The properties include the holdings of the Beaver Coal and Coke Co., Wampum Coal Co., Mehard-Dinsmore interests and Matthew Gunton. The new owners plan to increase the production and employ many additional men. Much of the coal mined will be used by the cement company for the operation of its plant.

Indian Head—The Melcroft Coal Co. which is opening an extensive coal field in the Indian Creek Valley, has completed 100 miners' houses and announced that it will construct 300 more in the spring. The electrical plant was started last week and the coal production has materially increased. The houses are unique in that the new mining town will not have two houses alike in design and will be painted differently in so far as the color scheme will permit. The houses are all equipped with modern conveniences and running water and light.

Indiana—The coal production of Indiana County has been greatly decreased by the epidemic of Spanish influenza which is raging in several of the mining towns near here. The Coal Run mines, where there are 450 cases of the disease and seven deaths, have been shut down entirely. Several of the officials are confined to their beds. The mines at McIntyre, Luciusboro, Fulton Run and Ernest are greatly crippled on account of so many of their men being stricken. The schools and moving picture theaters have been closed and nurses and doctors have been rushed by the state and federal governments to this county. Guards have been placed at all the towns and are enforcing strict rules as to arrival and departure of all persons.

Anthracite

Pittston—Mine workers in this vicinity are taking a prominent part in helping this district meet its quota in the Fourth Liberty Loan drive. At the Pennsylvania Coal Co. and the Hillside Coal and Iron Co. the workers have made 100 per cent. subscriptions, and similar reports are expected from employees of other mines now being canvassed.

Jeddo—Miners dropped their picks on Sept. 28 and put on exhibition some extremely large cabbage, potatoes and other vegetables at their annual war garden show. The G. B. Markle Coal Co. has given land to its employees free and has plowed it every spring. Between 15,000 and 20,000 bushels of potatoes were grown and 6000 heads of cabbage, as well as hundreds of bushels of other food products. Prizes were awarded to many of the successful amateur farmers.

Punxsutawney — Spanish influenza is wreaking havoc upon the mining town of Wishaw, six miles east of here. Nine-tenths of the population of 500 miners and their families are afflicted, 450 cases of the disease having been reported up to noon Sept. 30, and within the last few days many deaths have been reported. The only two physicians combating the disease have been stricken with the malady and have been forced to quit their work. The State Health Department has supplied physicians who have placed the town under quarantine.

Wilkes-Barre — Vice President F. M. Chase, of the Lehigh Valley Coal Co., in meeting new labor conditions by the employment of 50 young women in the office building to replace the young men who have been drafted, is now taking steps to make these young women comfortable. A rest room for the female employees is being fitted up in the office building and a professional nurse has been employed as matron and advisor for the girls. This is in line with the policy of this company in looking to the comfort and contentment of its employees, the Lehigh Valley being a pioneer in the movement for attractive colliery surroundings and better working conditions.

Shenandoah—Officials of the Philadelphia & Reading Coal and Iron Co. strongly deny that the company insisted on employees making a declaration to remain in the employ of the company at least seven years in order to secure exemption. It was pointed out that the company, in view of the fact that collieries have been crippled and production lessened by the large number of mine workers entering the service, is making every effort to secure the men necessary to keep the collieries operating at top speed, but no limit is placed on the time men shall remain in the employ of the company. Officials claim, however, that they expect men exempted because of their essential occupation to remain at work at the collieries at least for the duration of the war.

WEST VIRGINIA

Hartland—Work was started this week on the construction of a plant for the development of a tract of coal at Hartland leased by E. Fellabaum, of Charleston. Within a short time the lessor expects to have his plant in operation.

Huntington—Following a recent hurry call for coal consigned to Cincinnati, Ohio, to be sold by the Cincinnati Red Cross, 35 officials of the Lundale Coal Co., from the vice-president, general superintendent and secretary down, loaded four railroad cars with fuel before noon.

Peytonia—The Peytonia Coal Co. is about ready to begin operations at its No. 2 mine at this place in the No. 2 gas seam. By Nov. 1 the company expects to have the plant completed and to begin the shipment of coal. The mine will have an actual capacity of 200 tons per day.

Clay—With power to be supplied from a central station at Hartland, the Lima Coal Co., of Lima, Ohio, is arranging to proceed with the construction of its plant near Clay, including the erection of a tipple, many new houses, etc. Construction work will be begun at an early date. E. H. McCool will be in charge of operations.

Charleston—J. B. Hart, of the Hartland Colliery Co., has acquired a tract of 5400 acres of coal land in Kanawha County, the land being underlaid with Cedar Grove, No. 2 gas and other Kanawha seams, the newly acquired tracts adjoining the holdings of the Hartland company. Arrangements will be made to develop the property at an early date.

Fairmont—Among other improvements being made by the Chesapeake Coal Co., at its plant near here, is the installation of an electric hoist. Operations at this plant are in charge of J. J. Halcomb, superintendent.

Numerous improvements are being made at the plant of the Marion Gas Coal Co., near this city, a new water system having been installed. The company has also built a large number of new houses. J. D. Vutor is the superintendent at this plant.

ALABAMA

Bessemer—George H. Stevenson and associates, who recently acquired the Bamford coal mines located about 12 miles from Bessemer, which have been idle for some time past, have inaugurated active operations for production. A quantity of new mining machinery and equipment has been installed. The coal is of good grade, the veins running from 4 ft. to 5 ft. in thickness.

KENTUCKY

The West Virginia and Kentucky Coal Co., located on Smoot Creek, Letcher County, made its first shipment of coal on Monday, Sept. 9. This company leases from the Kentucky River Coal Corporation 1200 acres of coal, mining what is known locally as the Amburgy seam, the analysis being practically the same as the famous Elkhorn seam. The coal averages 5 ft. in thickness and is an excellent by-product coal. The town, yet to be named, consists of some 60 four-room houses, and a contract has been let for 50 more. All the houses are modern and up-to-date and modern "Sanisep" closets are installed in each house. The company starts out with shipments at the rate of 750 tons daily, which will be increased until 2000 tons per day has been reached. The officials of the company are Harry P. Jones, president; T. P. Jones, general manager; H. S. McClelland, secretary; J. B. Kennerly, treasurer.

ILLINOIS

Oglesby—Plans have been made for the temporary employment of the miners from the Oglesby Coal Co.'s plant, which was closed by an injunction secured by the Marquette Cement Manufacturing Co. For a few days the coal company asked its employees not to seek employment elsewhere, as it was believed that the injunction would only be temporary. It is hoped by the Oglesby Coal Co. that the men can secure employment in and near Oglesby, so that they will be enabled to reside there permanently.

Carlinville—Mine No. 4 of the Standard Oil Co. is being concreted. Excavations have been made 11 ft. below the coal for the concrete foundation. It will take at least 30 days to complete the work. Delays have been experienced in the arrival of the machinery, and it may be the first of the year before the hoisting engines and steel tipple are up. At Mine No. 3 the hoisting shaft is now down about 165 ft., and the material shaft is down about 60 ft. Work is progressing well on the power house and the dam.

Royalton—Twenty-three men are believed to have lost their lives in an explosion Saturday morning, Sept. 28, in the north mine of the Franklin Coal and Coke Co. Six bodies have been recovered. Rescue crews found it impossible to reach the portion of the mine where the others are supposed to have been at the time of the explosion, and the mine has been sealed to extinguish the fire. Among those who perished were Superintendent A. E. Capstick, Manager Theodore Helm, Pit Boss A. A. Capstick, Assistant Bosses Tony Heberer, Grover Capps and Harry McLaughlin, and Examiners William Ditterline, D. Alvis, Jettie Harris and J. Bothman. Fire was discovered in the mine by a watchman at 1 a. m. He gave the alarm and the officials and a number of miners went below. They were closing up entries, at 5 a. m., in an effort to confine the fire, when there was an explosion. A dozen men working near the shaft escaped. A rescue team arrived in a short time from Benton and by using smoke helmets were able to reach the bottom of the shaft; but it was 11 o'clock before the first bodies were found. Several hundred men are employed in the mine. Four years ago there was an explosion in the same mine which killed 52 men.

MISSOURI

Macon—The electrical equipment of the new mine of the Home Coal Co. has been installed and the mine will soon be ready for operation.

OKLAHOMA

Poteau—After being shut down for two months to enable the making of repairs, the mine of the Columbia Coal Mining Co., at Witteville, recently resumed operations with a force of 50 men.

Personals

J. I. Boyd on Oct. 1 resigned as purchasing agent of the United Coal Corporation, Pittsburgh, Penn.

W. C. Dodson of Paris, Ky., has taken charge of the Raymond Coal Co., having recently been appointed as manager.

Horace N. Trumbull, advertising manager of the SKF Ball Bearing Co., of Hartford, Conn., has entered the Reserve Officers' Training Camp at New Haven, Conn.

H. C. Steffey, of Akron, Ohio, has been appointed chief clerk to the general superintendent of the United Coal Corporation, with headquarters in the First National Bank Building, Pittsburgh, Penn., to succeed W. W. Oillett, promoted.

George A. Cokely, of Homer City, Penn., who was recently mentioned in these columns as having resigned his position as superintendent of the Tide Coal Mining Co., is still engaged in that capacity with the Tide Coal company. The announcement of his resignation was an error.

W. W. Oillett has been promoted from the position of chief clerk to the general superintendent of the United Coal Corporation, Pittsburgh, Penn., to the position of purchasing agent, succeeding J. I. Boyd, resigned. Mr. Gillett's headquarters will be in the First National Bank Building, Pittsburgh, Penn.

A. C. Emery having resigned as general purchasing agent of Thomas A. Edison, Inc., Orange, N. J., in order to devote his entire time to the Edison International Corporation, **William Dykeman** has, effective Oct. 1, been promoted and will assume the duties of general purchasing agent for the Thomas A. Edison industries.

Robert C. Byler, for nearly four years advertising production man for the SKF Ball Bearing Co., of Hartford, Conn., has been appointed advertising manager of the SKF Administrative Co., of New York City, and will direct the advertising of the SKF Ball Bearing Co., of Hartford the Hess-Bright Manufacturing Co., of Philadelphia, and the Atlas Ball Co., of the same city, all of which are controlled by the SKF Administrative Company.

George Watkins Evans, of Seattle, Wash., has been named a member of the Alaskan Engineering Commission. Mr. Evans is a well known coal-mining engineer, having specialized in that line of work for more than ten years in the Northwest. He has been the Government's representative in that field when investigations were first made of Alaskan coal, and supervised the getting out of the first test lots of the Bering River field for the Navy. In 1906 he surveyed the same field for the Guggenheims, and in 1913 surveyed the Matanuska field. He is the author of several books on coal mining and has been consulting engineer for many of the large coal operators of Washington, Canada and Alaska.

Obituary

Milton M. Baldwell, 44 years of age, who had for several years been connected with the Byrne & Speed Coal Co., of Louisville, Ky., and the Beaver Dam Coal Co., at Beaver Dam, Ky., died at his home in the latter city on Sept. 25.

William H. Bowser, 70 years old, member of the Bowser & Browning Coal Co., of Louisville, Ky., dropped dead of heart disease while standing on the rear platform of a Sixth St. car at Fifth and Main Sts., on Sept. 25. Mr. Bowser and George Avery Browning had been in the coal business at 136 South Sixth St. for a number of years, and at one time were large river coal handlers.

Trade Catalogs

U. S. G. Co.'s Graphite Products. United States Graphite Co., Saginaw, Mich. General Catalog No. 20. Pp. 64, 5½ x 8½ in., illustrated. Contains detailed information relative to lubricating graphite, greases, paints, etc. A group of photomicrographs and an interesting report of an exhaustive test made by the chief engineer of the Interborough Rapid Transit Co. of New York, are also included.

Type FK-20 Oil Circuit Breakers for Industrial Service. General Electric Co., Schenectady, N. Y. Bulletin 47,433. Pp. 16; 8 x 10½ in.; illustrated. The circuit breakers described and illustrated run up to 300 amp. and 2500 volts, and are intended primarily for use with induction motors in industrial applications. Under proper supervision they may be used in coal mines.

Industrial News

Sunbury, Penn.—The Anthracite Briquetting Co. has filed notice of an increase in its capitalization from $5000 to $150,000, the proceeds to be used, it is understood, for extensions.

Bristol, Va.—The Powell River Co. is said to be considering plans for the installation of a quantity of new mining machinery to practically double the present output of the plant.

New York, N. Y.—The Inter-City Fuel Co. has been incorporated with a capital of $200,00 to deal in fuel. T. L. and W. D. Eyre and J. H. Cullen, 350 Riverside Drive, are the incorporators.

Manchester, Ky.—The Manchester Coal Co. has filed articles of incorporation with a capital of $40,000 to operate coal properties in the Manchester district. Henry Miller, J. W. Lamb and C. W. White are the incorporators.

Ardmore, Okla.—The East Ardmore Coal Co. has filed articles of incorporation with a capital of $90,000 to develop coal properties in the East Ardmore section. J. T. Marrs, J. W. Weeks and W. S. Smith are the incorporators.

Manchester, Ky.—The Bruner Coal Co., recently incorporated, has perfected its organization plans and will commence operations at once on the development of 36 acres of coal lands near Manchester. G. B. Bruner is president.

Clarksville, Tenn.—The Clarksville Ice and Coal Co. has installed a two-ton Autocar equipped with automatic dumping device, for use in its coal department exclusively. This is the first coal truck placed in service in Clarksville.

Evarts, Ky.—The Upper Harlan Coal Co., of Harlan, which recently filed notice of an increase in its capital from $60,000 to $100,000, is planning for the immediate development of about 230 acres of coal properties in the Evarts district.

Charleston, W. Va.—Coal will be mined on Campbells Creek by J. T. Lightner, who is erecting a plant in connection with a mine he is opening where coal will be taken from the Coalburg seam. This new mine will be in operation by Oct. 10.

Wayne, West Va.—The Burke Coal Co., a Cincinnati concern, will operate in Wayne County on a small scale. This company was organized with a capital of $25,000 by A. J. Roberts, U. S. G. Anderson, Kyle Smith, F. C. Gruble and G. Earl.

Buffalo, N. Y.—Eugene J. Henry, formerly Lehigh Valley lake agent at Chicago, has been appointed government supervisor of the Lehigh Valley coal and package freight lake line and lake-and-rail business at eastern lake ports, with headquarters here.

Philadelphia, Penn.—The Fernwood Coal Co. has been incorporated under Delaware laws with a capital of $200,000 to engage in general coal-mining operations. F. B. Hansell, Philadelphia; J. V. Pimm and S. C. Seymour, Camden, N. J., are the incorporators.

Birmingham, Ala.—The DeBardeleben Coal Co. will move its main offices to Sipsey, Ala., where its mines are located. The Empire Coal Co. will also have its head offices at Empire, Ala., where its mines and coke ovens are in operation. Both of these companies have heretofore maintained their general offices in Birmingham.

Wurtland, Ky.—The Wurtland Coal Co. has been incorporated with a capital of $25,000 to operate coal properties in the vicinity of Wurtland. Wayne Calvin, Wurtland, A. F. Lamaster and G. Washington, Russell, Ky., are the principal incorporators.

Big Stone Gap, Va.—The Liberty Coal and Coke Co. has been incorporated with a capital of $1,200,000 to engage in coal-mining operations in the Big Stone Gap district. S. Thurston Dallard and A. C. Stith, both of Louisville, Ky., are the principal incorporators.

Harrisburg, Penn.—Announcement has been made by the Gamble Briquette Co. that a new size of briquette coal has been evolved by its experts, suitable for use in basket grates. The company's products have been in great demand due to the present scarcity of coal.

Pennington, Va.—The Penn-Lee Coal Co., recently incorporated with a capital of $90,000, is planning to commence operations at once on the development of about 125 acres of coal properties in the Pennington Gap section to have a capacity of about 250 tons daily.

Beckley, W. Va.—Progress is being made on the construction of a plant by the Ingram Branch Coal Co. on the Virginian Ry. in Raleigh County for the development of a tract of 3200 acres under lease. C. H. Mead of this city is one of those largely interested in the company.

Pittsburgh, Penn.—The Pittsburgh Coal Co. has disposed of a tract of about 17 acres of property fronting on the Monongahela River at Dravosburg and extending back to Washington Road to the National Tube Co., Pittsburgh, for a consideration said to be in the neighborhood of $100,000.

Fairmont, W. Va.—Operations in Monongalia County on a large scale will be undertaken by the Diamond Coal Co., of Fairmont, which has been organized with a capital of $200,000. Identified with the new corporation are: A. P. Brady, Warder Cresson, W. E. Engle, Henry M. Schrader and H. W. Showalter.

Charleston, W. Va.—The Buffalo-Kanawha Coal Co., recently organized, is planning to commence operations at an early date on the development of approximately 750 acres of coal properties in the Malden district, to have an initial capacity of 200 tons daily. J. W. Johnson is president; G. A. Corson is vice-president.

Morgantown, W. Va.—The Scott's Run Coal Operators' Association, composed of owners of mines in Monongalia County, has taken up the question of an excessive arbitrary freight rate charged on all coal loaded by mines located on the Morgantown & Wheeling Ry. and a committee of seven operators has been appointed to handle this matter.

New York, N. Y.—Exports of coal through the Port of New York during the month of August amounted to 10,460 tons of anthracite, valued at $72,264; 10,149 tons of butuminous, valued at $72,612; and 333 tons of coke, valued at $9032. Of the anthracite, 65,845 tons went to Canada, and of the bituminous, 65,578 tons went to Brazil.

Fairmont, W. Va.—The Dawson-Connellsville Collieries Co. has been formed to take over certain coal lands already under development. The company will carry on operations not only in Marion County but elsewhere in the state, having been capitalized at $120,000 by Carl Riggs, G. C. Wedding, W. M. Kennedy, E. F. Hartley and H. H. Rose.

New York, N. Y.—State Fuel Administrator Cooke has announced the appointment of H. E. Willer as manager of bituminous distribution for the State of New York, and the appointment of D. T. Davis, of Davis, Symmes & Schreiber, 55 Liberty St., as counsel for the State Administration. Mr. Willer succeeds Ellery B. Gordon, who resigned.

Dallas, Tex.—Lignite production and consumption will be given marked impetus in Texas by the reduced freight rates granted for this commodity, as asked by the lignite producers some time ago., Texas produces much lignite which is being used for fuel in the boilers of many industries, such as electric light plants, cotton gins, oil mills, cotton compresses, etc.

Louisville, Ky.—The Smith-Gardner Co., of Louisville, Ky., which up to the present time has been doing a purchasing or jobbing business, is entering the producing field, having recently secured mining property, which is being developed in the Straight Creek field near Pineville, Ky. The company expects to start shipments in 30 days with an initial output of about three cars.

Denver, Colo.—Colorado's coal production for the first seven months of 1918 exceeded by 394,559 tons the production for the corresponding period of last year, the total amount from all the mines of the state up to Aug. 1, 1918, being 8,649,467 tons. The latest report shows that in August 1,124,067 tons were produced from the 222 mines in operation, with 13,867 men employed.

Fairmont, W. Va.—Team track loaders of the Fairmont section will soon have an adequate car supply if plans now under consideration mature, as they are expected to. The plan is to change the zone for shipments of box car coal to permit shipment to be made to points in Ohio, Indiana and Pennsylvania. This will permit the loading of empty box cars being returned to the west for shipments of foodstuffs to the eastern ports.

Monterey, Tenn.—The Tennessee Coal Co., recently incorporated with a capital of $100,000, has perfected its organization, and has had plans completed for the immediate development of approximately 2500 acres of coal property in the vicinity of Monterey, to have an initial capacity of about 15 carloads daily. The company has already purchased the entire mining equipment for operation. M. M. Whittaker is president and manager.

Charleston, W. Va.—Fifty thousand dollars will be expended by the Columbia Coal Co. of Charleston, in the development of a bed of coal in Malden District of Kanawha County. The company has an authorized capital of $90,000, having been organized by Charles A. Smith, Herbert Hannigan, S. G. Smith, R. M. Fountain and C. H. Hetzel, all of Charleston. The new company will take coal from the No. 2 gas seam on Campbell's Creek. Permission to install a siding has been granted.

Toledo, Ohio—Considerable activity was shown during the week ending Sept. 28 at the Toledo docks, showing a good movement of coal from Ohio and West Virginia mines to the Northwest. During the week the Toledo & Ohio Central docks loaded 85,000 tons as compared with 73,000 tons during the previous week, making a total of 1,607,000 tons for the season. The Hocking Valley docks loaded 200,638 tons as compared with 190,333 tons the previous week, making a total of 3,687,679 tons for the season.

Springfield, Ill.—The annual report of Evan John, director of the state department of mines and minerals, shows that coal production in Illinois increased 10,995,982 tons in the fiscal year of 1918 as compared with the next previous year. The report shows that a total of 967 coal mines in Illinois produced 89,979,469 tons of coal as compared with 78,933,487 in 1917. The figures are compiled from 370 shipping mines in the state and 597 local mines. A total of 91,372 men were employed in Illinois as compared with 80,893 in the previous year.

Oklahoma City, Okla.—The work of appraising the Indian lands in the Choctaw and Chickasaw Nations of Oklahoma has been completed, and these lands will be offered for sale during October. These lands lie in Pittsburg, Pushmataha, LeFlore, Latimer, Coal, Haskell, Murray, Garvin and Grady counties, and amount to approximately 14,400 acres, of which 6700 acres constitute the surface of unallotted coal and asphalt lands. These coal lands are underlaid with some of the richest coal veins in Oklahoma, as yet wholly undeveloped. All coal and asphalt under the lands of the segregated area is not to be sold with the surface, but is reserved by the Government. All other tracts will be sold without reservation.

New York, N. Y.—Among the contributors to the coal trade allotment to the Fourth Liberty Loan are: Pennsylvania Coal Co. and the Hillside Coal Co., $1,200,000; Madeira, Hill & Co., $160,000; Pennsylvania Coal and Coke Corporation, $110,000; F. A. Potts & Co., $50,000; Lehigh Valley Coal Co., $50,000; Willard, Sutherland & Co., $40,000; Thorne, Neale & Co., $30,000; Burns Bros., $100,000; Mill Creek Coal Co., $60,000; M. F. Burns, $25,000; Vinton Collieries Co., $60,000. Delaware, Lackawanna & Western Coal Co., $1,000,000; Lehigh Valley Coal Sales Co., $1,000,000; Pennsylvania Coal Co., $300,000; Hillside Coal and Iron Co., $100,000; Joseph B. Dickson, $65,000; Jesse L. Eddy, $65,000; Price-Pancoast Coal Co., $60,000, and West End Colliery Co., $60,000.

MARKET DEPARTMENT

Weekly Review

Coal Industry Now on War Basis—With All Demands Known, Fuel Administration Calls for Definite Tonnages of Anthracite and Bituminous—Domestic Demand Urgent, While Bottom Has Dropped Out of Market for Steam Sizes of Anthracite

NO RED-BLOODED American can read of the heroic exploits of our soldier lads across the sea without a thrill of pride. Only yesterday, as it were, a people devoted to peace and following peaceful pursuits, we have converted our plowshares into battle-axes and demonstrated to the disciples of *Kultur* that the spirit of a free nation can surmount all obstacles when it is actuated by high ideals.

To the end that humankind shall continue down the ages unfettered and unshackled, the coal mining industry, in common with other fields of endeavor, has been placed on a war basis. No longer will it be possible for slackers in the mining ranks to lay down on their jobs. The Production Department of the Federal Fuel Administration has divided the coal producing facilities of the country in such a manner that not even one single individual embraced therein will escape questioning if he fails to account for the full measure of the task allotted him.

That a maximum production of coal is an important factor in the war program is a matter of universal knowledge. The necessity for an enlarged supply of bituminous coal is particularly pressing. The Fuel Administration is no longer concerned about the coal situation except as it affects the output of iron and steel needed for munitions and other war purposes. It is either shells or human lives, the lives of our boys at the firing line, and the output required of the soft coal mines between now and Mar. 31, 1919, is 12,234,000 net tons a week. If this average tonnage can be maintained for the next five months, the bunker, naval and other oversea requirements will be met. For the week ended Sept. 28 (the latest statistics available) the production of soft coal was 700,000 tons above the average mentioned, as the total quantity mined during that week was 13,043 000 net tons.

The anthracite mines, too, have been asked to increase production, because of the expanding war program of the nation and to assure adequate supplies of fuel for American industries and American homes. The hard-coal mines are called on to furnish 2,030,000 net tons a week for the next five months. With a shortage of labor already existing in the anthracite regions, it will require strenuous efforts on the part of those engaged in this branch of the industry to meet the call. For the week ended Sept 28 the production of anthracite is estimated at 2,071,000 net tons, which is also well above the quantity demanded.

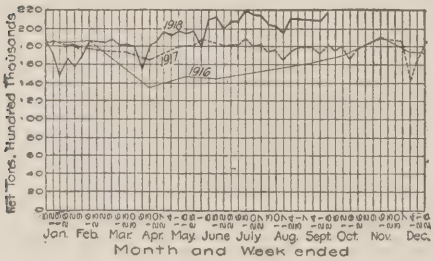
Market conditions, insofar as domestic demand is concerned, are active. The coming of colder weather has witnessed an urgent demand for fuel from household consumers. The influenza epidemic, too, has been responsible for the starting of fires in many homes much earlier than usual, and dealers are being besieged by consumers whose bins are bare of coal. The stove and chestnut sizes of anthracite are in strong demand, and calls for egg coal are also becoming more frequent. The outstanding feature of the market is the collapse in the demand for the steam sizes of anthracite, and several washeries are reported as about to close down for lack of orders.

Cities located near the mines, such as New York and Philadelphia, for example, are receiving only light shipments of anthracite, as a concentrated effort is being made to take care of the outlying sections before winter ties up transportation facilities. Fuel administrators are hopeful, however, that by December every home will have some coal, and dealers in many localities have been notified not to deliver any more coal to those who already have a supply.

It has been definitely decided that the Great Lakes shipping season will be held open until the last possible moment this year, and operators who were rather pessimistic over the outlook for the northwest are now more optimistic. The lake shipments for the season to Oct. 1 are roughly 800,000 to 850,000 tons behind schedule.

WEEKLY COAL PRODUCTION

Bituminous coal production during the week ended Sept. 28 not only exceeded 13,000,000 net tons but also records the third successive week of increased production. The output during the current week (including lignite, and coal made into coke) is estimated at 13,043,000 net tons, an increase over the week preceding of 325,000 net tons or 2.5 per cent., and over the corresponding period of 1917 of 1,863,000 net tons, or 16.7 per cent. The average production per working day, during the week of Sept. 28, is estimated at 2,174.000 net tons, 9 per cent. in excess of the average daily production for the coal year to date and 6.7



per cent. in excess of the average daily requirements during the balance of the coal year to make up the deficit.

During the past six summer months, or the first half of the coal year, production of bituminous coal is estimated at 311,216,000 net tons. This output, which is 33,418,000 net tons, or 12 per cent. in excess of the production during the same period of 1917, falls short of requirements during the current year to date by 10,897,000 net tons, or 3.4 per cent., the increase in requirements this period over the output for the same period last year amounting to 44,315,000 net tons, or approximately 16 per cent.

The production of anthracite in the United States during the week ended Sept. 28 is estimated at 2,071,000 net tons, an increase over the week preceding of 224,000 net tons, or 12.1 per cent., and over the corresponding week of last year of 65,000 net tons, or 3.2 per cent. The average daily production during the current week is estimated at 345,000 net tons as against 338,000 net tons during the coal year to date and as compared with 330.000 net tons during the same period of 1917. Total production from Apr. 1 to Sept. 28 is estimated at 51.651,000 net tons, an increase over 1917 of 1,072,000 net tons, or 2.1 per cent.

Carrier's reports show increased shipments from all districts during the week ended Sept. 28, compared with the week preceding, with the exception of the districts including Cumberland, Piedmont and Somerset, and Tennessee and Kentucky. The decrease in the Cumberland, Piedmont and Somerset district was slight, while Tennessee and Kentucky shipments declined 3.5 per cent. Material improvement occurred in central Pennsylvania, where shipments increased 1653 cars, or 4.5 per cent.; in Northeastern Kentucky and the high volatile and smokeless fields of West Virginia, where shipments increased 927 cars, or 3.2 per cent.; in the district including Illinois, Indiana and western Kentucky, where shipments increased 1955 carloads, or 3.8 per cent.; and the district including Iowa, Texas and Southwest States, where shipments increased 656 carloads, or 4.6 per cent.

Bituminous coal dumped at lake ports (including vessel fuel) during the week ended Sept. 28 is estimated at 1,200.672 net tons, an increase over the preceding week of 7.8 per cent. Compared with the weekly average of the months of July, August and September, the current week's shipments show a gain of 11.7 per cent.

New England shipments of bituminous coal fell considerably during the week ended Sept. 28. Estimates place the total of bituminous coal to New England during this week at 450.766 net tons, a decrease compared with the week preceding of 14.2 per cent. Of this total, rail receipts through the gateways declined 7.1 per cent. compared with the week preceding, the total tidewater shipments 18.1 per cent. A considerable decrease occurred in shipments from all harbors, New York and Philadelphia falling behind 14.8 per cent., Baltimore 9.8 per cent. and Hampton Roads 22.6 per cent. Shipments by rail and from each harbor also fell considerably behind the weekly average during the coal year to date.

Shipments of bituminous coal from tidewater harbors, during the week ended Saturday morning, Sept. 28, are estimated at 916,793 net tons, an increase over the week preceding of 1.8 per cent. All North Atlantic harbors report improvement in the week's shipments, the New York and Philadelphia increase amounting to 4.4 per cent. and the Baltimore increase to 13.8 per cent. Shipments from Hampton Roads declined slightly—1 per cent. Shipments during the week from each harbor also exceeded the weekly average for the coal year to date.

Beehive Coke—Production of beehive coke in the United States during the week ended Sept. 28 was approximately the same as that reported in the week preceding. Preliminary estimates place production during this week at 612,000 net tons as against 614,000 net tons for the week of Sept. 21, the average daily production during each of the two weeks amounting to 102,000 net tons. The operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania report production during the week ended Sept. 28 at 383,746 net tons, and the operation of their plants at 76.4 per cent. of their full time as against 76.7 per cent. during the week preceding. Operating conditions varied but slightly during the week, yard labor shortage, as in preceding weeks, being the factor which liimted production.

CARLOADS OF COAL ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended Sept. 7	Sept. 14	Sept. 21	Sept. 28
Bituminois shipments, 123 roads	195,367	223,131	223,981*	230,251†
Anthracite shipments, 9 roads	32,234	40,699	36,859	40,524

*Revised from last report. †Subject to revision.

BUSINESS OPINIONS

Marshall Field & Co.—Current wholesale distribution of dry goods is running well ahead of the heavy shipments of the same week in 1917. The volume of road sales for immediate and spring delivery is in excess of the corresponding week of last year. A smaller number of customers was in the market. Collections continue excellent.

Dry Goods Economist—Reports from various sections are to the effect that in department stores the demand for seasonable goods continues good. Collections are excellent and money appears plentiful despite the demand caused by the drive for the Fourth Liberty Loan. Labor appears

more free from unrest due, undoubtedly, to the feeling that the forthcoming draft of young men and those above 31 years old raises questions that must take precedence over all others affecting the working man for the time being.

The Iron Age—Steel output in September with two days less has exceeded that of August. A marked improvement in the quality of coke is reported and some headway is thus being made on the pledge of the trade to increase output 10 per cent. The Carnegie Steel Co. maintained this week its 92 per cent. of furnace capacity in blast last week and its rate of ingot production was 97.8 per cent. against 97.5 per cent. for the previous week. The industry enters October, always a good month, under generally auspicious conditions.

American Wool and Cotton Reporter—The Government has taken up the matter of procuring wool from Australia as the raw material from that market is to be obtained only through negotiation with the British Government. The influenza epidemic has had its effect on the cotton mills, 1600 looms out of 6000 having stopped operations at the Tremont and Suffolk mills because of this disease. Perhaps the one thing of note which has taken place in cotton goods during the past week has been the willingness of manufacturers and merchants to take some business following the announcements that there would be no further determination of prices until Nov. 16.

Bradstreet's—Government work, further adjustments of industry to war-time needs, and the Liberty Loan drive overshadows everything else, but in between these activities a large volume of business on domestic account is passing, three-fourths of the country being supremely active, and, in addition, the glowing news from the war fronts has evoked attention in stock market circles. In the east, however, activities flowing out of the campaign to make the Fourth Liberty Loan preëminently successful have produced a tendency to economize, which hampers business to some extent, while the ravages of influenza have held up trading in important sections of New England, as well as operations at many eastern shipyards and factories.

Atlantic Seaboard

BOSTON

While receipts continue to sag, New England is taking account of stock. Situation easy as to current needs but anxiety over future supplies is evident. Meanwhile buyers show no disposition to order box cars to the extent that might be supposed. The same consignees are most solicitious lest shipments be discontinued through ordinary trade channels. Influenza epidemic spreads to central Pennsylvania. Steel program dominates all other requirements except for bunker and naval use. Hampton Roads situation shows no improvement. The calls of Pocahontas coal moves to other markets. No redress as yet for shippers whose transportation arrangements have to be made in advance of receipts at the piers. Shipments from Baltimore and Philadelphia considerably reduced. Movement on New York's ports not much increased. Connecticut plants better stocked than 30 days ago. Anthracite shows little change. Too early yet to make comment on "free anthracite" shipped to Mr. Storrow's order.

Bituminous—It can now be said that New England industries have practically four months' supply in reserve, although some of the railroads and other large utilities would not make so favorable a showing. The schedule for all-rail shipments has been pretty well maintained as any examination of the figures will disclose. To Oct. 1 actual receipts through the five New England gateways were close to 5,600,000 tons, or about 400,000 tons less than the 60 per cent of the 10,000,000 tons that were to be moved in this direction between Apr. 1 and Oct. 1. By water the receipts have been considerably in arrears. The program called for around 12,000,000 tons for the six months, but actual deliveries were less than 9,000,000. The first half-year closed therefore with a shortage of something over 3,000,000 tons as compared with schedule.

The prospect therefore for shipments from central Pennsylvania the next few months becomes of especial interest; 83.5 per cent. of total all-rail deliveries to New England were scheduled to come from that one district and a brief analysis of receipts from that quarter now has a bearing on the supply available later on. The following table shows how evenly shipments all-rail from central Pennsylvania (wagon-coal not included) have kept up, comparing the week ended July 27 with that ended on Sept. 21:

No. of cars	July 27	Sept. 21
New England railroads..	1130	1361
New England commercial	2506	2308
Total	3636	3669

This, then, for New England is an encouraging showing. During September largely increased requisitions were made for byproduct use, to some extent in central Pensylvania, and yet the movement keeps up with fair regularity. The sag is apparent in other districts, but so far as central Pennsylvania is concerned this tertory has less occasion to worry.

Undeniably the situation is easy here as to current needs. Practically all the industries and power plants are well stocked, and to such extent is this true that buyers are getting particular about quality and the way in which deliveries are made. Among larger buyers, especially those more dependent upon water-borne coal, there is anxiety over future shipments, but yet not enough to make them eager to take what wagon-coal, for instance, is now offering. The 75c. extra for closed equipment is enough to turn the scale.

At Hampton Roads there are still serious cases of over-detention to bottoms waiting for coal for New England. There are today barges which have been two weeks awaiting coal, and meanwhile Government requirements are of course being supplied from day to day. Pocahontas coal, largely because of its low price, is moving very largely to byproduct plants and for coking purposes, while New River is practically free for Government, bunker and for commercial use in New England. For the Pocahontas transshipper who is obliged to arrange for his water transportation considerably in advance there is no redress when his coal is ordered away to other markets. He simply waits patiently for more of his coal to reach the piers, pays the demurrage and either hopes or expects the ultimate consignee eventually to make good the extra expense.

Shipments from Baltimore and from Philadelphia have sloped off to such extent that movement to those piers has been curtailed quite radically. So little coal has been dumped at the Philadelphia piers of late that coal trains have actually been stored in transit on account of yard accumulation. One effect has been a discontinuance of shipments from the mines to that quarter.

Another change is noted in Mr. Storrow's staff at the State House. G. G. Wolkins, who has been bituminous distributor all-rail since Jan. 4, has now returned to his regular work with Hanson & Parker, Ltd., who had given his services. Mr. Wolkins was expecting to continue his efforts through the coming winter, but the New England Fuel Administrator considered it suitable to assign the work to someone else. This change, following so closely on the similar experience of Augustus S. Cobb, who organized for Mr. Storrow the conservation department for New England, has caused comment in the trade. Mr. Cobb was promptly invited to Washington to take charge of the same work for the whole country that previously he had charge of only in New England.

Anthracite—There is little change in the situation on domestic sizes. Shipments are disappointing and retailers grow restive as the season advances. In many towns there are hundreds and thousands of orders on file from householders who have not yet had deliveries of any kind. It is likely that there will be some serious situations to deal with when cold weather sets in.

It is too early yet to comment on the distribution of "Storrow anthracite" which is now coming forward. The fuel authorities who are supervising this distribution certainly have their hands full.

PHILADELPHIA

Anthracite demand heavy due to weather and grip epidemic. Shipments moderate. Improvement promised this month, but dealers doubtful. Yard labor problem grows more serious. New conservation measures effective. No decision on wage problem. Steam coal market slows down. Bituminous up to average of past month or two. Coal well distributed.

Anthracite—Practically all householders got their fires under way this week due to some chilly days which made a little warmth comfortable. Also due to the influenza epidemic, most people who from measures of economy even delay this act until much later in the season, called upon their dealers for at least sufficient coal to get their furnaces going. The fuel administration in order to meet this situation made a ruling that any home where there was a case of the sickness should be served immediately with fuel. However, this extra use of coal was more than offset by the closing of all the schools, theaters, churches and all places given over to public gatherings. Unfortunately, the shipments continue somewhat light locally, although there are a number of the larger dealers who have quite a stock; but every cold day brings hurried calls for it. Stove and chestnut are, as always, in very active demand, with egg also showing considerable life recently. Pea coal is easier than for some time, although the demand during the past few days has been greatly increased.

In the way of shipments it can be said that the largest company shipped less coal to this market during September than any month this year. It is understood that in the same period it increased its shipments to New England almost 100 per cent. and the southern territory, particularly Baltimore and Washington, fared almost as well. This, together with several cold days, made the first week of the current month one of turmoil for both the shipper and dealer. To offset the unfavorable shipping conditions of this company, another of the larger shippers seemed to turn its attention to this market, and for five days shipped as much coal here each day as it had shipped during any one week for several months. This materially helped the situation.

The dealers in the suburbs are promised heavy shipments during October, but at this writing the dealers in the city proper do not know what to expect. It is estimated, however, that real substantial shipments to the rail yards are not to be looked for before November or perhaps December. It is apparently the intention of shippers to complete all obligations to the water yards first.

Probably the outstanding feature of the present market is the collapse in the demand for steam sizes. Commencing with No. 1 buckwheat, on which the Pennsylvania Fuel Administrator some days ago removed for the period of 30 days the necessity for securing exemption orders, down to culm, the demand is less active than for many months. As a representative of one of the large interests here expresses it, buckwheat and rice are free, barley is dead and culm is not salable.. It is understood that several washeries are about to close down for want of orders. The heavier receipts of bituminous have had their effect, also the fact that little has so far been used in the hotels, apartment houses, department stores and office buildings.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken.....	$4.90	$6.25	Buckwheat..	$3.40	$4.45
Egg.....	4.80	6.15	Rice.....	2.90	3.80
Stove.....	5.05	6.40	Boiler.....	2.70	3.70
Nut.....	5.15	6.50	Barley.....	2.40	3.30
Pea.....	3.75	5.00	Culm.....	1.25	2.15

Bituminous—A fair tonnage has been reaching here for the past ten days or two weeks, but it is generally conceded this is much less than the quantity necessary to maintain the plants throughout the coming winter. One thing is certain, however, and that is the tonnage has never been more equitably distributed. The big users, including all utility plants, many of whom have 60 day's supply, are completely shut off for the time being, while the small plants are beginning to exhibit appreciable stocks.

Car supply continues to range between 40 per cent and 65 per cent of working capacity of the mines, with rail movement good, as coal is prompt in reaching market after it is consigned. Shippers continue to urge on rail interests the necessity for a better car allotment, but there still exists a wide variance of opinion between the two as to the necessity.

The trade is still considerably interested in the investigations being made by the administration as to the irregularities in price charged against some of the brokerage houses. With the fining of several recently there are rumors of still other important cases pending.

NEW YORK

Lack of supplies chief complaint of dealers. Dumpings at the local docks show decrease. The trade gets broken coal instead of egg, but do no grumbling. Small sizes become burden and indications point to pooling of these coals. Bituminous situation improves and is in good shape. Bunker coals increase is supply.

Anthracite—Continued lack of supplies is causing much trouble in trade circles.

Dealers here are being hounded for coal, but their only answer lies in the slowness with which shipments are coming to this market. The reports of increased production and shipments do not give much encouragement to the trade here, inasmuch as the Anthracite Committee has recently discontinued deliveries to various communities throughout New England and in this state, indicating that coal has been sent to these places in good volume. Not much consolation can be found in the reports of dumpings at the local docks, which have been showing a gradual decrease week by week and month by month. For the week ending Oct. 4 the cars dumped were 6557, while for the previous week they were 6727. There is therefore a decrease of 170 cars, quite a deficiency when one considers the season of the year. For last month the dumpings were 27,944 cars as compared with 32,494 cars in August, 31,284 cars in July and 30,719 cars in June.

It is likely that the market is still feeling the effects of the suspension in the anthracite fields during the week ending Sept. 21, which resulted in a loss of 11.3 per cent. in production, or 1,847,000 tons produced as compared with 2,088,000 tons the previous week.

There is a steady demand here for all domestic coals. Recently there has been much broken coal sent to dealers who have asked for egg, and most buyers have been asked to take a portion of their shipment in the smaller sizes. This has naturally burdened the retailers with an over-abundance of these sizes, which it is difficult for them to dispose of unless they are able to secure bituminous to sell at the same time.

Some of the docks have been over-stocked with buckwheat and the smaller sizes, with the result that embargoes have been issued several independent producers and shippers. There is a movement on foot to provide for the storing and pooling of these coals, the one obstacle to prevent it being the mixing of the good and bad grades.

Mayor Hylan proposes to have the police repeat their work of last winter by making a house to house canvass for the purpose of obtaining first-hand information as to the amount of coal on hand. This canvass is not to be made until after the finish of the present Liberty Loan Drive.

The State Fuel Administration has fixed the allotment of anthracite for Greater New York at approximately 8,000,000 tons of sizes between broken and pea, inclusive; a trifle over 11 per cent. over the shipments of these sizes in the coal year 1916-1917.

The Brooklyn retail dealers are considering the advisability of inducing customers to have their coal dumped on the sidewalks, the customer to put it into the bins and to receive a reduction of 35c. per ton from the present retail prices. The dealers complain of a lack of help and say they would be enabled to deliver much more coal than at present.

Current quotations, per gross ton, f.o.b. tidewater, at the lower ports are as follows:

Circular	Individual	Circular	Individual
Broken..$6.75	$7.50	Buck.. $5.10	$5.90
Egg.... 6.65	7.40	Rice.... 4.65	5.10
Stove... 6.90	7.65	Barley.. 4.15	4.30
Chestnut 7.00	7.75	Boiler.. 4.60	
Pea... 5.50	6.25		

Bituminous—The situation is better than for many weeks. More coal is available and the trade appears to be on easy street. While the local dumpings for the week ending Oct. 4 amounted to only 6666 cars as against 7059 cars the previous week, the demand was not as heavy, due to the fact that shipments to non-essential industrials have been curtailed if not altogether suspended. For the month of September the dumpings were 30,440 cars as against 31,297 for August, 30,372 for July and 31,129 for June.

There has been an increase in bunker coal production, with the result that vessels are being more rapidly coaled and the near-shortage of these coals has disappeared.

Current quotations, based on Government prices at the mines, net ton, f.o.b., tidewater, at the lower ports, are as follows:

	Mine Gross	F.o.b. N. Y. Gross
Central Pennsylvania:		
Mine-Run, prepared or slack...	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of Mine	3.08	5.23
Prepared	3.36	5.51
Slack	2.80	4.95

Quotations at the upper ports are 5c. higher.

BALTIMORE

Continued liberal supply of bituminous here encourages more consumers to take only open-top cars, the result being box-car orders are frequently much over-filled in order to clean up. Hard-coal situation so acute here that Washington decides to make an investigation.

Bituminous—A liberal flow of soft coal is coming in, but much of it cannot be classed as desirable. This easy movement has made the entire market a little soft, with the result that a number of consumers are refusing to take box cars of coal and are willing to live on the small surplusages they have accumulated while waiting for open-car shipments. There have been quite a few reports recently that those willing to take box-car coal have been over-supplied, and that when an order is placed for that kind of coal it has not been infrequent to see it doubled or even trebled in delivery. This is probably due to the fact that for the moment the fuel administration in a number of sections has more loaded box-car coal on its hands for disposal than it has customers, and in order to clean up and prevent confusion is filling all such orders with a more than liberal hand.

Anthracite—The hard-coal situation in this city is serious. Coal men here claim it is worse than in any of the large cities of the eastern seaboard. Estimates have been made by some of the fuel administration officers here that there are 30,000 homes in Baltimore still lacking hard-coal supplies; while many retail coal men say the number exceeds 40,000. The light supplies have prevented any catch-up on the more than 200,000 tons of unfilled orders that have been on the books here for several months, while hundreds of persons are going from dealer to dealer only to be told that they can book no more orders.

A. S. Learoyd, anthracite distributor of the Federal Administration, arrived in the city last Saturday and made a personal investigation of the situation. While it is now rather late to hope to bring full relief, the strong hope is expressed that additional shipments will be sent to Baltimore to prevent real suffering when cold weather sets in.

The following bushel and peck rates have been established for this city by the Maryland Fuel Administration: Prepared sizes, per bushel of 80 lb.—at the yard, 45c.; when delivered to house, 50c. Pea coal, per bushel of 80 lb.—at the yard, 35c.; when delivered at house, 40c.; prepared sizes, per peck, 13c.; pea coal, per peck, 10c.

Lake Markets

PITTSBURGH

Car supplies continue fairly good. Labor insufficient for full operation. New car distribution system causes discussion.

Little if any production is being lost on account of car shortage and output is approximately up to labor supply. Production is short of capacity, but it is a matter of opinion whether the gap between mine capacity and actual production should be ascribed to labor shortage or to car shortage.

The revolutionary method of rating mines for car supply introduced by the Fuel Administration has been much discussed in coal circles. Each operator seems to look upon the change from the personal viewpoint, whether it will operate to the advantage or disadvantage of his own mine. The essence of the new system is that the capacity of the mine is to be determined afresh each month, by making the proportion of its rating to its production equal to proportion between full working time and the time actually worked.

Practice among railroads has not been uniform, various methods having been used in the past. The system of the Pennsylvania was quite complicated and on the whole operators considered it fair. Some roads have been rather careless about their ratings. One feature of the change, affecting but a few mines, is very important, that applying to mines served by more than one road. There have been a few somewhat notorious cases of mines thus located getting a much larger proportion of cars than other mines.

There are practically no open market transactions, nearly all the coal produced going out on contracts or allocations. The national association of coal brokers is making a new drive for membership and desires to include coke brokers. The brokers are doing scarcely any business these days. The market remains quotable at the set limits: Slack, $2.10; mine-run, $2.35; screened, $2.60, per net ton at mine. Pittsburgh district, with 15c. brokerage allowed to be charged by regular brokers to consumers or retail dealers.

BUFFALO

Trying to increase production. Plenty of cars; labor not so certain. Cutting out unnecessary consumers and suspending those with a supply. Anthracite by lake moving as usual, in Buffalo short.

Bituminous—The effort to get out an additional amount of coal is the rule on the part of all producing interests. Some of them are nervous and say that they do not see how the former pace can be kept through October as the men are not eager to come back to the mines with the return of fall weather.

The local situation is somewhat easier, and the issuing to shippers of a long list of consumers who are to be given no coal till further notice merely means that they have a supply and can wait awhile. Of course, they will take in an over-supply if they can get it. Often there comes in a complaint that this or that concern, perhaps a city water-works, is nearly out; but it remains to be reported that anything vital has been left unsupplied.

The jobber still sees his business lagging. He is of the opinion that the Government zonal managers will finally absorb most of the trade left to the jobber and claims that it is fast going now. Meanwhile the bituminous prices are holding as formerly, being $4.65 for Allegheny Valley thin vein, $4.45 for Pittsburgh lump, $4.20 for Pittsburgh mine-run and slack, $5.85 for smithing and smokeless and $5.60 to $6.10 for cannel, all per net ton, f.o.b. Buffalo.

Anthracite—The situation does not change materially. Distributors are sure that the city supply is running down, but wholesalers claim that they have turned over enough of what has come here to keep up the allotment, and a report comes from the state fuel office that every effort is making to provide this county with what has been promised it. At the same time the consumer will never cease to claim that the situation is critical till a good winter's supply has been delivered to everybody.

Lake shipments continue fair, being for the week 109,900 tons, of which 53,000 tons cleared for Duluth and Superior, 22,500 tons for Fort William, 20,500 tons for Milwaukee, 10,000 tons for Chicago, 2900 tons for the Sault, and 1000 tons for Depere. Freight rates continue strong at $1 for Depere and the Sault, 60 to 65c. for Chicago, 55c. for Milwaukee and 48c. for Duluth and Fort William.

TORONTO

Conditions growing very serious. Large number of consumers destitute of fuel. Increasing use of soft coal. Regulations being strictly enforced. Fuel made from garbage and waste material.

The coal situation has become more serious, the setting in of cold weather earlier than usual finding a large percentage of consumers entirely unprepared for the winter. Upwards of 9000 citizens have reported to the City Fuel Controller that they are absolutely without fuel. The more necessitous cases are being supplied as rapidly as possible, delivery of orders to those having partial supplies being suspended in the meantime. Soft coal is being laid in in increasing quantities by those unable to obtain anthracite.

R. Howe Smith, Ontario Fuel Administrator, states that in the allotment of coal originally made to Ontario there was a shortage, as compared with last year, of 400,000 tons of anthracite. With the coming of cold weather and prospective transportation congestion this shortage will possibly be increased to 500,000 tons, which will be most severely felt by the municipalities which have failed to comply with the regulations for the stabilization and distribution of their local supply. Some months ago the Provincial Fuel Administrator requested every municipality to appoint a local fuel administrator, but so far only 160 communities, or 18 per cent. of the total have done so. Circulars were also sent to coal dealers asking that figures be returned showing their requirements based on the consumption of 1916, but this request was in many cases ignored. As a result the Canadian Fuel Controller in his negotiations with Washington, did not take the possible consumption in their communities into his calculations when asking for the Canadian allotment. It is possible that these communities may have to go without coal, and they will certainly have to take a larger proportion of bituminous than the places where the dealers have made an effort to coöperate with the Fuel Administrator. It is imperative that municipalities which have not yet appointed their local fuel controller take immediate action, the intention of the Provincial Fuel Administrator being not to consider requests for relief unless from the local fuel controller.

CLEVELAND

With the exception of the domestic user, the position of every class of coal consumer has improved to a marked extent. Newly formed plans for unloading coal at the head of the Great Lakes have caused some dissatisfaction among operators. The labor situation at the mines constantly is growing more acute, but production has been on the upgrade recently.

Bituminous—Attention of operators in the No. 8 district of southern Ohio is now focused on the labor situation. For some few weeks labor has been going from bad to worse, but the evil has not been so apparent because improved car supply made up for the deficiency. But the point has now been reached, operators say, where they cannot blind themselves to the facts any longer. Cutters, in particular, have become slothful, and in some cases have refused to work more than four hours a day. As a result, some mines are losing from 25 to 30 per cent. of production, and the assistance of the Federal Fuel Administration is being sought.

Just now more coal is going to industrial plants than for the past few weeks, operators say, and stock piles seem as large as ever. The coal that is going to retailers, however, does not average more than 15 to 20 per cent. of their requirements. The extent of the fuel shortage in Ohio this winter depends entirely upon the amount of Ohio coal that is diverted to the East after the lake trade ends, about Dec. 1.

Lake Trade—The mobilization committee in charge of the Great Lakes ship pool this season has announced that in order to expedite the handling of coal cargoes at the head of the lakes all vessels, when possible, will be shifted from the so-called "slow" docks—slow in unloading—to the so-called "fast" docks. This has resulted in considerable dissatisfaction. Some operators assert that the operators who benefit from this step are the ones who made no especial effort early in the season to get their coal up; the efforts of those who dug in will not bring them any special reward, they complain. On the other hand, members of the mobilization committee point out the situation to be as follows: The operators who will be aided by this order are those working gas-coal properties. They had planned last spring, as usual, to send their coal up the lakes, and made no effort to contract for free coal. But the Federal Fuel Administration stepped in and ordered that no gas coal was to be sent to the Northwest. The result was that by the time this ruling was announced other operators had "sewed" up all of the free coal and none was left for the gas-coal men. Hence the need for assistance for them at present. This much, however, is held in common by all lake coal shippers—the iron ore interests more and more are seeking to govern the movement of coal, which is something the coal men feel should be reserved for themselves.

DETROIT

Low temperatures emphasize deficiency of domestic fuel supply. Steam plants find it difficult to replace coal diverted from Ohio, Kentucky and West Virginia. Lake movement is heavy.

Bituminous—Steam-coal users deprived of supply from mines in the West Virginia, Kentucky and Ohio districts by the recent orders of the Federal Fuel Administration in modification of zone restrictions, are experiencing some difficulty in obtaining substitute fuel. Complaint is made that the mines in Illinois are not filling orders promptly and seem unable to handle the increased business allotted them, in a manner satisfactory to the buyers. The coal sent from the Illinois and Indiana mines is pronounced inferior to that which the Detroit industrial plants heretofore have been using, though with the freight charge added its cost is practically the same as for the more desirable southern coal. A number of the large manufacturing plants, working on Government orders, are reported to be supplying their current requirements by drawing on reserve stocks that were intended to tide them over winter emergencies or interruptions of supply.

Jobbers assert that the modified zone regulation is not proving as helpful in adding to stocks of domestic consumers as was expected. The prepared sizes, they say, are being rushed to the lakes for shipment over the routes favored by priority order, rather than over the all-rail route to Detroit. Business of the jobbers is cut deeply by the changed zone regulation, as the only market left them for southern coal in the lower peninsula of Michigan comprises railroads, byproduct and gas plants, and domestic trade. With stock suitable for domestic use arriving in only moderate amount, and buying by railroads, gas works and byproduct plants not large in volume, the jobbers are getting slim picking.

Anthracite—Cold rains and low temperature have brought an insistent demand from domestic consumers seeking anthracite. The deficient supply and restrictions giving priority to base-burner owners on delivery of chestnut and stove sizes combine in balking efforts of many of the would-be buyers. Homes dependent on hot air furnaces are required to have put in an amount of bituminous equal to one-half their winter fuel needs before they can receive any anthracite.

COLUMBUS

The steam trade is not as overstocked as a week ago because of further modifications of the embargo against shipping screenings into Michigan. There is a continued good demand for domestic and lake tonnage.

The steam situation has been relieved to a certain extent because of modifications to the embargo against shipping small sizes into Michigan, and there is not so large a stock on the local market. In addition certain steam plants have been stocking up steadily, and many have a supply of from three to four months. Railroads are still taking a large tonnage as the freight movement continues extra heavy. Schools and hospitals have been supplied, and the same is true of public institutions. On the whole, the steam trade is running along in a more normal channel.

The domestic trade is one of the strongest points in the market. There is a considerable tonnage moving from mines into yards, partly to take care of current business and partly be used in stocking up for the future. Retail stocks are gradually getting larger. One of the worst features is the fact that lump is rather scarce, while there is an ample supply of mine-run. Retailers are fairly busy making deliveries. It is estimated that about 75 per cent. of domestic coal in this section has been stocked by the consumers.

The lake trade is also active and considerable attention is now being devoted to that branch of the industry. The vessel movement is generally efficient and little delay is experienced either in loading or unloading. The ore movement is also good and consequently the coal trade is stimulated. The movement off the docks to interior points in the Northwest is rapid and no congestion is reported.

CINCINNATI

Volume of business is high, with good movement from the mines and good local supplies on hand. Question of future industrial consumption is the chief cause for worry.

The excellent state of the local situation, both for domestic and individual consumers, may be gathered from the fact that the former, as a rule, have their winter's supply, or at least half of it, already in their basements, while the latter, wherever storage is available, usually have several months' supply stored. These is at least one large coal concern, with operating connections, which has been advertising for orders from industrial consumers, assuring them that it has ample coal to take care of all orders. The movement of coal from eastern Kentucky and West Virginia continues at a heavy rate, and with shipments by river being aided regularly by artificial rises brought about by means of the Government dams, Cincinnati is assured of a regular supply of coal. Whether this will be sufficient, with the constantly increasing consumption both locally and to the North for heating purposes, as the season advances, is another question. The peak of industrial consumption, of course, is also ahead, and as the average industrial consumer, unfortunately, cannot possibly store enough coal to last for more than a week or so, maintenance of the present movement, and its increase, if possible, are just as necessary as elsewhere. However, the general feeling among the trade, and among the authorities in charge of the fuel situation, is distinctly optimistic, and while this is based largely on the extent to which the public at large, including domestic consumers principally, has been induced to store its winter supply of coal, it also has regard to the prospects for taking care of the industrial situation in good shape.

LOUISVILLE

Local conditions reflect a general shortage of lump coal for domestic use, with mine-run and screenings in plentiful supply, and the market a little draggy on such coal. Car supply much better at mines, labor supply slightly easier and production on upgrade.

Conditions in the Louisville market are about the same as they were last week, with the exception that there is a still greater surplus of mine-run and screenings, which are not selling readily. Industrial plants appear to be well stocked and under regulations of the Fuel Administration are not buying freely. Jobbers and producers are meeting with some little trouble just now in disposing of steam grades, although there is an active demand for domestic or lump coal for stocking purposes. Most of the stocking at this time is in small lots, of one to four tons, except on eastern Kentucky coal, where many consumers have been waiting for deliveries.

Yards are laying up practically no surplus of lump coal, being unable to secure enough for requirements. A little mine-run is being stocked by some companies for emergencies, as they want to secure surplus stocks of some sort, and can not secure lump. Industrial consumption is taking more mine-run at this time than screenings, due to the fact that it stocks better, and is even easier to obtain than screenings as many producers are not screening at this time.

BIRMINGHAM

No marked change in Birmingham market. Steam demand easy in tone but of satisfactory volume, while domestic trade is strong and the supply short. Production slightly lower than the previous week. Car supply fairly good.

Reports in trade circles indicate a good, steady demand for steam coal, but the situation is devoid of any tenseness. The rail lines are taking coal on about the same basis as observed for several weeks past; the supply with some roads, however is said to be very short and fuel agents have been in the market lately to secure additional tonnage. There is practically no free coal available at present.

Domestic dealers still have many unfilled orders on file and new ones are being received about as rapidly as deliveries are made on old ones. The production of lump coal is short of requirements and a great deal of mine-run coal is being stocked for domestic use.

The output of coal in this district for the week ended Sept. 21 was 382,000 net tons, or about 50,000 tons short of the maximum weekly production record of two months ago. The loss is attributable to irregular work and shortage of labor, the car supply having been fairly good and little, if any, interruption was caused by lack of equipment. The production committees of the fuel administration are now fully organized and at work, and it is to be hoped they will be successful in bettering the production materially.

Coke

CONNELLSVILLE

Coke quality improving. Byproduct supplies maintained with difficulty. Heavier Connellsville coal shipments.

Blast furnaces in increasing number are reporting a visible improvement in the quality of coke received, but as a rule those who have had cause for complaint feel that there is still much more to be done. Pig-iron production has been at an increasing rate, but as output always increases at this season of the year, on account of decreased atmospheric humidity, it is impossible to trace directly the influence of improvement in coke quality upon blast furnace operations. As has been the case for some time past, there is only occasional shortage of coke, in point of actual tonnage. Furnaces would like to have more coke, however, as it is desirable to accumulate a reserve against winter conditions. Very little coke has been in stock at any furnace.

The Fuel Administration continues to watch closely the amount of coke offered as foundry grade, and requires that this be kept down to the actual needs of foundries engaged in war work, all other coke to be offered as furnace no matter if it has been in the oven 72 hours. These regulations have been helping the furnace coke supply for some time past.

The Fuel Administration has thus far had little success in finding byproduct coal to ship to byproduct ovens that have been receiving Connellsville coal, for the purpose of allowing the Connellsville coal to stay in the region and be coked in beehive ovens. The ruling made some time ago that beehive ovens must not be blown out promptly became practically a dead letter as it was impossible to observe it except at the expense of depriving byproduct ovens of coal, and a full supply to them is essential on account of the byproducts. There

is no prospect of any early improvement continued nearly if not quite to the end in this respect, as lake shipments are to be of the navigation season. Afterward there may be coal that can be diverted to by-product ovens to relieve Connellsville coal shipments.

The market is quiet and remains quotable at the set limits: Furnace, $6; foundry, 72-hour selected, $7; crushed, over 3-in., $7.30; clean screenings from old dumps, over ½-in., $5.50, all per net ton at ovens. Some minor screening operations have dropped out since the price limit was reduced to $5.50, apparently because too much labor was involved in the operation, but there is still considerable marketing of this material, for household purposes.

The "Courier" reports coke production in the Connellsville and Lower Connellsville region in the week ended Sept. 28 at 335,195 tons, a decrease of 4280 tons, and coal shipments at 245,136 tons, an increase of 22,733 tons.

GENERAL REVIEW

Mines producing more coal than territory can absorb. Steam market soft, as all large manufacturers have plenty of storage coal in reserve.

The mines in the Middle West are continuing to produce record tonnages, as the car supply is good, the labor situation favorable, and there are no serious storms to tie up traffic or cripple individual operations.

The coal market continues soft and, as has been the case for the whole month of September, the mines have produced more coal than the territory can easily absorb. The Fuel Administration has taken steps to alleviate this state of affairs, and it is now definitely announced that Illinois and Indiana coals are to continue to move into the lower peninsula of Michigan. Michigan, by the way, is no longer suffering for coal, and both Indiana and Illinois sales agents are having increasing difficulties in placing orders in that state.

A second step, and one which will relieve the situation to a certain extent, has been recently promulgated. Railroads doing business in Indiana, who have hitherto been purchasing their fuel in either Ohio or Pennsylvania, have been ordered to buy their coal from Indiana operators. This has proved an extremely wise measure, as it has tended to relieve some pressure from the East, where we understand there is an increasingly serious shortage, and at the same time has helped conditions in the Middle West, where the market is weak and needs strengthening.

Some of the largest producers in this territory are freely predicting a soft market on steam coal to continue throughout the winter season. They base their predictions on the fact that practically all the big manufacturers have in stock at the present time enough coal to last them from two to four months.

CHICAGO

Steam coals offered freely. Railroad purchases large. Screenings are selling at substantial reductions.

Conditions in the Chicago coal market differ little from the general situation in the Middle West territory. Nearly all steam coals are offered freely, and only a few of the better known and higher grade products are being sold on a basis of Government price. The mine-run situation is improved slightly, owing to large purchases on the part of the railroads, but screening sizes are to be had at substantial reductions.

The domestic market is a little better off, as the recent cold weather, combined with the Spanish influenza scare, has caused the domestic user to burn some coal to keep his place warm, and whenever possible he has bought additional fuel, rather than start in on the coal he has reserved for the winter.

MILWAUKEE

Fuel administration's schedule of prices for anthracite questioned by dealers. Threats of refunds if overcharges are made. Measures of conservation.

Before leaving for Washington, where he will endeavor to have Wisconsin's allotment of coal increased, State Fuel Administrator caused the following schedule of prices for anthracite to be promulgated: "Under date of June 24, the United States fuel administration established the prices of anthracite coal f.o.b. cars at the docks on the coal which left the mines prior to June 25, as follows: Egg, $8.35; stove, $8.57; nut, $8.66; pea, $ .19. On anthracite coal leaving the mines on and after June 25 there is an addition of 40c. per ton to the above prices f.o.b. cars at the docks, made necessary by the advance in freight rates from the mines to Lake Erie ports. During the summer there was a voluntary reduction of 30c. per ton on anthracite coal as an inducement for people to order and take in their coal early, if it was available. This voluntary reduction expired Sept. 1, and after that date 30c. per ton was added to the price. At the present time the prices f.o.b. cars at docks are: egg, $9.05; stove, $9.27; nut, $9.36; pea, $7.89. To these prices should be added $2.25 per gross ton which covers all expense of retailing and delivering such coal to the consumers' curb, the prices for curb delivery being as follows: Egg, $11.30; stove, $11.52; nut, $11.61; pea, $10.14. These are the maximum prices prevailing in the city of Milwaukee on coal handled by all the large dock companies." The consumer pays an additional 70c. per ton for carrying the coal from curb to bin. The fuel administrator threatens to impose refunds wherever overcharge from the above rates are discovered.

Retailers are somewhat puzzled over the latest order, as it is at variance with the prices they have been permitted to charge following the conditions noted in the fuel commissioners' detail, and there is a disposition to await Mr. Fitzgerald's return before making any change.

Coal receipts at Milwaukee by lake during the month of September foot up 96,451 tons of anthracite and 631,775 tons of bituminous, making the receipts during the season of navigation thus far 461,428 tons of the former and 2,778,187 tons of the latter. There are about 10 weeks of lake navigation still ahead.

ST. LOUIS

A continued easy market, with a surplus of all coal, excepting Carterville. Steam and domestic demand light. Car supply good and transportation improved.

The St. Louis market is an easy one. It is hard to find a place for some sizes of coal from the Standard and Mt. Olive fields. Car supply has shown improvement during the past week and transportation continues better.

In view of the fact that between 75 per cent. and 85 per cent. of the domestic tonnage usually stored by December has now been delivered, the market will continue easy for domestic coal from this time on, with the exception of Carterville. There is still a shortage on that locally, not only for domestic but also for steam. The domestic demand from the country has eased up in the past week and the same pertains to steam sizes.

A good railroad tonnage moves in from all the fields, and this is the only thing that is saving the southern Illinois market at the present time. In the Carterville field cars are not so plentiful as the operators would like, but the service rendered is good in comparison with the past. Some mines are catching up on orders. A large tonnage continues to go on Government requisitions, and the railroads are still pulling heavily. Labor and other conditions are about normal under existing circumstances. In the Duquoin field there is little change. The Mt. Olive district still produces more coal than it can find a ready market for. Car supply here is good, and in a general way this field is a satisfactory one to the operator. Labor is good and cars plentiful. The Standard field presents the same old problem of overproduction. The distribution of cars has shown some improvement here, and transportation facilities have also developed better in the last few weeks. There is, however, unbilled coal in this field nearly every night on all sizes. One of the problems in this field that has not been regulated is the taking over by the Government of certain short-line roads that openly discriminate in the distribution of cars, leaving some mines idle and working other mines full. No eastern fuels are moving into this market and very little from Arkansas.

The prevailing market per net ton f.o.b. mines is:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump..	$2.55@2.75	$2.55@2.75	$2.40@2.70
3x6-in. egg..	2.55@2.75	2.55@2.75	2.40@2.70
2x3-in. nut.	2.55@2.75	2.55@2.75	2.40@2.70
Washed:			
No. 1.....	3.05@3.20	3.05@3.20	.....
No. 2.....	3.05@3.20	3.05@3.20	.....
No. 3.....	3.05@3.20	3.05@3.20	.....
Mine Run..	2.35@2.50	2.35@2.50	2.20@2.30
Screenings..	2.17@2.32	2.17@2.32	1.50@1.60

Special preparation on Carterville is 10 cents extra.
Williamson & Franklin Co. rate is $1.10.
Other fields 95 cents.

KANSAS CITY

Retail prices increased after investigation of costs of doing business. Labor and miscellaneous items show increased cost.

The state and local fuel administrations gave to Kansas City, Mo., coal dealers, effective Oct. 1, an increase in retail prices of about 30c. a ton on bituminous and 45c. on semi-anthracite coal. Further increase will be established Jan. 1, 1919, of 25c. on bituminous and 10c. on semi-anthracite. The advances allowed on anthracite range from 5 to 80 cents.

The advance was the direct result of a report made by Gregg & Co., accountants of St. Louis, who made an investigation of local costs of doing business, at the instance of the retail dealers of Kansas City. The fuel administration had indicated that it would try to fix such prices as would allow a net profit of about 35c. per ton. The report of Gregg & Co. showed that dealers were not receiving this profit. The report made plain the fact that no absolute guide to a proper level of prices could be established now, since prices paid by coal dealers for various costs of operation were changing rapidly. For instance, dealers raised their teamsters from 30 to 35c. an hour recently; truck drivers are asking an increase from 35 to 40c. Unloading wages were formerly 5 to 15c.; now the range is 15 to 30c. Hay cost $31 a ton a year ago, now it is $40—with prospect of early advance. In view of the advancing costs of doing business, the fuel administration granted the increase in retail coal prices, though not as large an increase as the dealers hoped for, or as the report of the accountants indicated would be just.

The state fuel administrator, Wallace Crossley, in an interview announcing the advance to the public, remarked that the dealers had been operating on too narrow a margin.

SEATTLE

Secretary of Fuel Administration says domestic fuel situation is worse in Northwest than any other section of the country and predicts closed industries as war necessity.

The domestic coal situation is worse in the Northwest than any other place in the United States, according to David Whitcomb, executive secretary of the Fuel Administration of Washington, D. C., who is in Seattle while arranging for the departure of his family for Washington. Whitcomb was formerly fuel administrator for this state. Shortage of labor and the small demand for industrial coal in the Northwest are the reasons advanced for the domestic coal shortage, according to Whitcomb. Domestic coal for home consumption is usually the large lump coal. The fine coal has a small market in the Northwest, and it is impossible to mine the larger lump coal when there is no market for the fine coal which is mined at the same time. Some industrial curtailment of fuel will be made in this section this winter, he reports, as well as in certain parts of the Middle West and East.

The problem of the administration at this time, he states, will be to draw the line between essential and non-essential industrial plants and close down the latter as a war time necessity next year. He declares that people who complain of the scarcity and price of coal do not realize that the United States is the only country which has increased its coal tonnage since entering the world war. The domestic consumers of the Northwest will have to use pea coal or do without, is the opinion of coal operators of this section, who state that this class of fuel is in abundance.

General Statistics

NORFOLK & WESTERN

A statement of coal tonnage from mines on the Norfolk & Western R.R. and from other railroads, for the month of August, 1918, is as follows:

From:	Net Tons
Pocahontas field	1,470,411
Tug River field	316,574
Thacker field	295,868
Kenova field	125,057
Clinch Valley field	174,015
Other Northern and Western fields	16,594
Total Northern and Western fields	2,398,492
Williamson & Pond Creek R.R.	214,843
Tug River & Kentucky R.R.	66,697
All other railroads	96,663
Grand total	2,776,695

COAL AGE

Volume 14 New York, October 17, 1918 Number 16

The Days of Reconstruction

By Floyd W. Parsons

NOTHING can change the fact that war is a school where the tuition costs more than the learning is worth. However, the present conflict on our part was unavoidable, and we have been compelled to meet the situation with all the force we could muster.

When peace comes this Nation, like all the other great countries, will have to start paying off a debt that is so colossal it is beyond the average understanding. Victory, and a dictated peace, will mean the end of the horrors of killing men, but it will also mean the commencement of our struggle to pay the bill for our battles for liberty.

The money expended by the seven leading belligerents for purely war purposes up to the present time amounts to more than $141,000,000,000. The combined average war cost is now $4,500,000 each hour of the day. The total net war debt of the principal nations engaged in fighting is $132,000,000,000.

Let us not deceive ourselves concerning the years following the war. There will be industrial activity in certain lines, for we must gradually reclaim wasted areas and readjust our lives. But the wholesale destruction of life and property is not the precursor of prosperity. The task of healing the wounds that civilization has received will necessitate our enduring further sacrifices and continuing the maximum observance of our newly created conservation and efficiency measures. In other words, our future success will depend largely on our ability to avoid a relapse into the wasteful and careless industrial habits of our pre-war days.

Here and there among all our trials and sorrows are a few bright spots. Chief of such benefits is our better knowledge of standardization. The need for greater production at a time of labor shortage has forced our leaders to seek shortcuts, adopt new methods and substitute machines for men. Economy and efficiency are the watchwords of the day.

We have learned that standardization is something more than the pet hobby of efficiency experts. The doctor cannot make a correct physical diagnosis unless he compares his readings of the individual with the standard or normal respiration, heart beat and body temperature. Measurement is the soul of standardization; through it we determine the degree of quality and the rate of performance.

No longer do we believe that standardization means fixity of progress. Like the bark of a tree, it may bound progress but must not limit growth. Inflexible standards retard development. True standardization is the consensus of the best that an industry affords and always keeps step with the advances of that industry. At least we have come to know that the elimination of chance in our national effort has ushered in a new and better era.

What I am trying to get across to the reader is a broad general thought that should be discussed and developed in *Coal Age*. We have as an important principle of standardization the "interchangeability of parts," and there are other subjects equally vital to the big problem.

I want to ask coal-mining men in every field who are desirous that our industry shall not lose the ground gained through our present emergency to write us a few thoughts on this important question. We may enter the after-the-war period of reconstruction sooner than we anticipate, and no problem is of greater importance than the national standardization of coal mining.

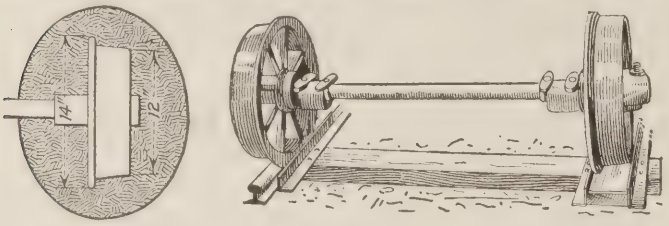
Do your part to help develop plans that are both practical and constructive, and let us hear from you today.

IDEAS AND SUGGESTIONS

Suggestion for a Sharp Curve

BY MATTHEW STAFFORD
Chase River P. O., Vancouver Island, B. C.

Sometimes a mine manager or foreman is crippled for lack of room for a proper curve either at the top or bottom of a shaft. I think as a general rule this applies to pit heads and to turning the cars, either when full from the cage or when empty toward it. Especially is this the case where the pit head has had to be changed in certain respects in order to meet a larger



TAKING A CAR AROUND A SHARP CURVE

output. The following suggestion is practical and will help to solve problems incident to the foregoing conditions.

We will assume that the car wheels are 12 in. in diameter and the flange say 1 in. high. This will make a 14 in. diameter measured over the flange. When the car comes onto the curve the outside wheel runs on the rim or flange, which is of greater diameter than the tread. A flat sheet of iron is laid upon a curved wooden rail on either side of which, as well as on the inside of the inner rail, an angle iron is placed. The circumference of the flange on the outer wheel is of course greater than that of the tread on the inner wheel. The outer wheel gains at each revolution approximately 6.28 in. on the inner wheel. This, together with the easy skidding of the flange on the sheet iron, enables the car to be taken readily around a sharp curve.

Straightening Bent Rails

BY W. H. BUTLER.
Christopher, Ill.

The straightening of curved rails is sometimes a difficult operation at a coal mine. I have been able, however, in many cases to use a method that requires only a short time to manipulate and accomplishes results that answer all purposes. The tread of practically all locomotive wheels is wider than the ball of the rail upon which it runs. Consequently, to straighten a crooked rail all that is necessary is to place it beside a straight track rail, properly support it with its convex side up and run a heavy locomotive over it once or twice. Of course, at least one end must be so supported that it is free to move endwise, as the span of the rail will be greater when straight than when crooked.

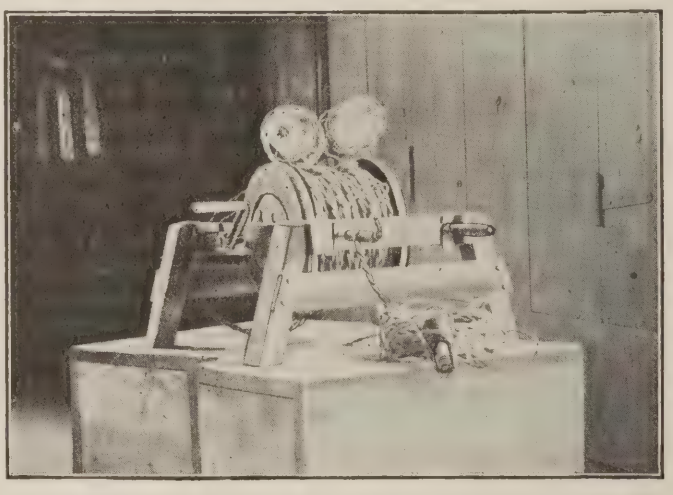
Should the end portions of the rail still be curved the extreme ends may be supported by cap pieces or otherwise and the locomotive again passed over the rail. This method, while it may perhaps seem crude, is nevertheless effective. Furthermore, under ordinary circumstances it is several times as rapid as straightening a bent rail with a jack or rail bender.

Portable Lighting Set

BY FRANK HUSKINSON
Trinidad, Colo.

Many jobs around the mine, such as repairing machinery or putting timbers in place, can be handled more conveniently with the aid of electric lights than by the employment of other means of illumination. This is particularly true if the repair job is located in the aircourse or some other part of the mine where the movement of air is strong.

After experiencing all the inconveniences incident to the use of open lights and electric cap lamps in repairing machinery underground, I devised the portable electric lighting set shown in the accompanying illustration. This set consists of a spool or reel of suitable size on each end of which is fastened a circular brass plate to which the wires wound upon the spool are connected through the spool axle. The spool is hung within a suitable frame and provided with a winding crank, as shown. A piece of spring brass is attached to each side of the frame, making contact with the circular brass plates upon the ends of the spool. These brass brushes are connected to the two terminal posts upon the frame.



LIGHTING SET THAT CAN BE CARRIED EASILY

A piece of lamp cord is fitted with plug terminals on one end to fit into the two terminal posts. On the other end this cord is fitted with an attachment plug to screw into a standard lamp socket. There are also provided two hook terminals to be attached to trolley wire or feeder cable and rail.

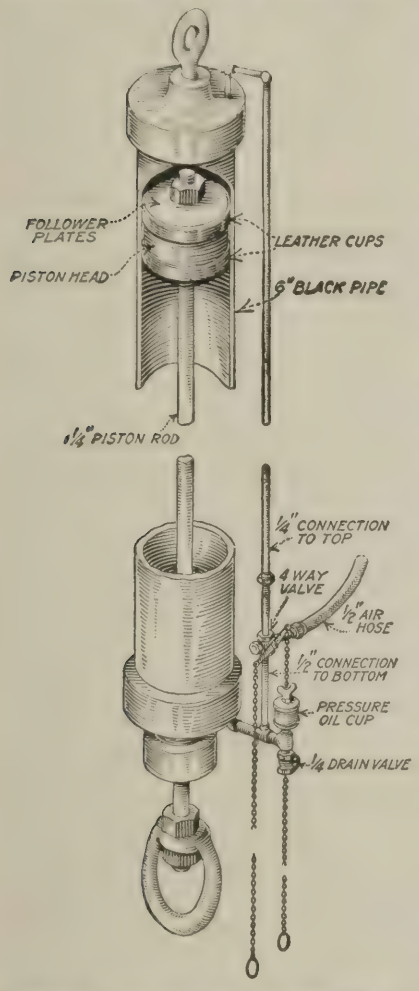
The amount of lamp cord on the reel or spool may vary with local requirements. I have found that from 400 to 500 ft. is ample for most purposes. A few feet

or the entire amount may be unreeled as occasion demands and as many lamps used as are needed.

This device has demonstrated its utility on numerous occasions. Its use is not confined to the mines alone, as it is a valuable contrivance to have in the shops. It is simple, inexpensive and easily constructed. It may be built by almost anyone and sufficient use for it exists to warrant almost every mine possessing one.

Homemade Air Hoist

The accompanying illustration shows an air hoist that can be made at almost any mine shop, where it may be employed to good advantage. Such a hoist may be used either for lifting heavy work into or away from the lathes or other machines, or for overturning cars or similar work. It has the great advantage over a chain block of being much more rapid in action; furthermore, it is far less liable to be taken away from the shop for heavy lifting elsewhere. The drawing is almost self-explanatory. The hoist cylinder, or barrel, is made of a piece of ordinary 6-in. pipe. The piston is constructed of three disks and two cup leathers faced in opposite directions, the whole being held firmly together between a collar on the piston rod and a nut on the end. The admission and release of air is controlled by a suitable cock operated from the floor by means of suitable hand rods. The length of the hoist cylinder and travel of the piston may be made to suit local requirements. One hoist of this kind that has been in successful operation for some time and has proved itself a great time saver is made with a lift of 4 ft. 6 in.

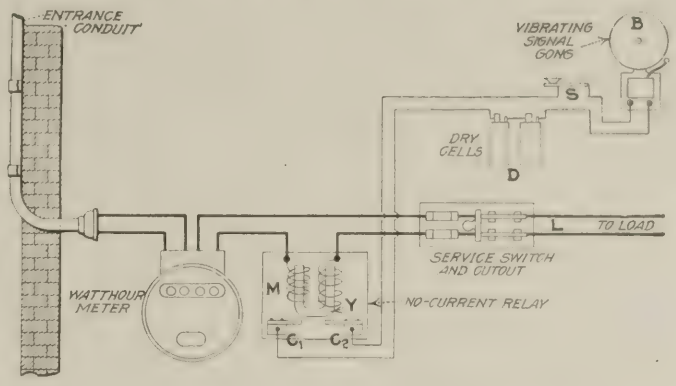


THIS AIR HOIST CAN BE MADE AT ALMOST ANY MINE SHOP

In operation such a hoist as this may be mounted upon a jib crane or a track suspended either permanently from the roof trusses of the building or from a frame in the repair yard, or it may be hung from a chain or eyebolt if horizontal movement is not necessary. Such a device as this may be constructed at small expense, and in many instances, at least, will not only be found highly convenient, but also prove itself a time saver of appreciable value.

Audible Signal to Indicate Discontinuance of Load

The accompanying illustration shows how a signal bell was connected so that it will ring when a group of motors in a distant building is stopped. The relay *M* was made and connected to the supply wires to the load. When the load is taking current through the line *L* the magnet coils of *M* have current in them and pull



METHOD OF CONNECTING AUDIBLE SIGNAL

up the U-shaped yoke *Y*. But when the load is discontinued, *Y* drops down and makes contact across C_1 and C_2. This closes the electric-bell circuit and causes *B* to ring, and it will continue to ring until the switch *S* is opened.

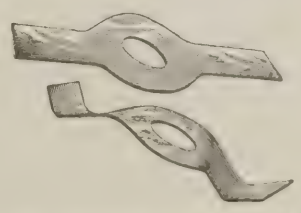
The magnet coils *M* do not require many turns, as all they have to do is to hold up the yoke *Y*. It is not, in most cases, necessary that they be strong enough to pull up *Y*, because it can be raised by hand. The wire used for the magnet coils *M* must, however, be large enough to carry the full load current in the circuit.

Positive Grip for Oil Cans

By J. A. Lucas
Ozone Park, N. Y.

It is quite unpleasant to have an oil can slip out of your hand, when standing on top of a ladder. To avoid this, I applied the little device shown in the accompanying illustrations. It is cut out and formed as shown in the pen and ink sketch, and is used on the oil can by tightening it between the oil container and the spout. This device will also prevent the oil can from tilting.





LITTLE DEVICE MAKES AN EFFICIENT GRIP FOR AN OIL CAN

Have YOU bought YOUR Liberty Bond?

Increasing Coal Mine Efficiency—I

By CHARLES E. STUART
United States Fuel Administration, Washington, D. C.

SYNOPSIS — *The first of a series of articles upon the subject of mine efficiency. Many operators and "practical" coal men do not yet realize that the power generation and distribution system of the fair-sized mine offers problems more complicated and intricate than exist in the ordinary town of 25,000 inhabitants.*

Introduction

IN ANY present-day consideration of coal-mine operation having in view increased coal production and operating efficiency, certain war factors must constantly be borne in mind. No study of the subject can be properly made without due allowance for existing war conditions, such as decreasing availability of required machinery; increased delay in obtaining factory repairs or repair parts; increasing load on central stations already frequently overtaxed; and decreasing man power incident to the requirements of the army and as a result of the tempting offers of other classes of war industry.

There is urgent demand for every pound of steel that can be produced. This is needed for the construction of ships, and for the manufacture of shells and other war material. Furthermore, the man with the skill to turn the axle of a mine locomotive can likewise turn an urgently needed shell; in a word, we are short of both skilled labor and raw material for imperative war requirements. Nevertheless, and in spite of these facts as well as because of them, we must increase the production of coal.

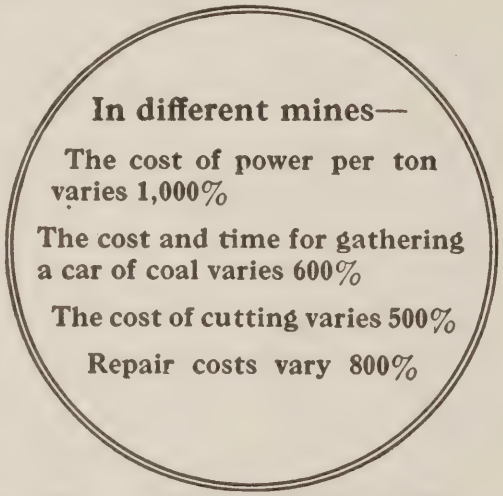


FIG. 1. COMPARATIVE ANALYSES SUMMARIZED

This series of articles will not be technical. An operator who regards himself as qualified to purchase a fan motor need not hesitate to study it because of the introduction of curves and other descriptive technical data. The operator capable of specifying and purchasing such a motor will recognize the information as elementary. He will also agree that the facts presented are logical, and they may perhaps recall considerations to which he has at odd times given some casual thought, or difficulties which he has definitely attempted to solve.

The fact that electrical and mechanical engineering skill has become as important a factor in the efficient management of mining properties as civil engineering ability, is today appreciated only by some of the larger and better organized operating companies.

Fig. 1 summarizes the results of a number of comparative analyses. The physical handicaps of the properties have a bearing on the extremes indicated, but these considerations have, relatively speaking, only a small influence. The following report of power consumed and tonnage output is illustrative:

15-Min. Demand, Kw.	Consumption, Kw.-Hr.	Tonnage Output	Kw.-Hr. per Ton
Operation No. 1			
June 518	90,700	35,000	2.7
July 547	101,600	36,400	2.8
Operation No. 2			
June 374	112,100	60,599	1.9
July 412	123,400	60,946	2.0

Mine No. 1 consumes 40 per cent. more power and has 30 per cent. higher power demand. There is some difference in the operating conditions, but nothing that would cause such a wide variation of output to demand as that cited above.

The average town of 25,000 population contains a pumping plant, which takes its water from a single source by a single lift. The municipality contains a well-regulated trolley system. There may be several factories containing more or less complicated systems of electrical drive, and in each and every instance there is maintained a well-organized engineering force headed by a capable electrical or mechanical engineer, or an engineer manager.

The mine with a capacity of 1000 tons a day contains a generating or converting plant, the load upon which corresponds both in diversity and complexity to the combined requirements enumerated in the case of the town of 25,000. The pumping system of the mine is invariably more complicated. If the miner is not properly served by the haulage system, he becomes idle through a greater or less period of time.

The subject of mine ventilation considered in relation to power demand and consumption is in itself an art to which the town offers no parallel. Extremely few factories, for instance, contain motor drives whose needs in the way of skilled attention compare with the requirements of a tipple designed to prepare coal properly for coking and for the market. The lighting requirements of the average mine camp are identical to those of the small town, provided the miners' homes are to receive reasonably good service and the mine itself is to be properly lighted.

In many instances a mine operator does not appreciate the complexity or possible efficiency of his expensive equipment, and is entirely satisfied with an electrician who can keep things going. Frequently, such electricians are capable of serious efficiency work and would gladly undertake it if requested or encouraged to do so and furnished with the necessary assistance. Such an attitude on the mine operator's part is distinctly shortsighted and results in loss of greatly needed coal production, both to the mining company and to the country.

There is another phase of equal importance to the operator from a personal viewpoint—namely, the relationship of investigation and improvement recommended herein to cost and profit. Every recommendation made, if carried out, will save money; or, conversely, will make money for the mine operator. It should be remembered also that no suggestion is made in this series of articles whose value has not been fully demonstrated in practice. These suggestions are not impractical and will only

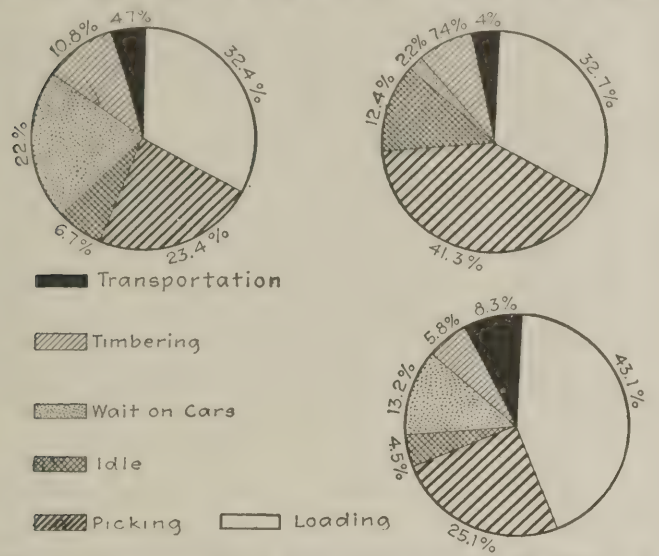


FIG. 2. COMPARATIVE PERFORMANCE OF MINERS IN THREE MINES

appear so to the superintendent or owner who is unable to grasp their significance, or who is unwilling to give the small amount of time necessary to digest the recommendations here made and put forth the subsequent effort that may be requisite in order to carry them out.

To repeat, I am endeavoring to bring to bear a few simple analyses to show that the mine operator with the help at hand is in position to go a great deal farther today than he is now going to meet the demand for conservation in its broad economic sense.

None of the considerations and conditions enumerated in the foregoing should be overlooked in considering the following factors in mine operation, which will be covered in this series of articles: (I) A comparative analysis of a miner's working day. (II) An analysis of the performance of mine locomotives. (III) An analysis of the performance of cutting machines. (IV) The power demand and consumption of mine fans. (V) An analysis of power demand and consumption of mines in relationship to capacity and production. (VI) An analysis of mine power conditions in relationship to production. (VII) A consideration of track conditions in relationship to production. (VIII) The condition of the generating plant. (IX) The relative output of electrified vs. unelectrified mines. (X) Considerations in the case of a shortage of central station capacity. (XI) A coal mine efficiently electrified using purchased power.

I—Comparative Analysis of a Miner's Working Day

Fig. 2 shows the comparative performance of miners in three different mines, two of which are electrified. To arrive at these summaries, a careful analysis was made not only of the actual employment of time by the miner, but also in order to locate and isolate all elements tending to delay him. It is the rule to blame the miner for a small day's production, but we rarely hear of the superintendent or foreman taking unto himself criticism for failure to keep the miner properly supplied with cars.

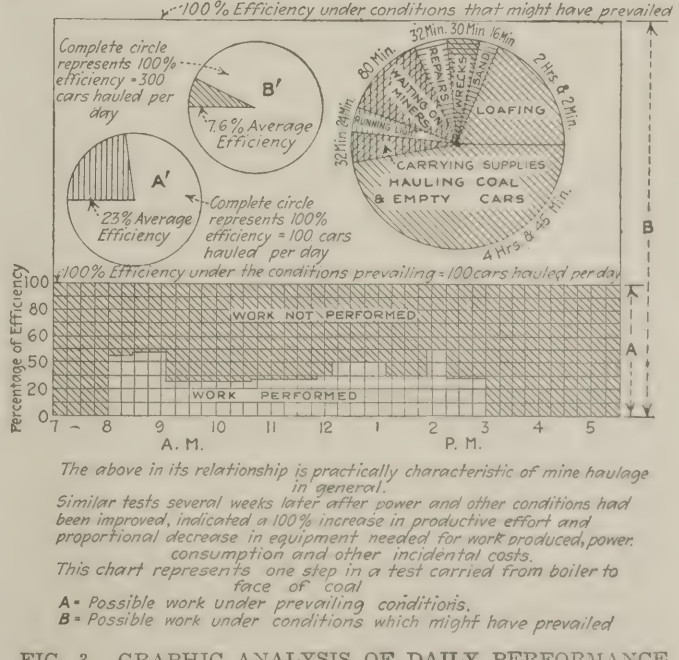
The showing in Fig. 2 is by no means a poor one, or below the average. On the contrary, the group of mines where the observations were made are supposed to be among the most efficiently operated in the country; and

TABLE I. AVERAGE PERFORMANCE OF EQUIPMENT AND MINERS

Hoist:	Minutes	Per Cent.	Gatherers:	Minutes	Per Cent.
Hoisting cars	231	51.2	Hauling	286	49.7
Hoisting supplies	125	22.3	Running light	81	14.1
Waiting for loads	123	22.0	Waiting on loads	89	15.5
Wrecks	60	10.8	Waiting on empties	75	13.0
Idle	21	3.7	Waiting on drivers	...	...
			Wrecks	28	4.9
Total	560	100.0	Idle	16	2.8
Haulage Motors:			Total	575	100.0
Hauling	284	49.3	Miners—Average of 6 Men		
Running light	39	6.8	Loading	217	41.9
Waiting on loads	73	12.6	Picking	141	27.2
Waiting on empties	10	2.0	Idle	53	10.2
Waiting on motors	...	...	Waiting on cars	60	11.5
Wrecks	164	28.2	Timbering	25	4.8
Supplies	6	1.1	Transportation	23	4.4
Total	576	100.0	Total	519	100.0

furthermore, their output of coal per miner is a record output. Table I gives several average performances of equipment and miners.

Fig. 4 is a graphic analysis of daily performance showing how the summary in Fig. 2 and the comparative analysis in the table are obtained. We are particularly concerned with those elements of delay which bring about the "wait on cars." Such delays may be classified under the heads of "avoidable" and "unavoidable." Unavoidable delays are those such as occur in any system of transportation. For example, there will be delays incident to transfer of cars from one locomo-



The above in its relationship is practically characteristic of mine haulage in general.
Similar tests several weeks later after power and other conditions had been improved, indicated a 100% increase in productive effort and proportional decrease in equipment needed for work produced, power consumption and other incidental costs.
This chart represents one step in a test carried from boiler to face of coal
A = Possible work under prevailing conditions.
B = Possible work under conditions which might have prevailed

FIG. 3. GRAPHIC ANALYSIS OF DAILY PERFORMANCE OF LOCOMOTIVES

tive to another. Wrecks may occasionally be classified as unavoidable.

In a general way, avoidable delays as here considered are such as are occasioned by a section of the haulage system being congested or inadequate for the work. The chief causes which are responsible for the element of

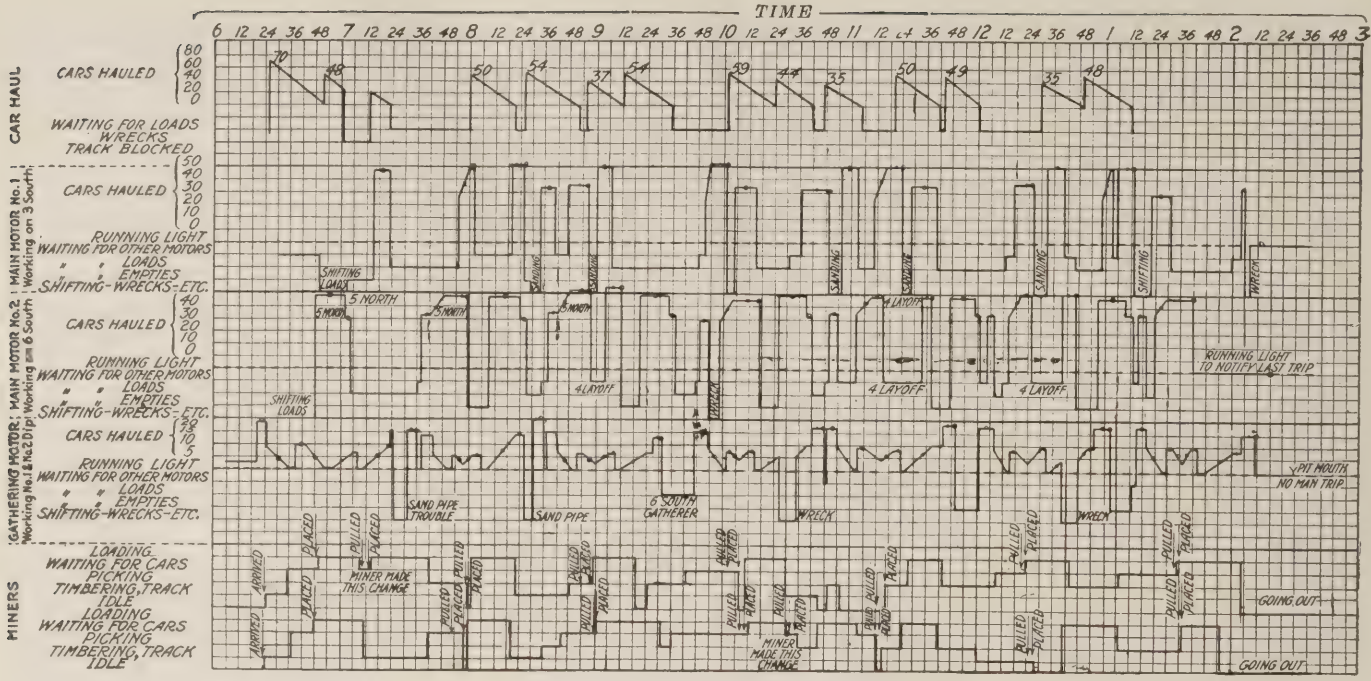


FIG. 4. COMPOSITE RECORD OF PERFORMANCE OF LOCOMOTIVES AND MINERS

time loss shown in Fig. 2, and which may be classified as avoidable, are as follows: (1) Handling supplies; (2) sanding motors at other points than where stops are regularly made; (3) insufficient capacity of loaded and empty partings; (4) poor signal system; (5) insufficient number of cars; (6) wrecks; (7) locomotive trouble due to lack of inspection; (8) delay due to failure to place car ready for miner on his arrival; (9) indifference of motormen; (10) bad management.

II—Analysis of Mine Locomotive Performance

The converse of the analysis of a miner's working time is indicated in Fig. 3. Here we have the composite record of the average performance of a number of gathering locomotives as taken in different mines. Practically speaking, the record is characteristic of mine haulage. One hour and 20 minutes out of the day is shown waiting on miners and 2 hours 2 minutes are spent in idleness or loafing.

I have observed many tests of mine locomotives with the object of developing such comparisons as the foregoing. I have never observed a single test—that is to say, a trial carried through the period of a day—that failed to show serious elements of time lost that could not be classed under the head of avoidable.

The elements of delay derived in Section I are also the basis of time wastage in the locomotive movement. In fact, as is readily appreciated, a delay which would prevent the prompt serving of a miner with cars would similarly as a rule reduce the efficiency of operation of

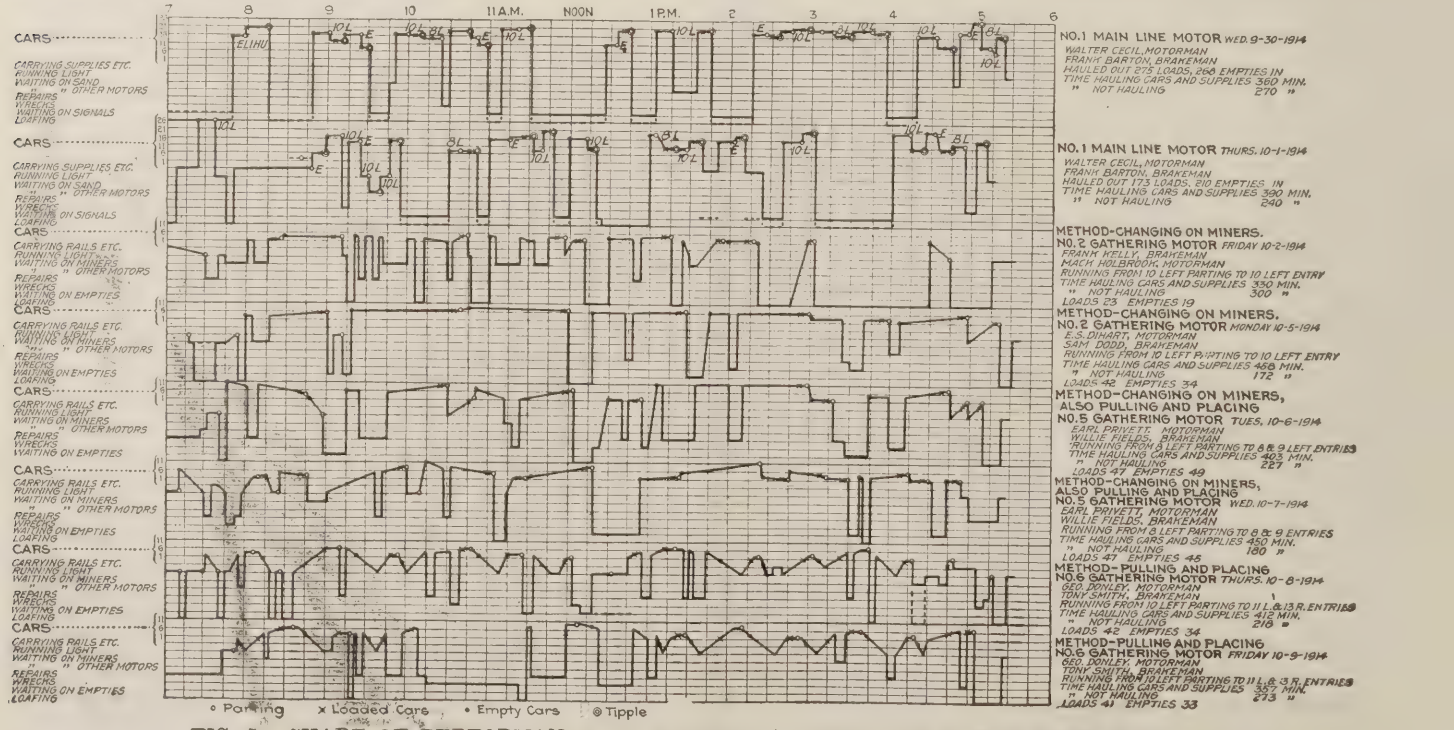


FIG. 5. CHART OF PERFORMANCE OF SEVERAL LOCOMOTIVES IN THE SAME MINE

the haulage system. There is also the factor of management which adjusts the movement of locomotive and cars to the requirements of the miner. Failure to properly make such adjustment will necessitate either the locomotive waiting on the miner or the miner waiting on the locomotive.

Fig. 5 is the chart of one day's work of several locomotives in the same mine. Such a chart can be easily developed for the entire haulage system so as to isolate the elements of avoidable time wastage. If such an analysis is properly prepared for and accurately conducted, it will usually be found that locomotives which were thought necessary can be done without. It will often be discovered that a mine is overequipped from a haulage standpoint. I have observed increases of more than 100 per cent. in productive effort following carefully conducted examinations of this character.

A locomotive is usually regarded as necessarily subject to frequent breakdowns incident to controller trouble, bearing trouble and armature burnouts. When these troubles are too frequent, the manufacturer is blamed. Nevertheless the manufacturers who supply a considerable proportion of mine locomotives in use likewise supply approximately 100 per cent. of street-car motors, which are in nearly all respects similar in design to the mine motor.

A street-car motor is supposed to last about five years before it becomes necessary to rewind it. During that period it is expected to do 200,000 car-miles. Provided a mine motor is of proper capacity for its work, there is no reason why its lasting qualities measured in period of time should not be equal to that of the street-car motor. The mileage, of course, will not compare.

Why Motor Trouble on Street Cars Is Rare

We all know how rare it is for a street car to stop on account of motor trouble. In spite of the number of cars in operation in a great city, a tie-up on account of trouble with a motor is a rare occurrence. The reason is that the rated voltage is supplied at all times and there is daily inspection.

I visited a number of mines in Germany some years ago in order to observe the mine machinery in use. On commenting upon a daily delay sheet that was kept, and the absurdly low repair cost as well as the small amount of time used in effecting repairs, I was advised that this was due to the daily inspection which all machinery underwent. The rule of the railways should be followed and the mine locomotive should be subjected to daily inspection by a competent man. The following parts should be examined with particular care daily: First, controller segments should be filed and greased with vaseline. Second, every bearing should be oiled and packed. Third, brushes and commutators should be watched carefully. Fourth, the distance between armature and pole pieces should be gaged weekly. If these parts are kept under observation in the manner suggested, locomotive troubles will become nearly negligible and actual breakdown in the mine will become practically unknown.

A suggestion in connection with the operation of the haulage system, which on its face may appear radical, is what might be termed a dispatcher system, corresponding to the system in use on all electric railways as well as railroads. We have reference to a man whose duty it would be to observe and systematize the movement of equipment in the mine and who would keep check on delays of the character recorded in Sections I and II. He should maintain a system of checks and charts which would throughout the day's work inform him as to the condition of the rooms and the relative location of cars, locomotives and machines. This man, if of the proper training, could also carry out or direct the tests and investigations recommended in the several sections. We have observed the partial adoption of this system in one or two cases, and the results have been gratifying. There is no question but that if the mines of the country would adopt such a system, and if competent men could be utilized for the work, exceedingly valuable results would follow in relationship both to cost and production.

There should be at the disposal of the mine officials or a dispatcher a comprehensive mine telephone system. A good telephone system is as necessary to efficient mine operation as it is to a trolley system or a railroad. It will increase production and reduce the cost. It is the opinion of coal properties in which telephone systems have been installed that these systems rapidly become essential to efficient handling of the mines.

Mines which have been equipped with telephone service, and these systems properly used, have shown marked increase in production through scheduling of main-line locomotives. The telephone tends to reduce the number of wrecks. It enables the mine foremen to keep in touch with each locomotive, making it possible for them to direct and control movements to advantage. We believe from observation of mines that have installed telephone systems that it is one of the best investments a mine operator can make. When properly installed, the maintenance is a small item.

(*To be continued*)

Legal Department

Federal Reservation of Coal Lands.—The provisions of the Federal land laws reserving "mineral lands" to the United States include coal lands. The statute enacted by Congress in 1894 granting sections 2, 16, 32 and 36 in every township to the State of Utah for the support of common schools, read in connection with other legislation, must be interpreted as excluding from such grant all section constituting mineral lands. (United States Supreme Court, United States vs. Sweet, 38 Supreme Court Reporter, 193.)

Damages for Personal Injuries.—An employee of a coal-mining company, in suing for injuries sustained while temporarily engaged in pushing loaded coal cars from a pit mouth to a check house at a daily wage of $2, was entitled to show that he was a skilled miner and able to earn higher wages under normal mining conditions. But it was improper to permit him to testify that he could earn from $6 to $7 a day, without any showing as to the prevailing wage scale for miners. And where plaintiff sought recovery for injury to his foot resulting from his stepping into a hole in the track along which he was pushing cars, it was improper to permit his witnesses to testify concerning the unusual or exceptional character of the hole, measured by general practices in coal mining, since that did not bear on the issue as to whether defendant was negligent or not. (Pennsylvania Supreme Court, Clark vs. Butler Junction Coal Co., 102 Atlantic Reporter, 952.)

Standardization of First-Aid Methods

By LIEUT.-COL. C. H. CONNOR*
Medical Corps, United States Army

As Chairman of the Committee on Standardization of First-Aid Methods and Rules for Conducting and Judging First-Aid Contests, Lieutenant-Colonel Connor submitted to the Seventh Safety Congress of the National Safety Council, held at St. Louis, Mo., Sept. 18 and 19, 1918, a report summarizing the work accomplished in connection with the committee's effort toward the standardization of first-aid methods. In presenting the report certain facts were cited, among which were the following: Preliminary letters were sent to the members of the committee, with a copy of the Red Cross circular describing first-aid contests. The rules and suggestions contained in that circular have proved satisfactory to the First-Aid Division of the American Red Cross in competitive events, and it was suggested that they be adopted as standard by the Mining Section of the National Safety Council. Replies to the letters were received from all but two members of the committee and a digest of the comments is contained in Lieutenant-Colonel Connor's remarks.

SINCE the last annual meeting of the National Safety Council a census has been taken of the opinions of industrial surgeons in reference to organizing first-aid teams in industrial concerns, the giving of prizes and medals for excellence in first aid among employees, and the holding of first-aid contests. Nearly all favor and indorse such methods.

In reference to organizing first-aid teams, some members of the committee are of the opinion that it should be compulsory, especially in hazardous occupations; others say that it is not required in small industrial establishments. The point is brought out that organized team work greatly stimulates the study of first aid, adds to the interest manifested and ultimately leads to prevention of accident. The unfavorable criticisms received were not altogether explicit. One industrial surgeon replied: "It is better to employ nurses"; another gave the opinion that it might lead to something being done which would later be regretted.

The majority of your committees—industrial surgeons and first-aid men—approve of giving prizes. A large number express a preference for medals rather than a cash prize. "It is a splendid idea and men are proud of these trophies"; "It is an incentive to greater energy and effort, and results in more efficient workers"; "has worked satisfactorily in the mining region," and similar expressions are read. "Give cash prizes and certificates of merit; medals should be reserved for big deeds," is another individual expression. Unfavorable comment was as follows: "Trade to commercialize man's duty to his fellowman" and "highest efficiency should be reached purely from the standpoint of relieving the suffering of a fellow employee."

The favorable comments far exceeded the unfavorable ones as to holding first-aid meets in companies, at which different first-aid teams may compete for the prizes. By stimulating a healthy rivalry first-aid meets make for greater efficiency and improve both individual and team work. They develop technique and lead to an exchange of ideas; the results obtained are well worth the effort in every way. The meets are particularly advantageous in mine rescue work and in industries where team organization is essential. One member cites the fact that exhibitions are to be favored, but not contests, as the latter provoke trouble. Another favors contests of this character, but opposes the giving of prizes. Unfavorable criticisms are that rivalry is gallery play, that it belittles the purpose and nothing is gained, and that it does not give a chance to the best, who are always modest and timid. Several surgeons state that the performance of a plain duty to one's comrades should not require reward.

Inter-Company and Inter-State Meets

As to whether or not inter-company and even inter-state meets are productive of good results in maintaining interest in first-aid instruction, about one-fourth of the replies to the letters received indicate that the writers do not approve the idea of holding either inter-company or inter-state meets, while a few express their preference for inter-company contests. A majority, however, indorse the meets as outlined in the letter. In the opinion of one member, such meets result in an exchange of ideas and cause greater interest in the subject, thus tending to broaden and perfect the system and ultimately leading to standardization of first-aid methods. Another states that the spur of competition is helpful, while a third believes that a national association for first-aid instruction might be the outcome. Those who are opposed to first-aid contests say such meets are neither necessary nor practicable, that it is too difficult to put this kind of efficiency on a competitive basis, or that such contests should be limited to boys and girls, that they are not suitable for workmen.

E. E. Bach, director of the sociological department of the Ellsworth Collieries Co., has called attention to a "bone of contention" among safety men in the appointment of judges for first-aid contests. In the past it has been recommended that all such judges be physicians. Mr. Bach makes a good suggestion—that men who have completed a first-aid course and show a good general knowledge of first aid be permitted to act as judges as well as physicians.

C. E. Pettibone, chief safety inspector of Pickards Mather & Co., suggests that members of first-aid teams be limited to laboring men only, and that men should be taught to rely entirely on measures they can improvise from the materials at hand. The opinion of industrial surgeons to this question is unanimous, all believing that students should be taught to be able to improvise suitable materials when regular supplies are not available.

W. A. Lynott, in his Bureau of Mines manuscript, recommends that first-aid teams be selected with great care and with the thought that the men will remain in the employ of the company for years.

As to the advisability of permitting first-aid instruction to be given by other than physicians, the majority of opinions received regarding this matter are in the

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negative, the principal reason cited being that the layman cannot answer intelligently and correctly questions which may be asked during the course of instruction. A large number, however, agree that the first-aid instruction may be given with very satisfactory results by a thoroughly trained and experienced first-aider or graduate nurse. Some of the statements are amplified in the following manner: "Instruction should be given by a physician, but it is highly desirable to standardize the courses so that definite and prescribed teaching shall be followed; the entire course to be kept simplified and not left to the individual judgment of the instructor as to what shall be included or omitted." "First-aid instruction to be of value must be given by one who thoroughly understands the subject." "Intelligent first-aid instruction requires a considerable knowledge of anatomy and some physiology and symptomatology; a layman is not often in possession of this knowledge." "Physicians, unless they have spent considerable time in informing themselves on first-aid work, are not qualified to teach it as it should be taught today; furthermore, they do not always have sufficient time to devote to the subject. A salaried, well informed, first-aider with teaching ability, spending his entire time at the work, talks to employees in a language which they can understand, not 'over their heads.' He drills them personally and obtains results." It is recommended, however, that previously prepared lectures on first aid should be given by a physician, mentioning briefly details of anatomy and physiology, and presenting reasons why certain first-aid procedures should or should not be followed. The advisability of giving elementary instruction in anatomy and physiology in a first-aid course is not questioned.

First-aid treatment is meeting the basic and immediate requirements of the sick and injured from an anatomical and physiological standpoint. As the life of an injured person often depends upon the care he receives from the first individual to aid him, it is important that people be taught the rudiments of physiology, anatomy and the principal factors to be met in an injury. For instance, in resuscitation, something of the mechanism of the respiratory apparatus should be taught; in the control of hemorrhage, knowledge of the location of the most important and vulnerable blood vessels is necessary.

In furtherance of first aid and accident-prevention work, and the dissemination of knowledge in the homes of the workmen, it is recommended that all employees should be instructed by lectures and demonstrations and also by giving them textbooks.

Did Rope Break from Sudden Jerk?

On the morning of Sept. 10 a cable broke at the Protection shaft of the Canadian Western Fuel Co., Nanaimo, B. C., and 16 men were plunged to their deaths. An inquest was held at Nanaimo on Sept. 12 by Coroner Hickling. He soon came to the conclusion that by delaying the inquest till Oct. 22, valuable information as to the condition of the rope at the time of the disaster might be obtained, and, in consequence, postponed the hearing till that time.

William Fleet Robertson, provincial mineralogist, has been sworn in as an official of the court, and he will take the broken cable to eastern Canadian laboratories where he will have "critical microscopic and chemical" examinations and tests made under his supervision. He is also taking samples of the water which flows into the shaft so that he may have it analyzed to ascertain whether it contains any matter likely to cause rope corrosion or deterioration.

James Menzies, rope expert, who is employed by the Canadian Western Fuel Co. to examine, at regular intervals, all cables in use in the company's mines, was one of the chief witnesses. He informed the court that he made an inspection of the cable once a week. His last inspection was made on Sept. 4. On that occasion he had passed the cable as was his custom through his closely gripped hand for its full length. Had there been any broken strands then he would have noted them, either when they struck his flesh or met his eye. He also said that his practice was to inspect the safety clutches and that he had found these, also, in good working order during his last visit.

Entire Rope Was Not Inspected

Another important witness was C. Wallbank who, until Aug. 28, was employed by the company to make the daily inspection of cables, etc., required under the terms of Section 91, General Rule 36, of the Coal Mines Regulation Act. On the date indicated he had left the service of the company. Up to that time he had made the daily inspection required and filed the necessary report. He had never found anything wrong with the rope in question. It appeared, from the evidence of C. Nicholson, that the latter took Mr. Wallbank's place. The former swore that he had inspected the cable and the cage, but on cross-examination it was found that this inspection was only of the 50 ft. of the cable immediately above the cage, whereas his daily report would lead to the belief that it extended the full length.

S. Tembey, the engineer in charge of the operation of the hoisting machinery at the time of the break, swore that he was not using steam or brakes at the moment the cable gave way. William Woodman, an engineer of 30 years' experience, argued that the application of brakes could not have been the cause of the breakage of the rope, because it was evident that the rope broke when the cage was only one-quarter way down and at that point there could be no advantage in applying the brakes. He came to the conclusion that the rope broke at the point stated by him because it snapped 157 ft. from the cage and the shaft was 650 ft. deep. The inspector of mines, J. Newton, stated that he inspected the mine once a month, but did not inspect the ropes himself.

William Woodman in the afternoon of Sept. 13 admitted that he had heard the men make complaints as to the jerky way in which they were lowered at the Protection shaft. When the attorney asked for the names of these men Mr. Woodman refused to reveal them, declaring it unfair to give hearsay evidence. On an appeal made by the attorney to the parties in question, several of whom were said to be in court, one of them corroborated the statement. The doors were then closed and all the miners who had descended the shaft were put on the stand and sworn. Some corroborated the statement that there were complaints made about the manner in which the cage was jolted.

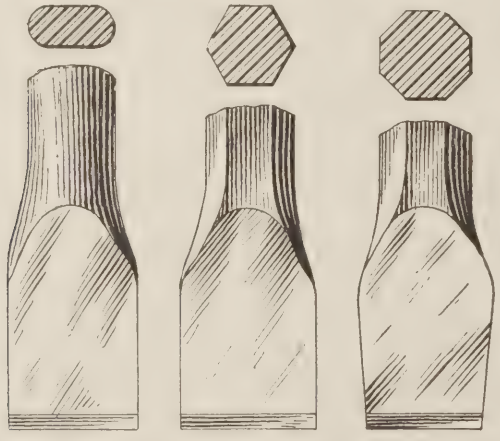
The Cold Chisel

By J. A. LUCAS
Ozone Park, New York

SYNOPSIS — *To the average layman a cold chisel is a cold chisel. This article shows, however, that there are cold chisels and cold chisels. The shape of a chisel is determined by the work to be performed and the kind and texture of the material to be cut. It is highly important to keep both ends of a chisel in proper shape if best results are to be secured.*

THE machinist's cold chisel is made from the three forms of steel shown in Figs. 1, 2 and 3. Of these the first is preferable, because it has two broad flat surfaces diametrically opposite which form guides to the eye in holding the chisel on the grindstone and aid in grinding the facets that form the cutting edge true. Furthermore, as the cutting edge is in a plane parallel to these flats, they serve as a guide to show when the chisel edge lies parallel to the work surface. This is requisite in order to produce true and smooth chipping.

To make a chisel, a piece about 6½ in. long is first cut from the bar. One end is heated to a cherry-red heat and the head formed by slowly rotating the tool and hammering down the steel until the end becomes conical



FIGS. 1 TO 3. VARIOUS TYPES OF ORDINARY COLD CHISELS

for a distance of about ⅝ in. The steel is now reversed, and after a heat about 1½ in. long has been made the metal is drawn down to a wedge shape, care being taken to keep the edges from spreading.

It is important to note that the under side of the chisel lies flat on the anvil, and a flatter or smooth set-hammer should be used toward the end of the process to smooth the work. If possible the chisel should be made in not more than two heatings, in order to maintain the original hardness in the steel. The finished forging should be allowed to cool off on the anvil while steady light hammer blows are struck upon it near the cutting edge. This operation renders more dense the molecular structure of the steel and greatly increases the life of the tool.

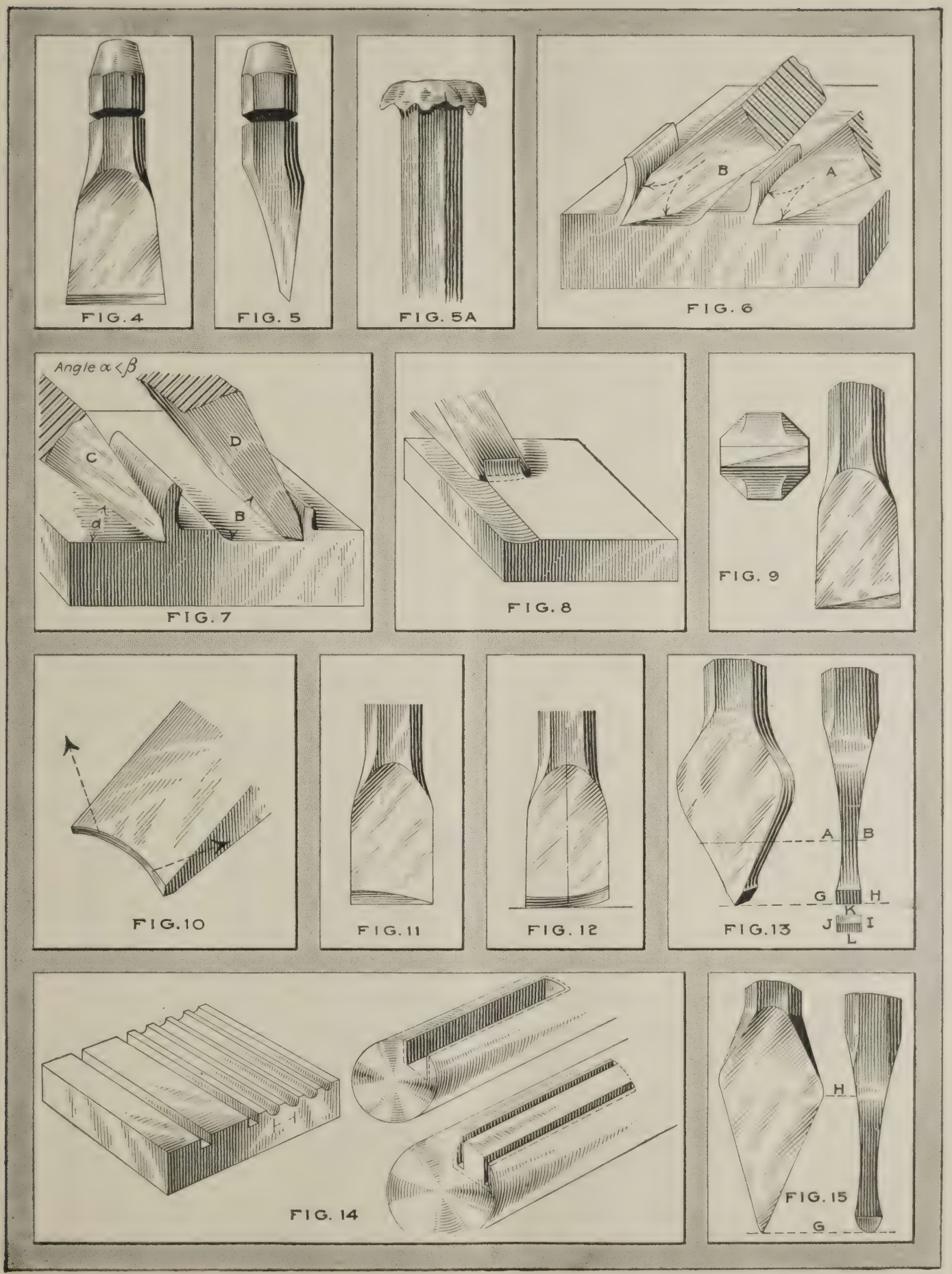
The chisel of ordinary size should measure between 8 and 9 in. over all, assuming that it is made from a bar of octagonal steel measuring ⅞ in. across the flats. The width of the tapered portion should not exceed 1 in., and the sides should be parallel for 2½ in. in a tool intended for general work, as shown in Fig. 2. For hard metal a chisel should be slightly tapered toward the point (Fig. 3), and for soft metals it should be bell shaped, as shown in Fig. 4. Soft metals are cut or chipped without lubrication, but wrought iron and steel yield far better results when the chisel edge is first rubbed on a piece of oily waste.

The width of the chisel may be made greater (as in Fig. 4) for use on brass or cast iron than when intended for wrought iron or steel, as on account of the toughness and hardness of wrought iron and steel the full force of a blow from a 1¾-lb. hammer, having a handle 13 in. long, may be struck on a chisel about ⅞ in. wide without danger of causing the metal to break out below the chipping line; but if such a chisel be used with full-force blows upon cast iron or brass the metal is liable to break out in front of the chisel, the line of fracture often passing below the level that it is intended to chip down to. Hence if a narrow chisel is used lighter blows must be delivered. By using a broader chisel, however, the force of the blow is distributed over a greater length of cutting edge, and full-force blows may be employed without danger of breaking the metal.

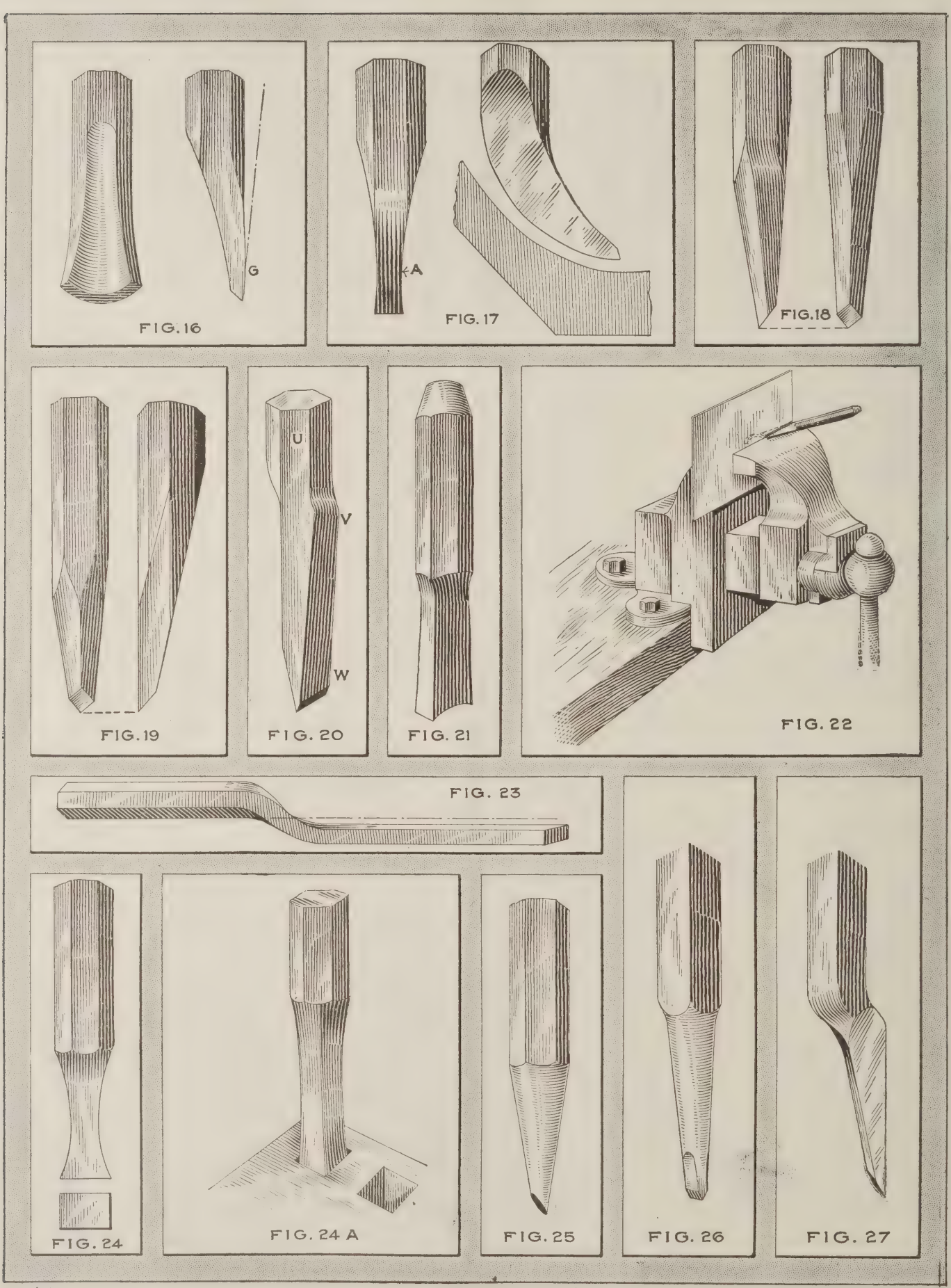
The cutting end of the chisel should be ground thin, as in that case it cuts both easier and smoother. The total length of a chisel, when new, should not exceed 8 in. If made longer it is not suitable for heavy or smooth clipping, as in that case it will bend and spring under heavy blows and cannot be held steady. The forged part should not exceed 2½ or 3 in. in length, as a long taper is highly conducive to springiness, whereas solidity is of great importance both to rapid and smooth work. The facets forming the cutting edge should be straight throughout their widths, as at *B* in Fig. 6, and not rounded as at *A*. Straight faces permit the face next to the work to form a guide in holding the chisel at the proper angle to maintain the depth of the cut. This angle depends upon the nature of the material to be chipped. The more acute the angle, the better the chisel will cut and the less will be the effort of raising the chip, thus increasing production.

From the viewpoint of economy, one would be tempted to reduce this angle to a minimum. But we have to consider the resistance and durability of the tool, and make the angle according to the toughness of the material to be cut. The cutting angle may therefore safely be made 65 deg. for machine and other kinds of steel, 50 deg. for cast iron and brass, and 30 to 35 deg. for copper, babbitt and lead.

The more acute these angles the nearer will the body of the chisel lie parallel with the work and the more effective will be the hammer blows. Thus in Fig. 7 chisel *C* shows the position of the tool for wrought iron, while position *D* shows that for steel. The edge angle should always therefore be made as acute as the hardness of the material will permit. If such an angle is too



FIGS. 4 TO 15. VARIOUS SHAPES OF CHISELS AND EXAMPLES OF THEIR APPLICATION



FIGS. 16 TO 27. SPECIAL FORMS OF CHISELS AND SOME OF THEIR USES

acute, the cutting edge will be apt to bend, while if not sufficiently acute it will not cut keenly; hence the object is to make this angle as acute as possible without causing the cutting edge to bend or break throughout its length.

The cutting edge should be slightly rounded in its length. This will strengthen it and also enable a fine finishing chip to be taken, as in Fig. 8, the width of the chip not extending fully across the chisel width. Thus the corners are not under duty and are not, therefore, liable to break or dig in and prevent smooth chipping. In some practice the edge is made straight throughout its length, as shown in Fig. 2. This is permissible in heavy chipping when a cape chisel has been used, but in any event an edge rounded slightly throughout its length is preferable. If the edge is hollowed, as shown in Fig. 10, the chip acts as a wedge to force the corners outward, as denoted by the arrows. This may cause breakage under a heavy cut and, furthermore, a smooth cut cannot be taken when the corners of the chisel meet the work surface.

If the edge facets are ground less on one side than on the other, as in Figs. 9 and 11, the edge will not be parallel with the flats of the chisel, so that in holding the tool the flats will not form a guide to determine when the edge lies parallel to the work surface. Fig. 12 shows a wrongly ground chisel that will never cut parallel to the surface of the work. The edge at its center should also be at a right angle to the center line of the chisel, as denoted on the left half of Fig. 12, for if not at a right angle the chisel will be apt to move sideways with each blow and cannot be held steadily.

The chisel should be held as close to its head as possible, so that the hand will steady the point where the blow is received. The tool should be pushed forward firmly and steadily to its cut. This will greatly facilitate rapid and smooth chipping. When working on wrought iron and copper it is found better to occasionally moisten the chisel with oil or turpentine, the former being preferable.

The head of all chisels should be dressed round and somewhat reduced in diameter, as shown in Figs. 4 and 5. When the head becomes battered, as in Fig. 5A, it should be redressed as small pieces of steel are apt to fly from a bushed chisel head, embedding themselves deeply in the hand holding the chisel.

The flat chisel can be modified in form to suit special conditions, as, for example, the cutting of the flat sides of a mortise require a chisel the axis of which will follow a line nearly parallel to the work surface. Such a chisel is shown in Fig. 5, in which one flat is parallel with the length of the chisel, having at the end one wide facet at a slight angle with the length. This is done in order to be able to guide and control the cutting edge of the tool.

All that has been said respecting the flat chisel applies equally well to the cape chisel, except that the sides at right angles to the cutting edge are narrower than the shank and that the sides parallel with the cutting edge are spread wider where they join the shank, as in Fig. 13. The cape chisel will cut up some ugly capers if not properly forged and ground. If not made narrower at *AB* than at *GH* it will, when the corners wear dull or tapering at *GH*, wedge and possibly split a frail piece on which it is being used to cut a slot. Referring to the end view, if the sides *IJ* are not ground approximately at right angles with *KL*, the chisel will twist and hang, and cannot accurately be guided in a slot or keyway.

When cuts of $\frac{1}{8}$ in. or deeper are to be taken, it is necessary to precede the flat chisel by grooves cut with a cape or round-nosed chisel. The distance apart of these grooves should be less than the width of the flat chisel, thus leaving strips to be chipped by the latter. This method is used in chipping broad surfaces, but is unnecessary when the area is quite small. The surface shown in Fig. 14 represents this preparatory grooving. Besides the uses above given, the cape chisel is employed for cutting keyways in shafts, pulleys, gears, etc., also for cutting slots.

In cutting a keyway with the cape chisel, if the keyway be made, say, $\frac{5}{8}$ in. wide, the cape should be about $\frac{1}{32}$ in. narrower. The remainder of the keyway is removed by a file. If the keyway be $\frac{3}{4}$ in. or wider, it is

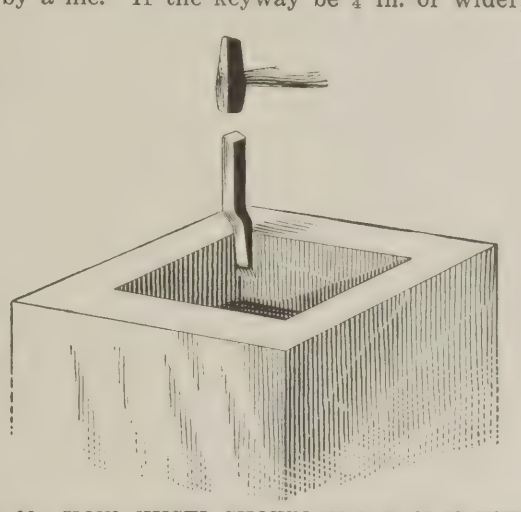


FIG. 28. HOW CHISEL SHOWN IN FIG. 27 IS USED

better to use a cape chisel less than half the width of the keyway and cut two grooves.

The round-nosed chisel, Fig. 15, may be straight from *H* nearly to the point *G*, but should be bevelled near *G* so that the head of the chisel may be raised or lowered to govern the depth of the cut. The round nose should also be wider than the metal higher up, so that the chisel head may be moved sideways to govern the direction of the cut, as is the case with the cape chisel.

The cow-mouth chisel, Fig. 16, should be bevelled from *G* to the point, so as to permit governing the depth of the cut. It should have a greater curvature than the corner it is to cut out, so that its corners cannot wedge in the work. The name of this chisel is derived from its curved shape; a better name, one not infrequently used, is "gouge," on account of its similarity to the wood-cutting tool of this name. This tool is used for enlarging holes or for chipping curved surfaces.

The oil-groove chisel, Fig. 17, should be wider at the cutting edge than at *A* for reasons similar to those given above, and of less curvature than the bore of the brass of bearing in which it is to cut the oil groove.

The diamond-point chisel may be made in two ways. First, as in Fig. 18, for shallow holes, or as in Fig. 19, for deep ones. In shallow holes the chisel can be leaned over, whereas in deep ones it must be held straight so that its body may not meet the other side of

the hole, slot or keyway. The form shown in Fig. 18 is the strongest, because its point is brought into line with the body of the steel. The side chisel, Fig. 20, for cutting out the sides of keyways or slots, should be bevelled from *W* to the cutting edge for the reasons already given, and straight from *W* to *V*, the line *VW* projecting slightly above or beyond or outside of the body *U*. All these chisels are ordinarily tempered to a blue color.

The ripper, shown in Fig. 21, is a necessity to the repair machinist for cutting off boiler tubes, tanks, sheet metal, etc. The shape of the cutting blade is on the style of that of the cape chisel. The cutting edge is slightly hollowed to guide the tool in the course of cutting. Sheet metal held in the vise may be much more easily sheared with the ripper than with the ordinary flat chisel. This process is shown in Fig. 22.

The drift, Fig. 24 and 24A, is a tool that is sometimes used instead of a file for enlarging or correcting square, rectangular or polygonal holes. The drift has no cutting edge proper, but the end is at right angle to the body and cuts on the same principle as the punch used in punching holes in boiler plates, or somewhat like the ripper mentioned above.

The key drift is for driving keys out of pulleys, gears, etc. Like the drift, its small end is rectangular in cross-section, but it is not intended to do any cutting, as shown in Fig. 23.

The round-nosed chisel, Fig. 25, and the flat chisel, Fig. 26, are small size and used on light work. The chisel, Fig. 27, is fit for deep, internal work, and is shown in use in Fig. 28.

In tempering chisels for general use they should be drawn nearly to a blue, which gives a tough temper that will stand up well on all metals except chilled iron and hard steel. For these latter metals, in drawing the temper the chisels should be plunged in water just at the time the color starts to change from straw to blue. In exceptional cases a bright straw color is kept, but in use hammer blows must be comparatively light, otherwise the brittle edge will fail.

No matter how carefully a chisel may be tempered it may be softened in a few seconds by overheating the edge at the emery wheel. To avoid this a constant flow of water may be directed to the point of the chisel when grinding. If an automatic water supply is not available, the chisel must be frequently dipped in a can or other container filled with water.

Possibilities of Using Peat as Fuel

In view of the dangers of another coal shortage the Director of the U. S. Geological Survey calls attention to the practicability of using peat as fuel in some localities and offers some suggestions as to the preparation, storage, value and use of peat.

Vast deposits of peat that could be converted into fuel are found throughout Minnesota, Wisconsin, Michigan, New York and the New England States, and in the northern parts of Iowa, Illinois, Indiana, Ohio, Pennsylvania and New Jersey, according to C. C. Osbon, of the Geological Survey, who has recently been studying this subject. Many peat beds occur also on the Atlantic coastal plain from New Jersey to southern Florida and westward along the Gulf coast to the Mexican boundary. This coastal plain is rather remote from the known coal fields and contains few other mineral fuels. The preparation and storage in farming communities and villages of peat fuel taken from these deposits by the owners of small bogs and by citizens' associations for distribution among their members would not only increase the local fuel supply and in many localities prevent a recurrence of the suffering caused by our recent coal shortage, but would release railroad cars that will be vitally needed for other purposes.

Fuel Value of Peat

Peat, or muck, as this mineral is frequently called, consists of partly decayed plant remains that contain enough carbon to ignite and burn freely when dry. In texture it ranges from a fibrous, imperfectly decayed kind, through progressive degrees of decomposition, to a thoroughly disintegrated type, and varies correspondingly in color from light yellow to jet black.

Peat in an undrained bog contains about 90 per cent. of water, which must be reduced to 30 per cent. before it can be used for fuel. By thoroughly draining the deposit approximately 10 per cent. of the water in the peat may be removed, but the remainder, which is held in microscopic plant cells and minute intercellular spaces, can not be reduced below 70 per cent. without drying in the open air or in a heated chamber. Artificial drying, however, requires so much heat in comparison with that obtainable from the fuel prepared by this process, that so far as the U. S. Geological Survey is aware, it has not proved commercially feasible.

The value of a given deposit of peat as a source of fuel is dependent on many factors, most important of which are degree of decomposition, heating value and ash content. Coarse-textured fibrous peat makes fuel that is inferior to the black, compact, thoroughly decomposed kind, unless that kind contains a large proportion of ash. The maximum quantity of ash that is usually considered allowable in peat for commercial use has been placed between 20 and 25 per cent., but if the content of ash exceeds 20 per cent. of the total weight of the dry peat it is scarcely worth the labor of production, even for home use. The heating value and ash content of peat fuel intended for domestic consumption may be determined by a simple practical test. A typical sample should be taken from the bog, thoroughly macerated, dried and weighed. If, when burned in an ordinary heating stove, the heat generated is almost equal to that produced by bituminous coal, and after complete combustion the weight of the ash does not exceed 20 per cent. of the weight of the dry peat before burning, its usefulness as a fuel for domestic purposes is established.

Methods of Preparation

The season for drying peat begins about Apr. 15, or as soon as the frost is out of the ground, and ends in September, except in the southern peat region, where it is somewhat longer. Present industrial conditions in the United States prohibit the manufacture of large-capacity peat-fuel machines for operation this year, as such machinery, on account of the small demand in this country, has to be specially designed and constructed. It seems, therefore, that peat intended for use next winter will have to be prepared either by hand or by

existing machinery that can be readily converted to use for producing peat fuel.

The hand-cut process of preparing peat, which is widely used in Ireland, seems most practicable for the owners of small deposits in the United States. Before this method can be used the deposit must be thoroughly drained and cleared, and the turf removed from its surface. Most bogs of the built-up type—that is, those which were formed by the deposition of the remains of plants that grow near the ground-water level—can be drained to the bottom by a simple system of surface ditches. Lake bogs, in which the deposit has accumulated below a permanent water level, can not generally be drained far below the surface of the peat without incurring great expense, and are therefore not so well adapted to hand digging as built-up beds. However, many lake bogs in the northern peat region, where most of the marshes in which this mineral has accumulated were formed during the Wisconsin or last glacial stage, may be sufficiently drained for peat recovery by means of a short drainage canal connecting the edge of the basin at the lowest level with an adjacent stream.

How the Peat Is Dug

After the surface of the bog has been cleared the peat is dug in brick form with a special tool called a slane. This instrument, which can be made by a blacksmith, is a narrow spade with a sharp steel lug welded on one side at right angles to the edge of the blade. The blocks of peat range from 8 to 10 in. in length, from 4 to 7 in. in width, and from 3 to 6 in. in thickness, their dimensions depending on the size of the slane. As they are dug they should be removed to the drying grounds and stood on end or placed on covered racks. At the end of about four weeks, during which they should be frequently turned until their moisture content is reduced to about 30 per cent., the blocks are usually ready for storage. As cut peat absorbs water rapidly, great care should always be taken to protect the dry blocks from rainfall. Peat fuel prepared in this way is bulky, easily crushed, and burns rapidly with considerable waste. In heating value it is superior to wood, but it is unfitted for commercial use.

To produce peat fuel of better quality and in larger quantity than is possible by hand, the machine process should be used. This process, which should be practicable for the use of citizens' associations desiring to prepare fuel for distribution among their members is, so far as known by the Geological Survey, the only one that has proved commercially successful in Europe. The machinery for a small plant is simple and could be quickly obtained and easily operated. It consists essentially of an excavator and a macerator. The steam shovel could be used for digging peat from drained deposits; the dipper dredge is well adapted to removing this mineral from undrained deposits. The purpose of the macerator is to grind the constituents of the wet peat into a homogeneous pasty mass, which may be shaped into compact blocks. In principle and form the latest types of such machines are similar to the pug mill or grinding machine for plastic clay. Many of the experimental plants in the United States have used brickmakers' pug mills, with very slight changes, to grind peat, and they have proved to be well suited for the purpose. These machines may be readily obtained from dealers in clay-working machinery. After being thoroughly macerated the peat should be shaped into blocks as it issues from the machine or spread in a layer, from 8 to 12 in. thick, on the drying grounds and the bricks marked off by hand as the spreading proceeds. When partly dry they are loosely stacked or placed on drying racks and thereafter handled the same as cut peat.

A specially designed and constructed machine must be used for the production of peat fuel for market. Such a machine consists of a receiving hopper attached to a vertical or horizontal cast-iron body, in which revolve one or two knife-armed shafts. These shafts are also provided with spirally arranged flanges for moving the peat to the grinding knives and advancing it to the device for cutting it into bricks of uniform length as it issues from the orifice of the machine.

Machine peat that is allowed to dry slowly contracts into a dense mass covered by a gelatinous skinlike substance called hydrocellulose. After the moisture has been reduced to about 25 per cent. this coating renders it impervious to water, even when immersed. Peat manufactured by this process makes excellent fuel. In heating value a ton of machine peat is equal to about 1.3 tons of wood, seven-tenths of a ton of good bituminous coal, or half a ton of anthracite. Despite the disadvantages of cut peat, air-dried machine peat is well adapted for domestic use. It is clean to handle and burns freely, yielding an intense heat and producing no soot or other objectionable deposit. For open grates this fuel is nearly ideal, and it is said that peat may be burned in the same stoves as coal and wood. However, the best results could probably be obtained by burning it in a stove with relatively small grate openings and a restricted draft.



PUT YOUR CUSH IN THIS BIG PUSH

How Prices of Bituminous Coal Were Fixed by the Fuel Administration*—II

By CYRUS GARNSEY, Jr., R. V. NORRIS and J. H. ALLPORT
Engineers to United States Fuel Administration

THE great mass of cost figures, obtained from the analysis of the cost of operators mining over 95 per cent. of the entire production of bituminous coal in the United States, would be merely confusing and of but little practical value if presented in tables of figures and it was considered necessary to devise some plan to present these graphically so that they might be studied and compared with a minimum of effort and with maximum efficiency. After many trials, a chart was evolved which appears to have satisfactorily accomplished the ends sought.

The costs for each district, both exactly as reported and as adjusted were arranged in order by 1c. increments, beginning at the lowest cost, with the tonnage at each separate cost, whether from one or more operations; the percentage of total tonnage at each cost was calculated, and the cumulative percentage beginning at the lowest-cost tonnage was obtained.

Charts.—The percentages thus obtained were plotted on 10 by 10 cross-section paper, resulting in a diagram like Fig. 1. The dotted line shows the costs reported, and the full line the adjusted costs. The percentage of the total output between, or up to, any limits of cost can be determined by simple inspection. The "bulk line," or line of indispensable coal which must be assured of a minimum profit, after study of the conditions and necessities of any district, can be properly located, and from this a minimum profit necessary for the district can be determined.

Bulk Line Required Careful Study

The "bulk line" is a matter requiring very careful study. Its location must be such as to conserve and encourage all necessary operations and thus assure the maximum coal supply from each district. It is almost invariably found that at the high-cost end of the diagram are collected most of the doubtful enterprises. These include: Mines which have failed under normal competitive conditions and have been reopened under the stimulus of the high prices preceding Government control; mines abandoned as exhausted and reopened for the few remaining pillars; new enterprises in the development stage; mines opened on beds so thin or of such poor quality that they could not operate under normal conditions; small mines on outcrop coal, often of poor quality, which have neither capital nor equipment for economical working; mines which have encountered faults or in which the coal has thinned or split, or the quality has so deteriorated as to prevent working at a reasonable cost; and, not the least of this group, mines so badly managed as to show unwarrantable cost of operation.

All these classes of mines are unjustifiable under war conditions. They use labor inefficiently. Often their records show less than half the tonnage per employee usually obtained in their district, and their elimination is an economical advantage to a district in releasing labor to more efficient mines.

In this high-cost group occasionally are found mines which have a coal of unusually high quality or fitted for special use, for which a market at prices above those of the district has always existed. Such mines, on proving their special conditions, may receive consideration for special prices sufficient to allow a fair profit on their higher costs.

After a study of all conditions the "bulk line" is located as far as possible to exclude the classes of operations above mentioned, and to include all mines operating economically and efficiently. The margin above the "bulk line" is sufficient to allow all but a very small percentage of the tonnage to be produced without actual loss, but with less than the minimum profit applied to all mines up to the "bulk line."

Charts Divulge No Secrets

The charts have the further advantage that they show all the costs of any district without divulging the costs of any operation, yet by a very simple system of confidential keys the position of any separate operation can be almost instantly found and its cost sheets located.

The charts have the further advantage that almost any desired information as to costs or tonnage, averages, totals within desired limits, margins, excessive and subnormal costs with the tonnage involved, and other items of information often required can be obtained very rapidly and with a minimum expenditure of time or labor. On one occasion, two members of the committee calculated in a single evening the weighted average costs, both reported and adjusted, for over three-fourths of the entire bituminous coal output of the country.

It is inevitable that mines should show wide variations in cost, due to the varying thickness and character of the beds worked, and to apply a single price to all the mines of a state would result in either allowing an unreasonable profit to those working the better and thicker beds, or absolutely put out of business the higher-cost districts.

Where an area examined shows wide variation of cost, it becomes necessary to employ some plan of separation, and to segregate into groups those mines operating under similar conditions. Such districting may be based on difference in beds, on thickness of coal, or by geographical and geological districts.

Districting by beds is only occasionally practicable, for the following reasons: (*a*) Variation in thickness and quality in the same bed. (*b*) Difficulty of identification of beds. (*c*) Splitting of beds, changing one thick bed to two or more thin ones. (*d*) Changes in mining conditions in the same bed, making radical differences in cost of mining.

*Paper presented at the Colorado meeting of the American Society of Mining Engineers, September, 1918. The first part of this paper appeared in *Coal Age*, Oct. 10, 1918.

Districting by thickness of beds seems at first glance the most logical method, but it has the fatal objection that, as nearly all beds become thin in places, two or more costs will be found in contiguous mines and often in the same mine. Further, this districting leads to gross profiteering, by attempting to classify mines by the thinnest coal, not by the average.

The terms "thick" and "thin" beds are particularly dangerous, as what would be considered thick in one region may be classed as thin in another, and the reverse; it is therefore manifestly undesirable for the United States Fuel Administration officially to designate any particular thickness as the dividing line between thick and thin.

Districting georaphically has the great advantage of making divisions susceptible of accurate description and eliminating all questions as to the proper price applicable to any colliery. It generally puts together mines having the same conditions and normally competing, avoids varying prices for coal of the same quality and character, and simplifies distribution and marketing. The difficulties in applying this method are greatest in fields where numerous beds of varying thickness and character are worked, resulting in considerable variations in price. It is also frequently difficult properly to classify operations near the borders of adjoining districts, and geographical districts are hence necessarily subject to some adjustment of boundaries.

Further, in designating districts, labor conditions are necessarily carefully considered. Neither miners nor operators wish to have the scale of wages changed in any mine by the throwing of such mine from one wage district to another, and before deciding on the boundaries of districts, it has been found essential to obtain the wage-scale and the boundaries of wage-scale districts. Further, it is found that in making up the wage-scales, some very accurate districting has been done, and maps showing these wage districts are of great assistance in the final determination of proper boundaries.

It is the practice of the committee to classify mines under study, first by counties or fields, and then to separate or combine them, as the case may be, to obtain districts containing, as far as practicable, mines operating under the same general conditions.

Diagrams 2 and 3 show the result of districting in an important territory producing about 75,000,000 tons of coal per year. Diagram No. 2 shows the costs for the entire area, and the very wide variations in cost due to different mining conditions are apparent. Diagram No. 3 shows the costs in the three districts finally segregated. These all permit price fixing without giving excessive profit, or putting the high-cost districts out of business, thus assuring the mining of the required tonnage of coal.

It will be noted in the three-district diagram that the low cost of No. 1 corresponds with the high cost of No. 2, and the low of No. 2 with the high of No. 3. If prices had been fixed on diagram No. 2, for the entire state, the "bulk line" would have been placed at about $1.90. This would have put the whole of District No. 1 and 36 per cent. of District No. 2, or a production of about 500,000 tons per month, above the bulk line, giving these regions an insufficient margin, and checking production, if not stopping it; at the same time it would have given to District No. 3, producing 5,700,000 tons per month, 30c. per ton or over $1,700,000 per month unnecessary margin. Similar conditions throughout the country have been handled in this manner.



FIG. 4. MAP OF WEST VIRGINIA, SHOWING PRICE DISTRICTS

It will also be noted that the variation between high and low costs increases with the higher-cost districts. The angle of slope of the cost line increases from No. 3 to No. 1. This results in a somewhat greater margin between the average cost and the "bulk line," which is logical and necessary. The high-cost mines, having greater expenses, need a larger margin to attain the same percentage of profit. As an example of the districting necessary in exceptional cases, Fig 4 is a map of the districts in West Virginia. On fixing prices for these, only seven different prices were found necessary for 13 districts.

The "bulk line" of the chart, with the margin added by the Fuel Administrator, gives the necessary realization for a district, but it does not completely fix prices.

The price for run-of-mine is usually fixed at the realization price, but where screening is desirable it is necessary to fix a spread of price so that the operator receives as much as 1c. or 2c. more for the screened product than for run-of-mine.

The tonnage of run-of-mine, prepared, and screenings for each district is obtained from the cost sheets; then the average division of the screened coal in percentage is computed and from this margins are determined which will permit screening but not too greatly stimulate the practice. For instance, if a coal will produce 55 per cent. prepared, and 45 per cent. screenings, an equal margin above and below the run-of-mine price would be indicated; but a coal which would produce 30 per cent. prepared and 70 per cent. screenings would need a much larger margin for prepared above run-of-mine, and a very small margin below for screenings.

If the "spread" is not correctly figured, the result is to make some combination unduly profitable, with the result that only that combination is found to be made. In some instances, run-of-mine from particular collieries shows a few cents margin over screened coal, and these collieries will produce run-of-mine exclusively. In other cases, prepared and screenings are more profitable, with the reverse result.

Unusual Sizes.—In many parts of the country it was found that special sizes were customarily made. In Illinois, for instance, a considerable amount of coal is sized, about in accordance with anthracite practice, into egg, stove, nut, pea and buckwheat, and in certain states so-called "modified run-of-mine," passing through 2, 3, 4, 5, 6 and 8-in. bars is a standard product. These specially prepared and modified run-of-mine sizes cost the operators something extra, and will only be made if the prices received yield a profit over the regular procedure. The Fuel Administration has met this condition by allowing special prices for specially sized coal, and for modified run-of-mine sizes, but all such prices are so calculated as to allow only enough profit on any combination to permit its existence and not enough to encourage the forcing of such size on consumers.

In price fixing of this sort, it is essential to obtain, from several independent and reliable sources, the percentages of the various sizes produced by screening from each coal likely to be used in this way, and carefully balance the costs, losses, and percentages of each size produced, to arrive at a proper price.

It is also necessary to evolve methods of preventing profiteering on special prices. For instance, it was found that after making sizes down to buckwheat from bituminous coal, in some cases the fine screenings, far below the standard mesh of the district, were run into the regular run-of-mine and sold at the run-of-mine price. This was handled by an order allowing a maximum of 30c. below *screenings price* for any mixture of the fine coal below 2½-in. mesh with any other coal. This is easy to police, as the mere report of sizes below the standard screenings mesh of any district involves the report of special fine screenings or "carbon" at the price 30c. below screenings, and if such is not found, it is assumed to be mixed with commercial sizes.

Margin.—The difference between the mine costs, arrived at as described above, and the price is the "margin." This is far from being the profit, as many items of expense necessarily incurred are not included in the mine price. Such are: (*a*) Selling expense. (*b*) Improvements. (*c*) Developments to increase output. (*d*) Excess of capital expenditures over normal costs. (*e*) Contracts at lower than "Government Prices." (*f*) Interest on bonded indebtedness. (*g*) Income taxes. (*h*) Excess-profit taxes. (*i*) Profit on investment.

None of these items is properly included in "cost of production" under normal conditions, but in a war situation it is practically impossible to obtain money to capitalize expenditures for excess improvements, and developments, which would normally be capitalized and properly included in the permitted depreciation, particularly as all such expenditures are made at from two to three times their normal costs; it is a serious question whether the "margin" allowed should not be made large enough to include at least this class of expenditures.

As our Government has been forced into this untried realm of price control by war conditions, it may be interesting to know the results. These, in general, are available only as applied to the latter months of 1917, before the labor increase, compensated for by the 45c. general advance in coal prices above referred to. Diagram No. 5 shows the average costs, "bulk lines," and prices fixed for practically all districts in the country, as of August and September, 1917, and covers about 84

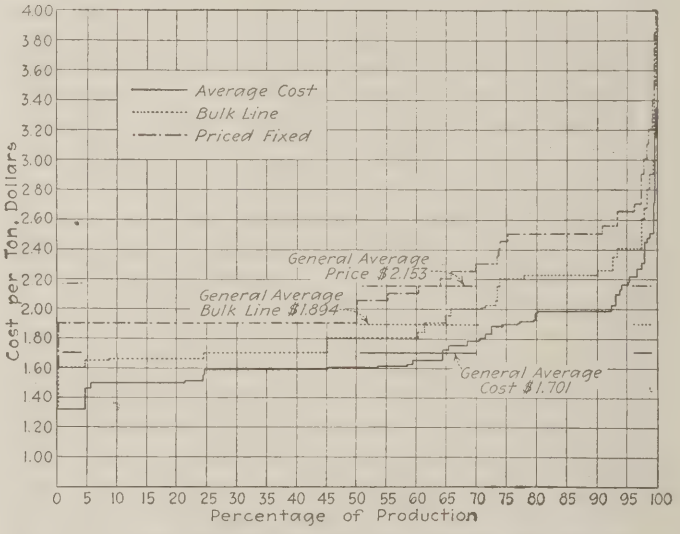


FIG. 5. AVERAGE COSTS, "BULK LINES" AND PRICES FOR ALL DISTRICTS

per cent. of the total output of bituminous coal for the period stated.

The costs for each district, in the proportion of its output to the total tonnage studied, are shown in full lines; the "bulk lines" are shown by dotted lines; and the prices fixed are indicated by dot-dash lines. The diagram also shows the weighted average costs, "bulk lines," and prices fixed for the tonnage included, and effectively disposes of the widely circulated aspersions of profiteering, of which the industry has been so freely accused by people having no knowledge of the facts or willfully misrepresenting them.

The weighted average margin between costs and fixed prices for practically the entire bituminous coal production of the country is but 45.6c., and between the "bulk line," which represents the higher-cost necessary coal,

and the price fixed by the Fuel Administrator of but 26c. When it is known that the capital invested per ton of yearly output ranges from $2 to nearly $8, and that the items above noted, which amount to a considerable sum per ton mined, must come out of this very narrow margin, it is evident that the coal business of the country is not only not on a profiteering basis, but is still on a very narrow margin of profit.

The average cost of the 84 per cent. of the total coal represented for the two months of August and September, 1917, was reported to be $1.696. The adjustments heretofore described raised this reported cost to $1.706, a very strong indorsement of the honesty of the reports made by the operators.

The average "bulk line" was fixed at $1.902, or 19.6c. above the average adjusted cost. This represents the

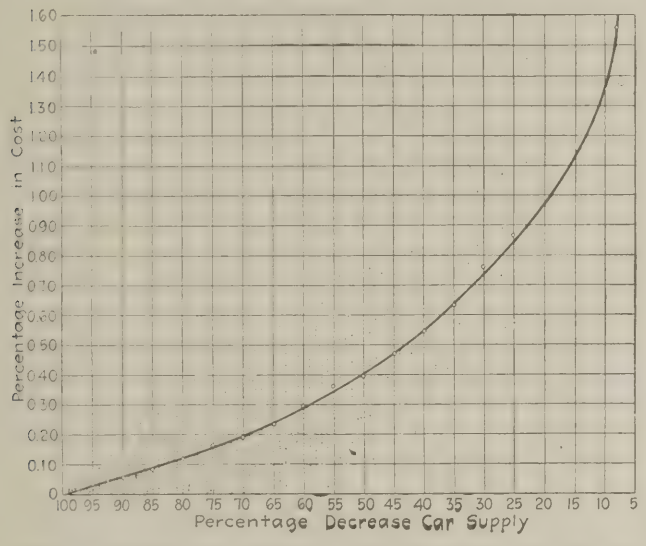


FIG. 6. INCREASE IN TOTAL COST OF PRODUCTION

margin required to assure the mining of the necessary coal, as compared with the average cost, which, of course, involves the mining of only coal up to or below the average cost; in other words, half the available output.

The weighted average of all prices fixed is $2.162 per ton and the average margin above the "bulk line" is 26c., representing all the above mentioned charges and all profit for the higher-cost necessary mines; the margin above the average weighted cost for the whole country is 45.6c. per ton, which, compared with profits in other businesses, certainly does not show any signs of profiteering in the coal business as a whole. The prices fixed are also sufficient, on the basis of the reported costs, to permit the mining of 98.4 per cent. of all available coal, without loss.

The prices fixed from this complete investigation of costs have shown, in many cases, a remarkable compliance with economic laws. For instance, in Illinois the cost of coal from the different price districts, delivered in Chicago, is found to be practically identical, showing that the mining of the higher-cost coal is due to its proximity to the principal market and the lower resulting transportation costs. High-grade coal shipped by lake and rail to Minneapolis was found to cost precisely the same per heat unit as a lower-grade coal shipped a much less distance all rail.

Special Prices.—The price fixing program adopted is expected to take care of all normal mining conditions and to permit the operation, with a reasonble profit, of all mines necessary to the country under war conditions. There are cases, however, of old established mines which are producing coal of a quality specially suited to certain processes or requirements, which coal, while produced at a cost materially above the regional "bulk line," is necessary and has always commanded a special price. In these cases, a higher price, sufficient to permit operation, is usually granted. Also, in some cases, groups of small mines, not required to report, are found to be serving certain communities at prices below other coal available, considering the transportation charges, but with costs above the regional "bulk line." These also receive special prices. In general, it is the policy of the Fuel Administration to encourage the operators to produce all coal needed and to place restrictions only on coal mined under conditions notably uneconomic.

Effect of Short Time.—While it is a syllogism in mining regions that "short time means increased costs," but little actual information as to the quantitative effect of lost time on the cost of coal mining is available. In the discussion as to the advantages or disadvantages of an even car supply to all mines, as compared with 100 per cent. supply to some and the remainder to the others, it developed upon the committee to determine, at least approximately, the effect of lost time on mining cost.

Reports from 73 Operators Were Analyzed

Fortunately reports were available from 73 operators in the New River district of West Virginia, which had been made out and submitted by an eminent firm of expert accountants for each month of the year 1917. Each of these was carefully analyzed, and the percentage increase of cost for each of the 830 observations thus obtained was platted; weighted averages were then taken at each 2.5 per cent. from 70 to 100 per cent. working time, and for each 5 per cent. below 80 per cent. The result of this study is submitted on diagram No. 6 which has been checked by numerous observations from practically every field, and has been found, within reasonable limits, to be correct. This diagram can be and has been used in reducing to normal cost the reported costs of collieries shut down during parts of months.

Anthracite prices were fixed by the President on Aug. 23, 1917, and have not since been revised. The latter is now a subject of intensive study, and it is expected that after sufficient data have been accumulated a revision and scientific price fixing will be attempted.

The problem of anthracite price fixing presents all the difficulties encountered in the bituminous fields, complicated beyond measure by the varying percentages of sizes produced by different mines in the same region, and the still more widely varying percentage of sizes produced by the different regions.

It should be generally known that the United States Fuel Administration exists only for war conditions. It expires by limitation of the Lever Act. The Administration is endeavoring most earnestly to give both to the miners and to the consuming public a fair deal and no favor. It has accomplished incredible results in conservation of fuel and stimulation of output, but such results have only been possible by the earnest, whole hearted, and patriotic support freely given by operators, miners, and by the consuming public.

DEPARTMENT OF HUMAN INTEREST

Using Posters to Boost Coal Tonnage

To stimulate the mine workers to produce a greater tonnage the anthracite producing companies have had recourse to big poster cards 20 x 30 in., printed with scarehead type and placed in the most conspicuous places in and about the mines, so that mine workers will not fail to see and read them. A poster put up by the Lehigh Coal and Navigation Co. on all its properties reads as follows:

Hit the Hun

Our mine output for
August, 1918, was 370,000 tons
August, 1917, was 392,000 tons

A loss
amounting to 22,000 tons

1 ton of coal makes 40
3-in. shells. In August

We lost 880,000 Shells

To back up our boys
"over there"

Let us make it up in September

A record tonnage means
a wallop at the Kaiser

Speed up September

L. C. & N. Co.

Other authorities declare that one ton of coal will manufacture only 27 three-inch shells but, more or less, the figure is startling whether you write it as 880,000 or 594,000, remembering as we must that a shell might well destroy a man who living might take the life of one of our boys "over there." These poster cards are well calculated to keep ever before the mine worker the tremendous importance of the work which lies before him and the part he has in the winning of the war.

All Kinds of Patriotic Work at Gary

The annual inspection of the gardens and yards of the employees of the United States Coal and Coke Co. at Gary, McDowell County, West Virginia, was made July 29, 30 and 31. The judges were Professor W. Paddock, head of the Horticulture Department, Ohio State University, Professor Dee Crane, representing West Virginia University, and Bert E. Sayre, representing the West Virginia Department of Agriculture. The judges found the gardens as a whole very productive. Many of these gardens had been planted under difficult circumstances, some being on ground that had been filled around newly constructed houses.

At one plant the garden of an Italian coal loader was found on an almost perpendicular hillside, the ground having been terraced laboriously as is customary in such cases in Europe. This man had about 25 varieties of vegetables in his garden, and yet he had worked every day at his occupation of coal loading. In another garden they found 600 newly planted grape vines methodically set out and properly staked. Interspersed between the vines were planted tomatoes, cabbage and other vegetables. At some of the plants all the yards had been used for gardens. The judges estimated that the gardens at the plants of the United States Coal and Coke Co. would bring at current market prices between $100,000 and $150,000.

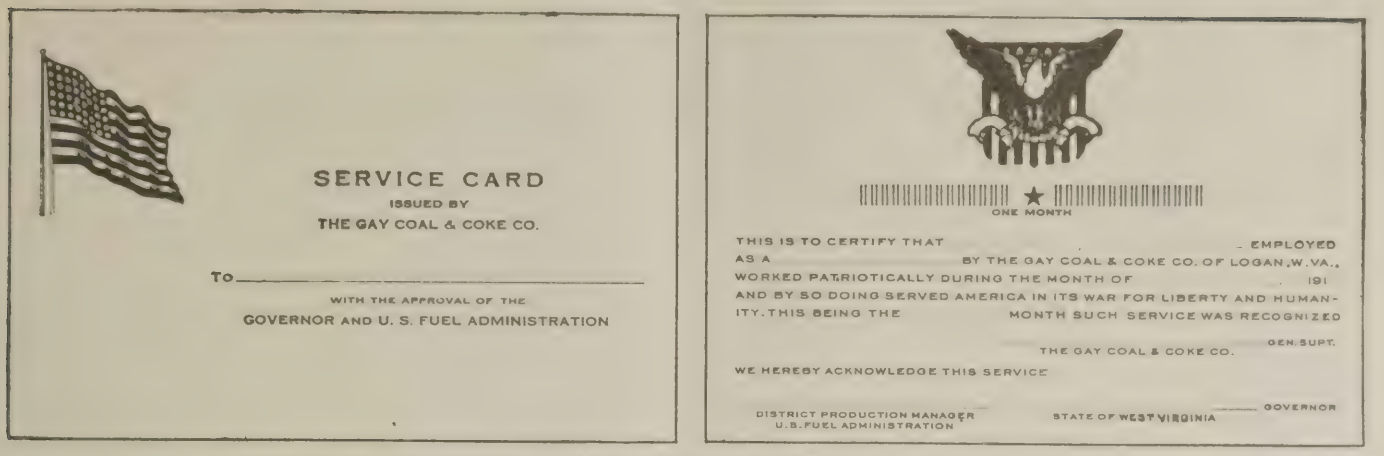
The employees of the United States Coal and Coke Co. have shown their patriotism in every call the government has made upon them: Red Cross work, Liberty Bonds and Y. M. C. A. work; and this inspection shows that they have likewise done their part in raising food supplies.

Reward for Patriotism in West Virginia

The Gay Coal and Coke Co., at Logan, W. Va., is issuing a four-page "Semi-Monthly Bulletin" for its employees. It is a pleasure to quote the remarks on "Service Cards" in its first issue, which appeared Aug. 31, 1918.

"Employees who render patriotic service by working full time each month will be awarded by the company with a service card certifying to that fact. This card will be approved by the general superintendent of the company and signed by Governor Cornwell and by the production manager of the United States Fuel Administration. Cards will be issued each month. Your first month's card will bear one star, the second month two stars and the third month three stars. The service, however, must be rendered in consecutive months; that is, to secure a card with three stars it will be necessary to have worked three months full time in succession.

"If an employee cannot work every day it does not mean that he will be deprived of a card. For instance: Should you desire to lay off a day or two for personal reasons, secure permission from your foreman or boss,



ENVELOPE AND SERVICE CARD ISSUED BY THE GAY COAL AND COKE CO.

who will issue you a written excuse. In doing this you will enable him to find someone to take your place without the production of the mine being curtailed. Should no cars be received and you report for duty and cannot work, it will be assumed, in keeping the record of your service, that you worked a full day. If you are compelled to lose time through reason of any fault not your own (that is to say, through any fault of the company in not furnishing you with work) you will be considered as having worked that day.

"In case of sickness, the company doctor or other practicing physician will furnish an excuse in writing, a copy being retained by the foreman or boss issuing it and a second copy being filed in the payroll office. This system with your own help will enable you to have a perfectly clean record each month. The value of these service cards cannot well be overestimated.

"Should you desire to leave the service of the company and apply to someone else for employment you could show a recommendation of weight and value. Should one of your friends come back from 'Over There' you could show him with pride that while he was doing his part you were doing yours. On the last page of *The Bulletin* issued for the first half of each month will appear the names of those who are entitled to service cards for the preceding month."

Some important directions to be observed after an explosion are as follows: Keep all air compressors working; if they are not working, start them, so that fresh air can be forced into the mine workings. Shut off all electric power entering the mine, unless this power is on a separate circuit entering a shaft or borehole to drive a ventilating fan. Do this in order to prevent any live men or the men who may come in contact with the electric wire from being electrocuted, and to prevent a fire or explosion through the short circuiting of any wires that may have been blown down.—*Rescue and Recovery Operations in Mines.*

STICK TO YOUR JOB

Written expressly for Coal Age

By RUFUS T. STROHM

You watched your pals as they marched away
To the snare-drum's martial rattle;
Your heart grew sick at the thought that they
Would strive in the heat of battle
While you held off, like a yellow cur,
Apart from the noise and bustle;
But such a thought is a baseless slur—
Stick close to your job, and hustle!

Let others dare where the star-shell's flare
Turns night into daylight glowing;
You're needed here, if the vast affair
Of war is to keep a-going.
The force that wins to the long-sought goal
Depends on the iron muscle
Of those who delve for the nation's coal,
So stay on the job, and hustle!

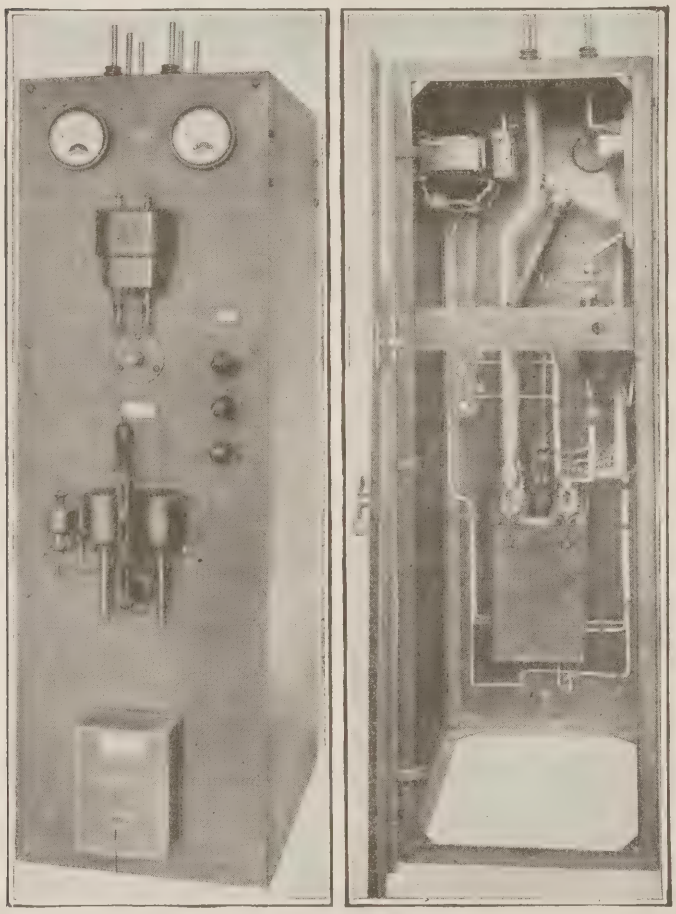
Shoot down the coal in a black cascade,
For that is the kind of shooting
That pays old Fritz for his every raid,
His lies and his savage looting;
And don't lament that you're left behind,
Denied a part in the tussle,
For winning hangs on the coal that's mined,
So cling to your job, and hustle!

Since coal is the mainspring of the war,
And you are a loyal miner,
Advance the cause we are fighting for,
Than which there is nothing finer;
Forget your dream of a far-off coast,
And death where the wheat-stalks rustle,
And give your help where it counts for most—
Stay right on the job and hustle!

New Apparatus and Equipment

Steel Switching Cabinet

The steel switching cabinet shown in the accompanying illustration is a unit made for single-, quarter- and three-phase circuits in capacities up to 300 amp. at 15,000 volts, and 800 amp. at 600 volts. All current-carrying parts are inclosed, and provision is made for bringing the leads out at top, bottom or sides of the unit. The cabinet consists primarily of instrument transformers, oil circuit breakers and disconnecting switches inclosed in a sheet-steel compartment with instruments, operating levers, etc., mounted on the sheet-steel front.



CLOSED AND OPEN VIEWS OF STEEL SWITCHING CABINET

The main switching apparatus consists of a standard switchboard-type oil circuit breaker operated in the ordinary manner. The oil circuit breaker is mechanically interlocked with the disconnecting switch so that this switch cannot be opened or closed while the oil circuit breaker is closed. The disconnecting switch is operated by means of a special handle or wrench from the front of the panel, and is so interlocked that the rear door cannot be opened while the switch is closed, nor can the switch be closed while the door is open.

This apparatus has been designed for use as distribution and tying in switches, as control switches for induction and synchronous motors, etc. It is usually mounted as a single unit but may be installed in groups if desired. When made with a drip roof the switching cabinet is particularly adapted to use in mines or other damp places. It can be made nearly water, gas and dust proof. It can also be used to control large motors in steel and cement mills, pumping plants, etc., where conditions often exist which cause the switching apparatus to become damaged or to be put out of service by dust, moisture and chains from traveling cranes.

Conveyors Replace Common Labor

Nowhere in the industrial fabric has the disturbance brought on by war conditions been more keenly felt than in the unskilled labor market—among the shovelers, lifters and movers of goods and materials. Perhaps because this type of labor had always been plentiful and relatively cheap there had been, before the war, less application of machinery to such purposes than in almost any other field.

Ore docks, coal docks, grain elevators and some large plants were equipped with complete and well arranged conveyor systems. But unless large quantities of material were handled in a highly organized way, it was the custom to depend on human labor using primitive equipment. Retail coal yards, factory power plants and construction jobs were examples of undertakings where it would long ago have been practical to install mechanical handling of materials, and where human labor was usually exclusively depended upon.

War conditions undermined old methods from two directions. Transportation became uncertain and made it essential to receive material in the largest possible quantities whenever transportation was available and to store it until it could be used. It was no longer possible to depend on shipments arriving at the plant in such regular sequence that coal or other materials could be unloaded from the cars for immediate use.

This situation aroused more interest in light, portable material-handling machines than ever had been felt before. It became an established principle with many companies not only to replace labor by machinery whenever the machine could do the work cheaper, but to give preference to the machine if the costs were the same or even slightly higher.

Conditions were ripe for the rapid application of light, portable conveyors to all sorts of handling problems. A grade of engineering skill and manufacturing ability was attracted to their production that had not previously been devoted to them. Light, strong, well-designed portable conveyors, economical of power, easily moved about and set up, made their appearance. These are adapted to handling coal, sand, gravel, ashes, salt chemicals, package goods, brick and stone.

They were designed and built in standardized sections that could be assembled in units of any length to meet varying requirements. This made it practical to carry at factory for prompt shipment a large stock—and held down the investment tied up in such a stock to reasonable proportions.

Such portable belt conveyors elevate as well as move material and so have made it possible to use more fully the storage space available. Without additional cost material can be piled to the top of a warehouse or a coal shed, while on the open ground higher and more compact piling of material is possible. Additional construction of storage buildings can in this way often be avoided.

In the service of the Western United Gas and Electric Co. at its plant in Joliet, Ill., two portable belt conveyors made by the Barber-Greene Company, of Aurora, Ill., are operated in series in loading coke into railway cars. These cars are loaded in from two to four hours, according to size and type, with less than half the labor that was previously required to load them in from 7 to 10 hours. The saving in cost is about 50 per cent.



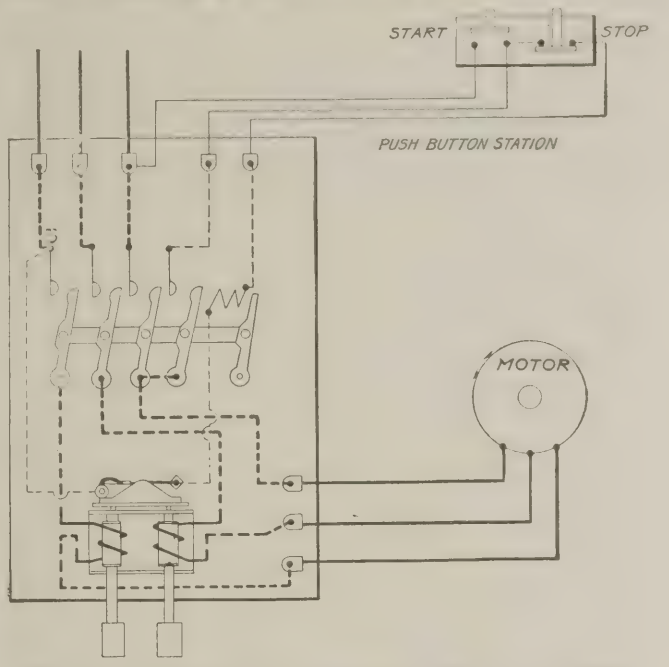
VIEW OF LIGHT CONVEYOR AT WORK

Several types of conveyors have been developed to meet different requirements by the Barber-Greene Company. For elevating at angles under 25 deg. a plain belt is employed. For angles of 30 to 35 deg. a belt equipped with steel flights is provided to prevent the material from slipping down the grade. For chemicals that will corrode metal, conveyors of similar design are provided with wooden frames. The conveyors are made portable by mounting them on a wheeled truck or suspending them from a trolley attached to an overhead steel cable.

A wide variety of applications have been worked out since these machines went into use—many of them unforeseen until they were discovered in practical operation. They unload cars into piles, into storage sheds, into wagons or motor trucks. They load cars from trucks or wagons, storage piles or sheds. Where the carry is long two or more conveyors can be worked in combination—sometimes with a chute between them.

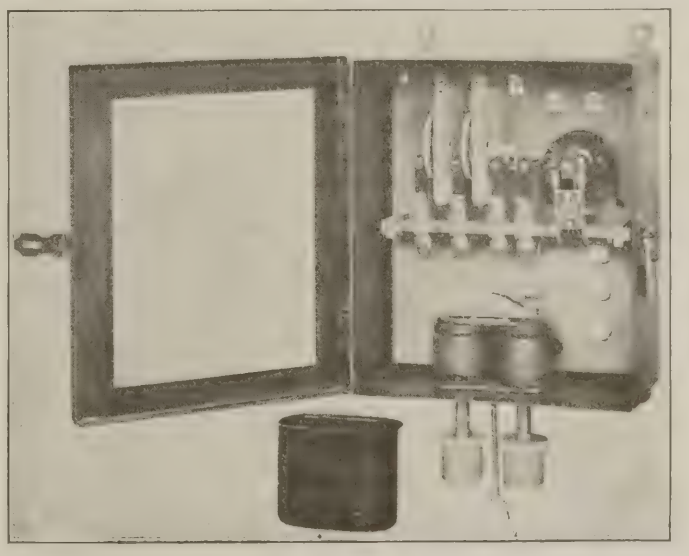
Remote-Control Starters

There has always been a demand for a device for starting small induction motors from remote points by throwing them directly across the line. The General Electric Co. has recently developed and placed upon the market such a starter, known as the CR-7006 remote-control switch, arranged for push-button control. This starter is applicable for use with motors up to and including 5 hp., 110 volts, and 7½ hp., 220, 440 and 550 volts. In addition to its starting function the device provides protection against undervoltage and overload. The device consists of a 25-amp., three-pole contactor with two inverse, time-limit, gravity-reset, overload relays mounted on a slate base totally inclosed in a strong sheet-iron case. A small "start and stop" push-button station is used as a remote-control switch. Completion



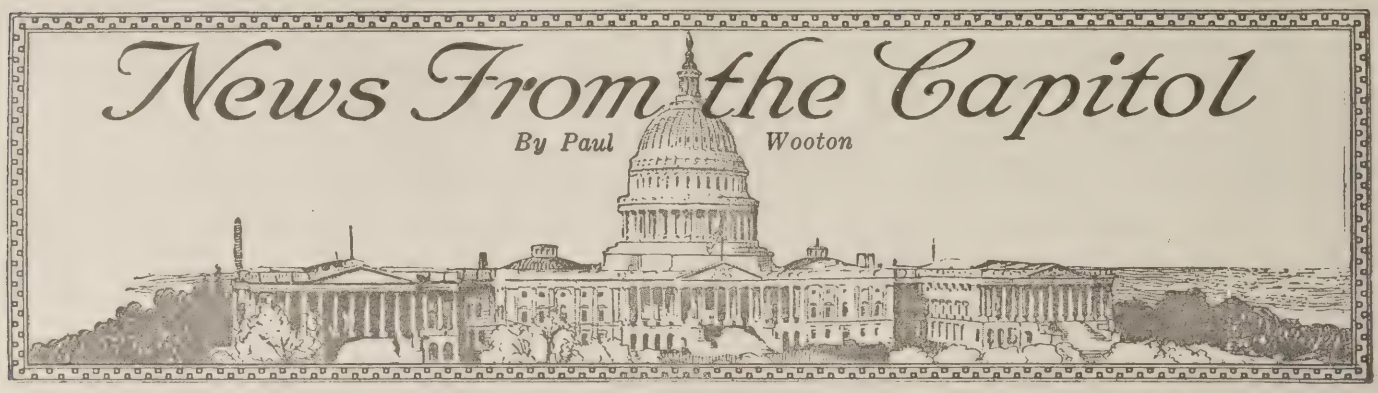
WIRING DIAGRAM OF REMOTE-CONTROL STARTER

of the starting circuit, by pressing the "start" button, energizes the coil of the magnetically operated switch, closing the contacts, which throws the motor directly on the line. Interruption of the circuit or a radical decrease in voltage permits the contacts to reopen by gravity, thus stopping the motor, which cannot start again until the "start" button is pressed.



REMOTE-CONTROL SWITCH OPERATED BY PUSH BUTTON

The overload relays can be adjusted for various values ranging from normal up to 50 per cent. above normal. They can also be adjusted over a wide range of time values. The relay trips automatically and resets by gravity. The cover of the inclosing case is furnished with a hasp so that if desired it can be locked in a closed position by a padlock.



New Prices Authorized for Certain Mines

New prices have been authorized for the Montevallo Mining Co., of Alabama, as follows: Run-of-mine, $3.65; prepared sizes, $3.90; slack or screenings, $3.15.

New prices have been authorized for coal produced by the Loony Creek Coal Co. and by the Reliance Coal and Coke Co., each of Kentucky, as follows: Run-of-mine, $2.55; prepared sizes, $2.80; slack or screenings, $2.30.

Owing to the unusual expense required in the stripping operation of the Graff Mining Co. in Westmoreland County, Pennsylvania, the Fuel Administration has allowed a price of $2.95 for run-of-mine, prepared sizes, or screenings. No addition is to be made for the wage agreement.

New Prices for Colorado Gas Coke

New prices for gas coke in Colorado have been established as follows: Run-of-retort, $5.50; run-of-retort, screened, over ¾ in., $6: prepared sizes above ¾ in., $6.50; prepared sizes below ¾ in., $4.50. The price at Colorado Springs may be 50c. in excess of those mentioned.

Stops Issuance of Distributors Licenses

An increase of 200 per cent. in the number of coal and coke distributors during the past seven months has caused the Fuel Administration to suspend the issuance of licenses pending an investigation. Some are of the opinion that advantage is being taken of the purchasing agent's commission and distributors are embarking in the business to contribute neither skill, experience nor anything else of value.

To Study Cargo and Coal Handling Methods at American Ports

New cargo and bunker coal handling machinery or new adaptations of the machinery now being used at the ports is considered by the Port and Harbor Facilities Commission the most likely means of cutting down a ship's "turnover." The active ports of the Old World have developed many of these devices, some of which are of American invention, and it is due to them that the capacity of the port is increased and cargoes handled quickly and cheaply.

"We want to make our ports as efficient as any in the world," says a statement issued by the committee. "We want to benefit by the experience abroad. We want to bring the standard of efficiency for machinery for handling general cargo and bunker coal up to the standard reached by the ore and coal handling machinery of the Great Lakes and elsewhere in the United States which is of American invention and admittedly the most efficient in the world.

"American manufacturers have been invited by the Port and Harbor Facilities Commission to make a careful study of our entire port situation to the end that possible new and ingenious methods of handling cargo and coal may be developed in conjunction with the best arrangement of piers, warehouses and other terminal facilities.

"Improvements, particularly in machinery, are desired now not only to expedite the movements of supplies to our armies in France, but also to have our mercantile marine ready to meet the keen competition that will follow after the war."

Price Fixed on Reclaimed Coke

A price of $5.50 has been authorized for mixed sizes of screened and cleaned beehive or byproduct coke reclaimed at the point of production from accumulated breeze piles. Such business, however, must be conducted under permit.

Production Quotas Now Being Assigned

Actual assignment of production quotas has been begun by the director of production for the Fuel Administration. Eventually each mine in the United States will have a rating and, as Dr. Garfield puts it, "individual responsibility." The enterprise of James S. Amend, the production manager for the Greensburg-Westmoreland district, is credited for making possible thus early the assignment of quotas in that district. When the rating of the mine has been established, the following letter from the director of production is sent to the operator:

After careful investigation it has been decided that your mine can produce at least ——— tons per day, and that tonnage has been allotted to you. It will be necessary for you to produce an average daily tonnage of ——— in order that you may contribute your fair share of the total coal tonnage needed by the United States Government in carrying out its war program.

The total coal requirements are definitely known and this has been allotted to the various producing districts and to each mine in each district. From this you will see that if the total amount is to be produced it is essential that no mine fail to meet that part of the Government requirement allotted to it. You will please make this situation known to your operating officers and to the mine workers in your employ, telling them that the United States Government looks to them in full confidence that they will accept the allotment of ——— tons per day as their fair share and

will cheerfully see to it that at least that amount is produced without fail.

Unless a sufficient tonnage of coal is produced it will be impossible for the United States Government to furnish to General Pershing material in sufficient quantities to enable him to carry on a successful campaign against our enemies with the smallest possible loss of life and labor. I have no doubt that every man and boy in your employ will gladly do his part and will rejoice in having this opportunity to contribute toward winning the great war which is being waged for democracy.

Plans to Increase Coke Production

In response to an appeal from the War Industries Board for more coke, the Fuel Administration is launching a campaign looking to the increase of that important material in the making of steel. Steel requirements are millions of tons above the present output. The limiting factor is pig iron, and in the making of pig iron coke is the essential holding back output.

A hasty survey of the situation shows a great deal of idleness among coke workers. A material increase in coke production can be obtained if the required labor can be secured. Comparatively little attention has been given the matter of idleness among coke workers. If the methods now being used so successfully among coal miners are applied to coke workers, it is believed that a marked increase in coke production will result. James B. Neale, who is in charge of production for the Fuel Administration, is directing the new campaign.

Will Rehabilitate French Coal Mines

Much of the material which will be necessary for rehabilitating the coal mines in the Lens region of France will be supplied by the United States. Plans to this end were almost perfected more than a year ago when the recovery of the coal fields seemed imminent. Officials of the War Industries Board, the Fuel Administration, the Bureau of Mines and the French War Mission already are busy on the problems involved.

More Coal Cars Being Loaded This Year

From Jan. 1, 1918, to Sept. 28 there had been loaded 641,761 cars of coal more than in the same period of 1917, according to the Railroad Administration. A summary of the loading of coal for the week ended Sept. 21 is as follows:

	1918	1917
Total cars bituminous	219,925	182,565
Total cars anthracite	36,859	37,294
Total cars lignite	4,056	3,379
Grand total cars all coal	260,840	223,238

A summary of reports for the week ended September 28, 1918, based on actual reports from most roads, but with the results of some roads estimated, follows:

	1918	1917
Total cars bituminous	226,238	191,185
Total cars anthracite	40,524	42,008
Total cars lignite	4,016	3,647
Grand total cars all coal	270,778	236,840

A drive is being made by the Forest Service, now that crops are out of the way, to stimulate the cutting of wood by farmers. It is pointed out that the heating value of one standard cord of well seasoned hard wood is equal to a ton of anthracite coal.

Summary of Traffic Conditions

Reporting to the Railroad Administration, the Fuel Administration summarizes traffic conditions as follows: "Car supply uniformly good in the East. Some accumulation on Baltimore & Ohio and need of power on Chesapeake & Ohio.

"Tidewater—Vessel supply ample.

"Lake Situation—Good, ample supply of coal at docks and dumping increased.

"Southern Region—Some car shortage in Birmingham district and in southwest Virginia.

"Coke—Car supply good."

Coal and Coke in 1917

The production of bituminous coal in 1917 was 551,790,563 net tons, an increase over 1916 of 49,270,881 tons, or nearly 10 per cent., according to C. E. Lesher, of the United States Geological Survey, Department of the Interior.

The production of Pennsylvania anthracite in 1917 established a new high record of 99,611,811 net tons (88,939,117 gross tons), exceeding that in 1916 by 12,033,318 net tons, or nearly 14 per cent., and surpassing the previous record of 91,524,922 net tons in 1913. With the exception of West Virginia all the large coal-producing states recorded increases, the only decreases having been in West Virginia (0.02 per cent.), Oregon, South Dakota and Georgia.

The production of coke in 1917 was 55,606,828 tons, an increase compared with 1916 of 1,073,243 tons, or 2.0 per cent. The output of byproduct coke increased from 19,069,361 tons in 1916 to 22,439,280 tons in 1917 and represented 40.4 per cent. of the total in 1917 against 35 per cent. of the total in 1916. The production of beehive coke decreased from 35,464,224 tons in 1916 to 33,067,548 tons in 1917. The number of active byproduct ovens increased from 6607 in 1916 to 7298 in 1917, and of beehive ovens from 65,605 to 68,687, but the irregularity of operation of beehive ovens in 1917, due principally to lack of railroad cars, reduced the average production per oven.

The number of men engaged in producing bituminous coal increased from 561,102 in 1916 to 603,143 in 1917, and the number producing anthracite decreased from 159,869 in 1916 to 154,174 in 1917. However, the number of men employed underground in the production of bituminous coal increased from 474,244 in 1916 to 498,185 in 1917, a gain of but 5 per cent. compared with a gain of 20.8 per cent. in surface employees.

In the anthracite regions the number of underground employees decreased 5.8 per cent., but the surface employees increased 2.4 per cent. In both branches of the coal-mining industry there was a relatively large gain in the number of men employed on the surface, which is significant when it is realized that it is the underground worker who actually produces the coal and who is the more skilled workman.

The average number of days worked in both bituminous coal fields and anthracite mines was the highest recorded—243 in the bituminous field and 285 in the anthracite.

A bond slacker is the Kaiser's backer.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The mine workers of the anthracite region were promised on Oct. 5 that an announcement would be made Oct. 15 relative to a change in scale. However, on going to press no such notice had been made. It is understood that there will be an increase, the amount of which will be announced Oct. 17, the date of this issue. The increase will bring the anthracite wage scale closer to the scale of the bituminous region. This gives substantial justice at this time as between the two regions, but it will give the anthracite worker by far the greater earning power, just as soon as the bituminous mines drop back, after the war, to their old-time desultory schedule of operation.

> One of the things that my father used to teach me when I was a boy was that it was not advisable to be honest solely because honesty was the best policy, but that it was advisable to be honest because honesty is right. And so it is with contract obligations, it is advisable to live up to your contracts not so much because you benefit from living up to them, although that has been the result, as it is essential that you should live up to them because living up to them is right.—*Secretary of Labor Wilson in reference to the wage increase asked in anthracite region.*

The anthracite region works steadily now and has done so for years. Everything, except perhaps the introduction of byproduct coal and carbocoal, seems to assure the continuance of steady work in the anthracite region. In fact it is likely to become increasingly steady as the years pass. Consequently the wage scale in the anthracite region, though based on the bituminous region and the short time its men work, will afford higher monthly wages than the wage scale of the bituminous region.

Yet it is likely that few will move into the anthracite mines. The evil apprenticeship rule keeps away the men from other sections. Many of the miners in the anthracite regions are foreigners and of peasant origin. No American wants to work as a laborer for such men, doing all the hard work and carrying off only a modicum of the pay. In fact the situation in the anthracite region is unbearably un-American and so long as the condition continues only immigrants will be found willing to fit themselves into it.

The mine workers in the anthracite region have shown that the increase in wage is not really needed by all of them for the maintenance of comfortable living. Of late it has been hard to get some of them to work steadily. At the plant of the Lytle Coal Co., near Minersville, the record of one month showed a loss of over 400 shifts. Most of these were lost by certain men who were absent from work day after day.

The complaint regarding the low wage is chiefly from the day workers who are not by any means as generously dealt with as the contract miners. The conference which will decide on the scale has been in session since Oct. 3. The union decided to ask for the increase on Aug. 16 and presented their request to Mr. Garfield on Aug. 22.

In Dubois, a leading town in the Clearfield district, a meeting was held Oct. 4 at which brewers and wholesale liquor dealers of the district promised the representatives of the Fuel Administration, there present, that they would not ship liquor into dry areas. The liquor dealers and brewers agreed to sell only to those persons who were known to them. The speakeasy evil is to be broken up. The day before the conference, Oct. 2, the retail liquor dealers made a promise similar to the pledge made by the wholesalers and brewers. The Fuel Administration has determined to try and put restrictions such as these in operation all over the United States and thus cure a loss of production from inebriety which is said to amount to from 5 to 9 per cent. of the whole production.

In the Butler-Mercer field the men have shown their loyalty, not only by an increased production but by undertaking to work full time. F. B. Reimann, production manager for his district, which includes all northwestern Pennsylvania, reports that at a mass meeting of the mine workers of Zenith mines Nos. 1 and 2, under the presidency of William M. Kay, the following resolution was passed:

"In response to President Wilson's appeal to the American miners to do everything in their power to increase the production of coal: We, the mine workers of Zenith mines No. 1 and No. 2 and of the new Victoria mine, in mass meeting assembled this 18th day of September, 1918, near Butler, Penn., do hereby pledge ourselves to work 50 full hours every week until the end of the war, unless prevented by causes beyond our control, and we hereby call on our fellow mine workers in the Butler-Mercer field to coöperate in making the production of this field 100 per cent."

In the Pittsburgh district Richard W. Gardiner, manager of production, is troubled by the fact that several local draft boards are exceeding their authority by placing miners in Class 1, thus causing them to be subject to immediate draft. He has been quite active also in his endeavor to prevent the miners from laying off for midday parades such as are being held on behalf of the Fourth Liberty Loan. These demonstrations of patriotic fervor should, he says, be delayed till 4 o'clock, at least, so that a full day's tonnage may be obtained, for unless we fulfill our duties as citizens we are not entitled to celebrate what we have done.

According to John Moore, the president of the United Mine Workers in Ohio, 100 out of 600 local unions report that the men comprising them bought about $726,000 worth of Third Liberty Bonds and had early in October purchased $432,319 worth of War Savings Stamps.

At Logan, W. Va., medals are being distributed to "industrial soldiers." A. C. Clapperton, general superintendent of the Amherst Coal Co. at Amherstdale, wears one himself and says that 416 of his mine workers will each receive one also. A bronze bar will indicate that the worker has done his full share of work for one month; a silver bar will attest the same for the second month; a bronze bar will be added to show the same service during the third month, and, after the fourth month of faithful service, a silver bar will be added and so on. Thus a worker will be readily recognized as a "steady" if the bronze and silver bars appear in right number and in regular alternation.

During the first month of this arrangement only 4 men in the employ of the Amherst Coal Co. put in less than 38 hours a week. The car supply was regular, so this result was made easy. The company has a storage arrangement, a Brown hoist loading the coal into railroad cars as soon as they arrive. A car can be filled in 22 min. Storage is made easy by reason of a convenient rocky ledge over which the coal can be dumped. As the coal contains little sulphur, and apparently that sulphur not of the kind which starts fires spontaneously, there has been no trouble from the firing of the coal piles.

The medals cost the company only 38c. each but the cost of the bars should be added. The Amherstdale mine workers find in the company a liberal landlord and a generous coal sales agent. Coal is sold the men at $1 a load, the company losing from 50c. to 75c. a ton by each sale. The houses rent for $10 a month though similar houses in Logan would readily bring $25 to $40 a month.

The Low Ash Coal Co. of Crown, Logan County, West Virginia, has a "black diamond" who loads 26 tons of coal every day the mine is operated. Last June the mine worked only 19 days, and this man, John Howard, loaded 525 tons of coal or 27.63 tons per day. On one of these 19 days the superintendent was afraid that he could not load all the cars furnished and Howard straightened himself up and put 50 tons on the cars that day. His earnings



JOHN HOWARD, WHO LOADED 50 TONS IN ONE DAY

are going into Liberty Bonds. John Howard is a "regular fellow," be it known; he drives a Ford.

The Pocahontas district has been asked for 14 per cent. more coal monthly. It is called upon to deliver 2,000,000 tons during the month of October. Such a large tonnage has never before been mined in this field. At Glen Jean, Fayette County, on Sunday, Oct. 6, a large meeting of miners, foremen, superintendents, other mine officials and operators was held under the leadership of James B. Neale, the Director of Coal Production for the United States Fuel Administration. There were 10,000 persons present from all over the New River field. James B. Neale spoke, also P. B. Noyes, the Director of Coal Conservation, Governor John J. Cornwell, Trooper Scott, Sergeant Brown and Lieutenant Nelidow.

In Kentucky operators are complaining that the boards are exempting only those men who are rated as skilled laborers—motormen, machine men, electricians and the like. The operators have made an appeal urging that coal loaders, and men who shoot the coal, are, in a degree, skilled and should be granted deferred classification.

The Kentucky draft boards find that a large proportion of the population would normally be exempt and consequently are disposed to turn a deaf ear to the requests for exemption unless the men seeking such a privilege are more than usually essential and have a reputation for steady work and large production. The associations of companies represented at the meeting which made the protest to Major H. B. Rhodes, of Frankfort, Ky., and the State Draft Advisory Board, were the South Appalachian, the Harlan coal operators, the Tug River operators, the Northeastern Kentucky Association and the Harold coal operators. These companies mine the best coal of Kentucky, much of which is of transport and byproduct-oven quality. It is extremely essential that these producers be not unduly interfered with, as their product is essential for the most vital of war uses.

Spanish influenza has invaded many of the coal fields thus reducing production in the Cumberland-Piedmont districts of Maryland and in Virginia and West Virginia, some mines being wholly closed and some operated only part time. In these sections the production is estimated at 50 per cent. of normal owing to the action of this disease. In Tennessee, Kentucky and Alabama the week's tonnage ranged from 15 to 50 per cent. of normal.

Reports from Altoona were to the effect that the tonnage in the Central Pennsylvania district fell off 70,000 tons or more than 5 per cent. of maximum output. Even at that the production was considerably larger than last year. Virginia has sent Dr. Paul B. Barringer, who was for many years with the University of Virginia to Bluefield, and he will visit all the mines in Virginia adjacent to Bluefield. Governor Cornwell, of West Virginia, has sent a representative to confer with him.

Doctor Barringer found 18 cases at Pocahontas, and reports arrived from the Richlands district saying that at least one-third of the miners were ill with the disease. One death had resulted. Other cases were reported in the neighborhood of Honaker.

Unrest in Canadian Coal Fields

The miners in district No. 18 of the United Mine Workers of America are extremely restless and seem to want a strike regardless of cause. The sliding scale has removed the old complaint about the cost of living, for the wages now rise with the increasing commodity costs. But it is still possible to strike because of an alleged unsafe condition of the mines, and 1300 miners at Fernie, Michel and Coal Creek are doing this; and they propose to get out the rest of the district if they can.

William Sloan, the Minister of Mines, offered to appoint immediately, under Section 73 of the Coal Mines Regulation Act, a commission composed of three members, one chosen by the miners, one by the operators and a third by the lieutenant-governor in council on the recommendation of the Minister of Mines. This commission, if the proposal had been accepted, would have taken evidence at once relative to the mining dangers at Michel and Coal Creek for which a remedy is still to be sought. What recommendations they would have made would have been binding on everyone.

This constituted the first proposal. The second was that the Minister of Mines pledge himself to "introduce at the next session an amendment to the Coal Mines Regulation Act calling for the production of coal in only one shift in every 24 hours throughout the Province of British Columbia, except in case or cases of national emergency." The amendment was to become effective within one year after the conclusion of the war.

The proposal was telegraphed to Fernie and was voted on unfavorably by the representatives in secret ballot. The company was perfectly willing to accept the suggestion submitted, but as the men turned it down and continued on strike the matter continued just where it was.

Thomas Biggs and E. E. Brown, district president and secretary respectively, held a conference on Sept. 21 with the provincial cabinet. They agreed to recommend that the mine workers return to work for 30 days on the single-shift basis, while the questions at issue were decided. Even this failed to satisfy the men, and the strike continued. The Crow's Nest Pass Coal Co. assented to the arrangement, as it has to every other change suggested.

There seems to be nothing of a reactionary character about W. R. Wilson, the general manager. Working conditions have been improved, as the men were good enough to admit. Chemical analyses of the air made by the Burrell indicator show a reduction in the percentage of methane of from 25 to 75 per cent. These Burrell indicators have been introduced as a means of more careful determination of the methane content. The company has agreed not to extract more than 15 per cent. of the coal at first working. The coal dust has not only been sprinkled with water, but also with fine flue dust. Electric safety lamps have been introduced in place of flame safety lamps.

The Province of British Columbia also has been active in meeting the problem. It is preparing to adopt George Rice's recommendation for the appointment of a permanent commission to investigate the "bumps" in the mines.

The miners finally offered to go back to work if the principle of the single-shift were accepted for all mines, if places were found at once for as many as possible on single shift and if places were provided for all within 30 days. They did not want the matter arbitrated. On Sept. 25 they declared that if their offer was not accepted by the following day they would order out the firemen, pumpmen and fanmen, making the possibility of an early return to work impossible.

Mr. Sloan was not prepared to require that all mines be run single shift. He made the suggestion that No. 1 mine, Coal Creek, where most of the bumps have occurred, be given separate treatment. He said it might be closed down or worked 8 hours in every 24 hours.

Director Armstrong Concedes Everything

The Dominion Director of Coal Operations, W. H. Armstrong, finally took up the dispute and used all the wide powers which were given him when the strike was at its height a year ago. The mine workers expected a great deal from him, because when he was appointed he made a wage scale full of concessions. The mine workers like a potentate of this kind who can wind up their disputes by conceding all that they ask. W. H. Armstrong's action was to issue the following document on Sept. 27, 1918:

"A request has been received from miners employed at the mines of the Crow's Nest Pass Coal Co. Ltd., at Coal Creek and Michel, asking the adoption of a single shift in all the mines instead of a double shift as at present. This request is based on the allegation of the men that there is a dangerous condition of the mines due to working double shift.

"The question of the safety of the above mentioned mines is one that comes under the regulations of the Coal Mines Regulation Act of British Columbia and therefore comes within the jurisdiction of the Department of Mines of that province and not under the jurisdiction of the Director of Coal Operations.

"The issue as to whether or not the operation of those mines would be more dangerous on a double shift than on a single shift is one upon which the representatives of the men and the company disagree.

"However, in view of the difference of opinion which has developed I hereby instruct the Crow's Nest Pass Coal Co., Ltd., to install a single-shift system at their mines and will request the Minister of Mines of British Columbia to appoint a Royal Commission as proposed by him to determine the question at issue, the Commission to report without delay when the matter under dispute will again be reviewed.

"It is further understood that the single-shift system does not apply to development places nor to necessary repairs in the mines.

"By virtue of the authority vested in me by order of the Committee of the Privy Council, passed under the provisions of the War Measures Act of Canada, 1914, I hereby direct the foregoing conditions shall be in force and effect at the mines of the Crow's Nest Pass Coal Co., Ltd., until further notice."

But Everything Appears Not To Be Enough

But this decision of W. H. Armstrong was not sufficiently subservient to please the mine workers, who were utterly irresponsive to every appeal and had cast off the leadership of their union officials. Apparently they did not want to have any commission appointed to consider their demands, because they realized that they might not win out when the matter was considered.

On Sept. 30 the Gladstone local turned down the "order," for "order" it was. It could not be regarded as a "proposition," though the press so termed it. It will be noted that the company was ordered to work single shift, whereas the mine workers were not even requested to work. The law does not rest with even-handed strength on all parties in the Crow's Nest district. The mine workers are in an unreasonable mood. They demanded in June not only this single shift, but a 6-hour day. Moreover, they would not consent to three men working in a room, a plan which the company asserted would mean the gaining of 80 per cent. of their demands.

On Oct. 7, however, the Gladstone and Michel mine workers voted in favor of a return to work on the following day, thus ending this long-drawn-out and bitter strike.

Some people regard the bumps as not due to mining, but to natural movements of the earth's strata, the outcome of ill-balanced stresses in the structure of the earth. It is suggested that if the bumps are of that nature a warning might be obtained from a properly equipped seismographic station if installed nearby. It is said that F. Napier Denison, the official seismographer for the Dominion government, at Victoria, B. C., is about to establish such a station.

The region around Edmonton was formerly not unionized. Now that the union has been forced upon the operators the men do not know when they have asked enough. Some time ago they received word of the trouble at Fernie and were the first of all to telegraph their approval of the strike, and for a while it was thought that they meant to start the ball rolling with a strike in sympathy with the Fernie men.

Edmonton Strikes Must Be Fought Out

Though they have not come out on strike in sympathy with the Fernie men, some have been out on their own initiative. The 40 miners working at the Bell mine, Namao, Alta., of the Sturgeon Consolidated Collieries went on strike Sept. 16 asking for an increase in wages of 20c. a ton. Humberstone, Bush, Clover Bar, Twin City, McPeal and Dawson miners were already involved in strikes. The miners at the first of these mines, Humberstone, wanted an increase of 133 per cent.

Pictou County in Nova Scotia has had a bitter coal strike on hand. In case the reader may need some help in visualizing the location of this field, it may be said that this county faces on the north the eastern end of Prince Edward's Island, and the principal towns in the field are New Glasgow and Stellarton. The miners did not want a board of conciliation, and they opposed an increase based solely on the increased cost of living. They made demands and insisted that these demands be complied with.

They declared that this must be done at once. They were quite willing that provision be made that future increases be based on the increase in the cost of living, but the increase sought at this time, they said, must not be limited by any such consideration. No one seemed to have much hope that the trouble would soon be terminated.

Pictou County Mine Workers Go Back to Work

Charles A. Magrath, Canadian Fuel Controller, who, as noted in *Coal Age* on Sept. 26, page 618, has all kinds of powers granted him in Nova Scotia and New Brunswick, successfully turned the trick. He arrived on Sept. 25 and met the operators and operatives and soon offered the mine workers an increase of 20c. an hour, the same scale of wages as was accepted by the Dominion Coal Co.'s workmen in Cape Breton. The offer was retroactive from Sept. 1 and it will hold good for four months—till Jan. 1 of next year.

The miners' claim, that cost of living has been steadily mounting, was the cause of this short-time settlement. It is understood that a committee will study the cost of living and that a further increase in wage will be granted on Jan. 1 if the situation warrants it.

The balloting relative to this proposed settlement—inflicted on the operator and humbly requested of the mine worker after the manner of such settlements—approved of its terms. An overwhelming majority ratified it at Drummond, Acadia and Thorburn.

The miners of eastern British Columbia and parts of Alberta seem to have arrived at a point where nothing but resistance on the part of the operators and the federal officials will produce orderly conditions. Concessions merely provoke to further demands. In Pictou county the status is somewhat different.

Smother Him with Your Coal

EDITORIALS

Operator's Attitude to the Workingman

AS IT is usually hard to sell and easy to buy, the seller is suave and the buyer is grumpy. Meet the salesman in the evening, when he is a buyer of the board and lodging of "mine host," and he is a perfect bear. Nothing is right, and for nobody is there a good word. You could not imagine the pleasant salesman and the ill-tempered guest as the same man.

The relations between labor and capital resemble those between seller and buyer, but when labor is plentiful the capitalist is apt to greet applicants for work with a snarl, and when labor gets painfully scarce the reception it is accorded by capital is of the nature of a wheedling. Just now the operator is at the wheedling stage. It will not last long, in all probability, but perhaps it will last long enough for him to learn a little about the importance of the workingman as an employee and, impressed with that, he may realize the workingman's power as a voter.

As a matter of fact, to obtain the right attitude of labor to capital should be a matter of continued endeavor. The salesman always keeps the attitude of the client in mind. He knows that the reputation of his house must be above question, not only for fair dealing, but for courteous and even generous conduct. He realizes that the surest way of doing this is by personal acquaintance under especially favorable conditions. How industriously he stages such conditions and carefully watches his opportunity. The operator should try to get a similar standing with labor and should watch in like manner his opportunity for creating the right impression.

It certainly pays. A dozen corporations with a bad reputation for unfairness to labor could be mentioned. They have changed the personnel of their officials, but still the past remains to plague them. The better men have left and the less desirable men have remained, and the longer they stayed the more sour they became. The corporations in question have reformed, but they cannot get workmen from outside to see it; and they have to get along with what men they have.

If they do, by chance, bring in fresh men, it is like putting fresh milk into a bottle of soured cream. They sour also. A bad reputation is extremely hard to live down. It is far harder to bring a reputation up than to ruin a good reputation once formed. A company that has sold its men the bad goods of comfortless working conditions, poor ventilation, slow car service, high store prices, poor homes and unsympathetic management is already out of business. It has lost its trade and it can sell no longer.

By dealing solely with the flotsam and jetsam of society it may go on doing a little business, but it cannot deal with such people in the same manner as it would with the better class of men. It is trading with subnormal men, with the outcasts of other mining camps. A strong arm is necessary, and no one desires to come where such discipline is enforced. A convict camp is undesirable quarters because the rules have to be arbitrary and because the social surroundings are not pleasing. A village where a company has been unkindly has all the character of a convict camp, and continues to have it long after the management has changed for the better. The memories, the harsh judgments, the traditions of the old and evil times still hang around the very hills that hedge the plant.

Let us gather hints from the salesman and plan for good will and mutual understanding. The man who has a hard-luck story to relate about his men is like the man who regales you on the hotel porch with a story that the town you live in has the worst merchants and poorest stores in the state. It is a reflection of his own lack of success or of the poor line of his goods. He should keep his story to himself or leave town. So, likewise, with the operator who is always abusing his men. There is something wrong, of course; there is surely something wrong—with himself or his predecessors. It would be the better part of wisdom for him to say nothing.

Filling the Liberty Loan Quota

IN MINING and agricultural districts it is not difficult to fill the Liberty Loan quota. That is well shown by the fact that Iowa was the first to subscribe the required amount in the Fourth Liberty Loan drive and, in fact, managed to exceed it. Evidently the quota selected is not based on population, but on financial resources. New York City's five boroughs, for instance, are asked for $1,334,082,400. Assuming a population of 5,737,492 persons, which is the 1918 estimate of the Board of Vital Statistics of the Municipal Department of Health, this would mean a rating of $232.52 per person, earner and nonearner alike.

The rest of the United States would have to raise $4,665,917,600. The population of the United States outside of New York City may be put roughly at 100,000,000. Thus in the country outside New York City the per capita asked is $46.66. So the New York City per capita is about five times that of the rest of the country. If the village allotment were separated from the urban allotment, and the per capita of the former calculated, it would be found extremely low. What wonder then that it is easily raised!

If, however, there were no unequal Federal taxes it might, nevertheless, be easy for New York City and other urban centers to take the hurdle gracefully and near the head of the procession, for the urban sections are extremely enthusiastic in the winning of the war, having read extensively about it since the war began and at a time when the village dailies and weeklies treated the local news as more important than the news from the front.

But the cities have not only the larger quotas in the Liberty Loan, but the larger amount of taxation. If New York City is taxed only in like measure as it is asked to lend, it will have to supply $310.03 per capita this year for Federal taxes, whereas the rest of the country will supply only $62.21. Probably the difference is far greater.

No one is complaining, of course, but if the quota is hard to raise in New York City let not the rest of the country raise a clamor and talk confiscation of wealth; and if a village exceeds its quota let it not boast unless every earner in the village has bought a bond and unless the bonds that are bought are as large as each man or woman can hope to pay for in the next few months.

Elaborate charts have been prepared showing what each of us should subscribe if we do our part; but no one can really size up the duty of others without knowing their circumstances. The amount due from each of us is not a dollar less than the utmost we can spare by saving and scrimping day by day. If looking over our expenditures we cannot find a single thing that we have sacrificed, we cannot feel that we have done all that could have been done. If we have not worked at higher pressure since the war began, we have not done our part toward the greater production that the war demands.

Quotas are deceitful things. Every soldier does his utmost, bags as many Germans as he can, and, if he brings home a bigger bag than his file mate, he is back for more the next day nevertheless. The quota of each of us is the utmost that each of us can do. To all of us comes the counsel of this hour of trial: "Be an 'utmost' man."

Character of South Wales Coals

A QUESTION frequently asked by would-be coal exporters is, What is the analysis of the celebrated South Wales coal? People who hesitate to ask for the composite analysis of Illinois coal or the coal from Indiana, despite the relative similarity of the fuels in each of these states, regard it as quite easy to formulate an analysis that will represent closely the coal of South Wales. As a matter of fact, while the coals of the two states mentioned have quite a uniformity of fuel ratio, the coals of South Wales vary immensely.

Perhaps the range in Illinois coal is adequately represented by taking the analyses contained in Bulletins 22 and 85 of the United States Bureau of Mines. The extreme low value for fuel ratio to be obtained from these figures is that of the Shiloh (St. Clair County) coal, No. 8 Mine, No. 6 bed. The ratio is 0.8768. The extreme value is for a Carterville (Williamson County) coal, and is 2.0294. The range in Indiana may similarly be taken from the records to which reference has been made. The Rosedale coal in Parke County has a fuel ratio of 0.9964, whereas a sample of Dugger coal in Sullivan County has a fuel ratio of 1.4875.

Probably few realize that there is this amount of variation within the limit of these states, where uniformity of fuel ratio is the general rule. The higher ratio in Illinois is 2.31 times the lower ratio, while the relation between ratios in Indiana is 1.49. The coal in Indiana is more uniform in ratio than the coal in Illinois, though the variation in physical appearance is far greater, part of the coal in the former state being known as "block" coal and the other, strange to say, being called specifically "bituminous," though surely the block coal is every bit as bitiminous as the other.

It is common to regard the South Wales field as including all the coal area in South Wales and in Monmouthshire, though the latter county is in England. Monmouthshire is, however, populated mostly by Welshmen, and even the English people look upon the shire as a part and parcel of Wales. The report of the Royal Commission on Coal Supplies groups, under the South Wales field, the Forest of Dean and the Bristol and Somerset fields, as well as the South Wales and Monmouthshire field—but that is a purely geological assemblement and in what follows only South Wales and Monmouthshire are considered as forming South Wales, because this particular grouping accords best with popular practice. The coal progresses rapidly in its degree of carbonization as the western end of the field is approached, just as the carbonization of the Appalachian field increases as we approach its eastern edge.

But the Appalachian field is broken by an upheaval and erosion, whereas the Welsh field is almost continuous, the only break being one of about 15 miles between Carmarthenshire and Pembrokeshire. For this reason carbonization in South Wales is even more regularly progressive than in the United States, and fuel ratios of all kinds between the limits may be found. Perhaps these limits may be set between 2.246, the ratio of the Yankee seam, to 24.136, the ratio of the Cwmnant Graigola seam. This is a progression in which the highest term is 10.74 times the lowest. It will be seen that the variation in the degree of carbonization is far higher than in Illinois or Indiana. It will be readily understood, therefore, that if we would talk of South Wales coals in relation, at least, to fuel ratio and heating quality, we must specify with exactitude the location from which the coal comes; and even then we are not quite safe, so variant in fuel ratio is the South Wales coal.

So much for fuel ratio. As for sulphur, the percentage is always low. Figures to hand show that it varies between 0.05 and 2.41 per cent., though the latter figure is not representative as the sulphur percentage somewhat generally is below one, and averages 0.90 per cent. The ash percentage lies betwen 0.99 and 7.75 per cent. This last is an exceptionally high figure for South Wales coal, the average of forty records of samples in the article of F. R. Wadleigh, appearing in *Coal Age*, Feb. 8, 1913, being 2.74 per cent. In every case by ash is meant not ash plus sulphur, but ash alone.

Some of Mr. Wadleigh's authorities have added the ash and sulphur together and then quoted the sulphur separately. A correction has been made wherever the totals indicated the necessity for such revision. It must be remembered that the figures for South Wales are those given by operating concerns and may rather show the quality of the coal they are selling than the quality of the coal in the bed. The sampling is probably not as severe as that done by the United States Government. Nevertheless, if the figures given are really representative of South Wales coal as it arrives at the market, one is not surprised that it has such an excellent status wherever used.

DISCUSSION BY READERS

Wage Adjustment

Letter No. 1—In discussing, editorially, a definite and systematic way to adjust wages and other labor disputes, under the title "After-the-War Arrangements," *Coal Age* assumes a commendable attitude.

The subject of wage adjustment is not new; various schemes have been proposed, but no satisfactory solution has been reached. However, there exists today a better knowledge of the problem and progress has been made, so that we have good reason to believe that the solution is not remote and that a plan will soon be devised that will admit of no reasonable dispute.

Evidences of Remarkable Progress Made in Dealing With Labor Problems

No problem is of greater importance to the world's industries than the relation of employer to employee. In a paper read recently before the American Society of Mechanical Engineers, L. K. Comstock declares that the problem transcends in importance those of the war. In a most convincing fashion he asserts that, while little effort has been expended by either employer or employee to reach a solution for scientifically adjusting labor difficulties, there is evidence that gratifying progress has been made.

Whether belonging to the ranks of employer or employee, one should be able to approach the issue without prejudice or rancor. In the past distrust and vindictiveness have prevailed to an extent that strikes and lockouts have followed with disastrous results to both sides. Some years ago, I recall that a coal operator, replying to a request for a truce, said "I will fight until my toe nails drop off." A decade has now passed, and that man's representatives now sit in peaceful council with the representatives of the same employees, which is certainly evidence of definite progress.

The Passing of the Walking Delegate

Another evidence of progress is the growing scarcity of the walking delegate, who is invariably under the influence of the "long green." Instead, now, right and reason are being more generally recognized as the determining factors when disputes arise that threaten to destroy business or social affairs. Only recently, there appeared in Washington the officials of the United Mine Workers of America, who came to ask Fuel Administrator Garfield for the right to demand an increase in wages. Though the request was denied at the time, later Doctor Garfield took up the matter, in the interests of the hard-coal workers, and started an inquiry to establish the merits of their claim.

While some may regard this as a novel procedure, they will not deny that it is in direct line with the spirit of democracy, and is an endorsement of the sentiment pronounced by Viscount Bryce, in discussing war and progress. Mr. Bryce emphasized the power of development of reason as the guide of life and the chief source of human progress. He contrasted this with the less refined power of selfishness and of passion, which he stated were also elements of human action when social order and right is to be secured only by force.

Equilibrating Wages and Prices of Living Necessities

Referring to the statement in the editorial previously mentioned, that "wages under normal conditions determine prices," it is worthy of note that for years the Department of Labor, at Washington, has maintained an index system, to establish the rise and fall of commodity prices and wages and their relation to the price of gold. Similar indexes have been maintained for many years by the London Economist, London Statist, Bradstreets, Dun, Gibson, and others.

No argument is required to prove the truth that *wages must advance with the cost of living*, so that, as the editorial writer puts it, the "margin between price of product and cost of production will be unchanged by a change in wages." The index numbers arranged to govern the rise and fall of prices and wages and kept by different organizations prove the accuracy of the system, which fact should appeal to the employer and employee with equal force and lead them to adopt some similar method in settlement of their disputes.

The following is quoted from the Bulletin of the Bureau of Labor Statistics, No. 173, referring to the usefulness of index numbers in working out the solution to an intricate problem, such as the one under discussion, the bulletin of the Bureau of Labor Statistics No. 173 says:

> The first step in framing a clear idea of the ultimate use of the results of index numbers is most important since it affords the clue to guide the compilers through the labyrinth of subsequent choices. It is, however, the most frequently omitted. When the end in view is specific and capable of precise statement, the problem of choosing methods is comparatively simple. Straight-forward logic then determines what commodities should be included, what sources of quotations should be drawn from, and how the original data should be worked up to give the most significant results.

Urged by President Wilson as Imperative

The remarks of President Wilson, in addressing the American Federation of Labor, at Buffalo, go to show that in his opinion such a course or method is imperative. The following is quoted from his address:

> Now to stand together means that nobody must interrupt the process of our energy, if the interruption can possibly be avoided without the absolute invasion of freedom. To put it concretely that means this: Nobody has the right to stay the processer of labor until all the methods of conciliation and settlement have been exhausted, and I might as well say that I am not talking to you alone. You sometimes stop the courses of labor but there are others who do the same.

The conclusion is thus forced upon us that a formula for adjusting disturbing differences between employer and employed is being gradually but certainly reached,

and it is to be hoped that this will eliminate acrimonious discussions, which will be replaced by reason and science.

The difficulty of stabilizing wages appears to have been overcome by the United States Bureau of Labor by taking a period such as that from 1900 to 1909, inclusive. Commodity prices are averaged for the ten years of that period; referred to a base of 100. If the average of commodity prices in 3 per cent. higher for 1913, the index number will be plus 3 for that year or 103. A base or rate of wages is similarly established from the prevailing wages for that period.

Statement of Louis K. Comstock Before the American Society of Mechanical Engineers

Quoting Mr. Comstock, further, on this theory, we have the following:

> This plan has the merit of immediate practicability. The means are at hand and the machinery already is in motion for giving it a trial; whereas the alternatives, which have at various times been suggested for regulation of prices by government for preventing commodity price increases by reason of the compensated dollar having a multiple standard of value, are not easy to try because they require legislative action following a vast amount of national education.

It is recognized, of course, that a method or system such as this, to be practical and effective, can only be developed after repeated efforts. There are elements entering the problem that are yet to be considered, such, for example, are the relation of different industries to the life of operatives, and the relation of that industry to the national development.

Other features will develop that can, no doubt, be taken care of as they arise. The application of the principles, in a practical way, however, is of primary importance, and it can be confidently expected that, not only will there be more satisfactory relations of employers to their employees, but the solution of problems relating to the speeding of industry, which is most pressing at the present time, will be greatly facilitated.

Sandy Run, Penn. W. E. Joyce.

Blackdamp on Pitches

Letter No. 1—I have read carefully the inquiry of "Miner", *Coal Age*, Sept. 19, p. 568, and the answer given to his question, of whether it is possible for blackdamp to hang at the face of a chute place pitching 35 degrees.

Having had a similar experience with this so-called "blackdamp" hanging at the face of some chambers that were driven to the rise, like our friend, I too have been puzzled for a while, but came to the same conclusion as explained by the editor, who states that, owing to the mixture having a higher temperature than that of the air on the gangway, it hangs to the face of the pitch.

Applying the Temperature Test

In order, however, to satisfy myself that this was the reason and that the mixture, which would extinguish a light but showed no tendency to gravitate, was of a higher temperature, I took a thermometer into the mine and made a few tests. I found the temperature of the air on the gangway was 34 deg. F., while that of the mixture at the face of the pitch was 55 deg. F. Then I was satisfied that that was the reason it did not gravitate to the level of the road.

Allow me to add that I made a test of the effect of this mixture on the life of a tame canary and found, after exposing the bird to the mixture for three minutes, that it was none the worse for its experience. A short time after I repeated the test with the same bird, this time exposing it for ten minutes, and found that the bird then acted very weak and tired. While the mixture did not seem to bother the men who worked around it and in it all day, they were obliged, however, to use carbide lamps, in order to keep a light.

Later, an incident occurred that proved, beyond any doubt, that if the mixture had the same temperature as the air on the gangway it would fall to the bottom of the chute. Up to this time the district was ventilated by one of the first splits off the main intake and the air was quite cool. To improve the general circulation in the mine, the foreman now ordered the current reversed, which caused this district to be ventilated by the return of two gangways below. The result was that the air passing on the gangway had a much higher temperature than before the change was made. The mixture that previously hung at the face was now found on the floor, while a fresh current of air swept the face. Whether this blackdamp was being generated from the coal or where I do not know, but there was always more or less of it present in this district of the mine.

Plymouth, Penn. Joseph R. Thomas.

Justice to the Miner

Letter No. 4—Kindly afford me space in the columns of *Coal Age* to reply to the query "What Is the Matter With the Miner?" which is the title of an article by A. H. Stow, Pocahontas, W. Va., appearing in the issue of Sept. 19, p. 539.

Mr. Stowe deplores the fact that the miner is neither taking advantage of the present situation to earn the wages that he might, nor doing his full part in increasing the production of coal to meet the present demand. These may be facts so far as the miner of Pocahontas is concerned but they do not obtain in Colorado, at least at any of the mines of The Colorado Fuel & Iron Co.

Conditions in Colorado Same as in West Virginia

The same conditions exist here in respect to the location of mining camps in districts remote from the larger cities and, as stated by Mr. Stow, it is true that the miner does not have the same opportunity for amusement as the larger cities afford. He does, however, in most of the camps operated by this company, have an opportunity to spend his spare moments in profitable reading, or bowling, or playing pool and billiards in the Miners' Club House, operated by the Y. M. C. A.

Whether the living conditions and opportunities for recreation are better in Colorado than in West Virginia, I am unable to say. I do know, however, that our miners have responded nobly to the demands of the war, by working more diligently and producing a larger average daily tonnage than they did prior to the war, or prior to the present high scale of wages.

Let me say that I am inclined to the opinion that, in localities where this is not the case, the miner may not have been properly informed or appealed to by his company. The Colorado Fuel & Iron Co. took steps, early in the war, to keep their employees informed through reading matter given them and mass meetings held. The result is that we have been much gratified at the response our miners have made by working more steadily and producing larger tonnages. There has been no occasion when they have not responded after the situation has been made clear to them.

The company has also kept a record of the percentage of possible shifts worked, and have posted, at each mine, the figures showing the employees what their own record was for the preceding month, as well as the record of every other mine operated by the company. We believe that this plan has created some rivalry and stimulated production. The records for June, 1918, showed that 90.03 per cent. of the possible shifts were worked; for July, 92.71 per cent.; August, 92,78 per cent.; September, 95.46 per cent.

The Colorado Fuel & Iron Company's miners have also responded liberally to all war funds and bond issues.

In my opinion, coal miners are just as patriotic as any class of workmen in the country, and are just as anxious to do their part. However, they must depend to some extent on their employer to keep them informed as to what their duties really are and what is expected of them.

E. H. WEITZEL,
Pueblo, Colo. Manager Colorado Fuel & Iron Co.

Accounting of Materials

Letter No. 1—Observing the request of "Office Manager," *Coal Age*, Aug. 29, p. 417, for suggestions regarding the best methods to be employed in the accounting of mine supplies and materials, I beg to submit a few remarks based on my own experience in the handling of supplies at mines during the past fifteen years.

Now, more than ever before, when the prices of both labor and material are soaring, it is of the utmost importance that the company or owner should know where and for what purposes the money is expended. Labor and material are the chief factors in the operation of mines and as such require the strictest regulation.

First, then, it is necessary to have a good storehouse where all needed supplies and material can be kept on hand ready for immediate use when occasion requires, and where perishable goods and valuable material will be protected from the weather and from theft.

The storehouse and its entire contents should be in charge of a reliable and competent clerk or storekeeper, who must be held responsible for all material received and given out. To enable him to do this properly a stockbook must be provided. I am permitted to offer below a sample page form of stockbook used at our collieries. The form shown here is one of the pages designed for entering material ordered each month, such as track material, piping, shafting, etc. There are other pages similarly ruled, but designed for daily consumption of the numerous smaller items that are constantly being required. These include such articles as nails, bolts, oil, powder, tools, etc.

The daily posting of supplies given out is absolutely essential to the right conduct of a storehouse. The work of caring for and accounting of these various supplies requires a good clerk. Experience shows that when either an inside or outside foreman is charged with this duty, the results are unsatisfactory and the company suffers a loss. A foreman who is pressed with too much clerical work ceases to be a competent foreman and, in many instances, makes a poor clerk besides.

THE "FOLLOW-UP" PLAN A MOST IMPORTANT FEATURE OF ANY ACCOUNTING SYSTEM

The groundwork of any accounting and supply-distribution system is the "follow-up" plan. The person in authority must see that all material is used for the purpose and in the place for which it was ordered. This is specified on the requisition, which must be certified by the mine foreman as needed for the purpose named, and duly authorized by the superintendent or manager, before it can be honored by the storekeeper and the material delivered.

The form of such requisition, as given here, shows the monthly requirement when possible, the quantity on hand, previous orders unfilled, quantity required, kind of material, its use or purpose, approximate value and order number. The requisition bears the date when it is presented and is made out in duplicate, the original being sent to the general manager, as soon as it is filled, and filed in his office, while the copy is retained by the storekeeper, for reference. The same form of requisition is used when the material wanted is to be furnished by the purchasing agent, the office, warehouse or any of the shops or other departments of the company.

Another blank form is used by the storekeeper or other person when delivering goods or material. As

SUNSET COAL COMPANY

Page No.....

Stock Account, Fiscal Year 191 —191 Warehouse

Item Unit of Measure																
Month	On Hand	Received	Total	Distributed	On Hand	Received	Total	Distributed	On Hand	Received	Total	Distributed	On Hand	Received	Total	Distributed
Nov.																
Dec.																
Jan.																
Feb.																
Mar.																

here shown, this form specifies the department furnishing the material, where it is to be delivered and the date, quantity, requisition number and value. It is made out in triplicate, the storekeeper who delivers the goods to the teamster, and the party who finally receives them keeping their respective forms for reference, while the teamster, after delivery, sends his receipt to the office.

Speaking of "following up" a requisition, it is not only important to see that supplies and material furnished are actually used as intended and not appropriated or carried off by individuals, but the department filling the order should see that material having a higher

DUPLICATE

No..... **SUNSET COAL COMPANY** Date..... 191...

Please furnish for..... (Place) Material required for use during..... (Month or Period)

Monthly Consumption	Quantity on Hand this Date	Unfilled Orders this Date	Quantity Required	Description of Material	Purpose for Which Required	Approximate Value	Order No.

I hereby certify that I have carefully examined this requisition and that the articles required are for the uses named.

.....
Foreman

Correct, to be furnished by
Purchasing agent — Machine shop
Warehouse — Carpenter shop
Office — Electrical shop
Stable — General mine
No..... Warehouse

..... Supt.

Authorized

.....
General Manager

market value is not used when cheaper material will give the service required. For instance a foreman may, without thought or knowledge, specify bronze or brass when iron would answer the purpose.

The Pennsylvania Railroad employs inspectors whose business it is to check up all material stocks on hand in its offices, towers, warehouses and section houses and report monthly. While I have no desire to advocate an increase of official duties, it is my belief that the right sort of supply "follow up" will require a similar check-

SUNSET COAL COMPANY

Supplies sent from.....
To.....
Date.....191...

Quantity	Material	Req. No.	Amount

Teamster.....
Received the above.....
Signed.....
Teamster will return this receipt to office

SUNSET COAL COMPANY

Supplies sent from.....
To.....
Date.....191...

Quantity	Material	Req. No.	Amount

Teamster.....
Received the above.....
Signed.....
Party receiving supplies will keep this receipt

SUNSET COAL COMPANY

Supplies sent from.....
To.....
Date.....191...

Quantity	Material	Req. No.	Amount

Teamster...

Storekeeper will keep this receipt

ing system applied oftener than the customary yearly inventory.

In order to obtain the best results and secure the highest economy in the use of material, the storehouse and, in fact, each department of the company should be considered as a separate and independent business having its own head and organization, and selling its products to the operating department at a sufficient profit to cover its own overhead charges. On the other hand, it should receive and credit the operating department with all unused material and scrap. If supplies of any kind are sold to individuals a fair profit should be realized on such business, and a statement sent to the office, showing kind, quantity, cost and selling price of the articles sold.

While all supplies and material should be issued, as previously stated, on an authorized order or requisition, the rules should be flexible enough to allow of material being secured for any emergency, on the assurance that the order for the same will follow. This is necessary in order to avoid an expensive delay in the operation of the mine when a breakdown has occurred and repairs must be made at once.

Many mine foremen are averse to writing orders for material needed in the mine, but they should be obliged to abide strictly by the rules, and a statement should be rendered each foreman, showing his material cost and credits for the month. The danger in supply accounting lies mainly in the fact that a foreman desiring to make a good showing will frequently sacrifice the upkeep of equipment in his charge.

Two instances of this came to my notice a short time ago. In the first, the attempt to cut down the operating expenses at one colliery resulted in such a sacrifice of boiler-room equipment that a chemical test of the ash dump, made a little later, showed an unwarrantable loss in the generation of power, and the needed repairs were then quickly made.

In the second case, the habit of the officials to cut requisitions led, on the death of the colliery machinist, to the discovery of a regular storehouse of brass and other supplies hidden beneath the shop floor. I cite these instances, which are not uncommon, to show the importance of pursuing a wise course in the supply of material required. There should neither be "feast" or "famine," but a workable stock sufficient for every call should be available at all times, at every mine.

——— Penn. J. KENVIN.

INQUIRIES OF GENERAL INTEREST

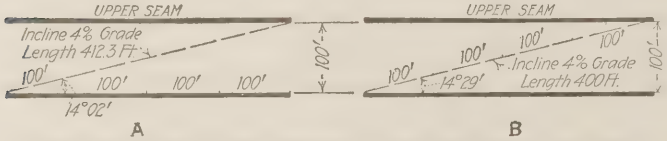
Estimating Percentage of Grade

Recently we have been having an animated but very friendly dispute as to the proper method of estimating the percentage of the grade of an incline. The question under discussion is, What would be the length of a plane between two level seams of coal separated by 100 ft. of rock strata? The plane is to be driven on a 25 per cent. grade.

Using the method that I have been taught to apply in such cases, I find the length of the plane, in this case, to be 412.3 ft. One of the best mine foremen in this valley, however, disputes this result, claiming that the length of the plane should be exactly 400 ft.

Comparing his method of calculation with my own, I find that the difference lies in the fact that he estimates the percentage of grade as being the rise in 100 ft. of pitch distance, while my understanding is that the percentage of grade is based on horizontal measurement. For example, in the present case, the 25 per cent. grade would represent a rise of 25 ft. in 100 ft. of horizontal distance. The question is, Which of these methods is correct?

In order to present the case clearly, I have shown in the accompanying figure my own method at *A* and



ILLUSTRATING TWO WAYS OF ESTIMATING GRADES

that of my friend at *B*. In each of these, the two seams of coal are shown as separated by 100 ft. of strata, and the incline, in each, is indicated by the dotted line. The sketch *A* shows the measurements to be taken in 100-ft. lengths on the horizontal line, while in *B* they are shown as taken on the incline.

In order to find the length of the incline, in the first instance (*A*), it is necessary to find the pitch angle or the angle between the incline and the horizontal. The tangent of this angle is equal to 25 ÷ 100 = 0.25 and the corresponding angle is 14° 02′. The length of the incline is then found by dividing the distance between the two seams (100 ft.) by the sine of this angle; thus, 100 ÷ 0.24249 = 412.3 ft.

Referring now to the second method, shown at *B*, it is clear that if the incline rises 25 ft. in each 100 ft. of pitch distance, there will be as many hundred-foot measurements as the rise per hundred feet is contained in the distance between the seams, or 100 ÷ 25 equals four 100-ft. measurements. The length of the incline, in that case, would be 400 ft. Kindly say which of these two methods should be used. MINING ENGINEER.

Scranton, Penn.

Replying to this correspondent, it can be stated that both of these methods are equally correct and both are in use. The usual practice in slightly pitching seams, however, is to estimate the percentage of grade as the *rise per hundred feet of horizontal distance*. Many engineers, also, prefer to use this method in fairly steep seams, the advantage being that the measurements are all taken in the horizontal plane and can be platted on the map without change.

On the other hand, a very common practice in steeply pitching seams is to make all measurements on the pitch, and in such cases many engineers prefer to estimate percentage of grade as the *rise per hundred feet of pitch distance*.

Of course, it is always necessary, in stating the percentage of grade, to understand clearly whether such percentage is based on horizontal or on pitch distance, since the results obtained are different in each case. That is to say, a 25 per cent. grade, based on horizontal measurement, does not represent the same incline as a 25 per cent. grade based on pitch measurement.

As previously stated, some engineers would prefer one method and others another, both being equally correct. Many misunderstandings and disputes have arisen similar to this one, because the parties do not recognize that the percentage of grade given may have been computed on the horizontal or plat measurement, which we believe the more common practice in coal mining, except where the seam has a high pitch.

We shall be very glad to have engineers and mine surveyors give their own preferences. The discussion will no doubt show the importance of understanding whether a given grade is based on horizontal or on pitch measurement, as otherwise grave errors will frequently result in the interpretation or reading of mine maps. The discussion should show the relative advantages of the two methods.

Calculating a Room Switch

We are opening a new mine and have decided to adopt a track gage of 42 in. The roof and floor conditions are such as not to permit driving entries or turning rooms a greater width than 12 ft. We shall use a car having a length over all of 8 ft. 9 in.

Kindly permit me to ask some of the practical readers of *Coal Age* to inform me what should be the dimensions of a room switch that will give the most satisfaction, under the conditions I have mentioned, and what frog number would give the best results.

————, Tenn. MINE FOREMAN.

This is a good practical question on the solution of which very much of the successful operation of a mine will depend. The theory of calculating the correct dimensions of mine switches has been explained so often in *Coal Age* that we are glad to submit this inquiry to our practical readers for their solution, which we hope to receive,

EXAMINATION QUESTIONS

West Virginia Examination (1918) Mine Foreman and Firebosses

(Selected Questions)

Ques.—How would you determine the quantity of air passing, where the section of the airway is 9 ft. 6 in. wide and 5 ft. 3 in. high?

Ans.—Measure the velocity of the air at that point of the airway, being careful to obtain a fairly approximate average reading for the entire section. Then calculate the sectional area of the airway, thus: 9.5 × 5.25 = 49.875, say 50 sq.ft. Assuming an average velocity, at this point, of say 600 ft. per min., the quantity of air passing is 600 × 50 = 30,000 cu.ft. per minute.

Ques.—In a gaseous mine where 175 persons are employed, would you consider the ventilation sufficient, providing the quantity of air in circulation is equal to 150 cu.ft. per min., per man?

Ans.—The West Virginia mining law (Sec. 26) requires the circulation of 150 cu.ft. of air per min., per man, in mines where there is danger from gas being liberated, and as much more as the district mine inspectors may deem necessary. The circulation must, therefore, conform to these requirements of the law. Conditions may arise, however, between the visits of the district inspector, that would call for the judgment of the mine foreman in regard to the sufficiency of the air in circulation. The foreman must decide these conditions according to his best judgment and experience, basing his decision on the percentage of gas in the air and the quantity of dust carried in suspension in the current, having due regard to the inflammability of the coal and the fineness of the dust.

Ques.—Under what circumstances may a body or an accumulation of gas fail to be removed after the ventilation has been restored?

Ans.—The circulation of air may not reach the body of gas accumulated at the face or in cavities of the roof, and it will then be necessary to erect brattices to cause the air to sweep those places. Again, the velocity of the air may be insufficient to remove the gas, which is frequently the case when methane or marsh gas has accumulated at the face of a pitch or blackdamp at the face of dip workings. In either case, a strong current of air is required to drive out the gas or force it from its lodging place.

Ques.—(a) Would you consider it safe to work with open lights in any portion of a mine liberating explosive gas? (b) What precautions would you take to insure the safety of the workmen? (c) What material should be kept on hand at mines liberating explosive gas? Answer fully.

Ans.—(a) Assuming the conditions in the mine are such as to require the use of safety lamps in one or more sections of the workings, it would not be safe to use open lights in any portion of the mine whatever. In other words, mixed lights should never be used in a mine.

(b) In a mine generating gas in dangerous quantities, safety lamps of an approved type should be used exclusively. These lamps should be the property of the company and inspected, cleaned and filled by competent lamp men, after each shift. All lamps should be numbered to correspond to the check numbers of the men and should be delivered to them in return for their checks, as they enter the mine. No man should be permitted to use or handle a safety lamp in the mine, until he has given evidence that he understands the principle of the safety lamp and its proper use. The fireboss should observe closely the lamps of the men when making his daily rounds, and give them any needed instructions in regard to their proper use.

(c) At all mines liberating explosive gas, first-aid outfits should be kept at convenient points in the mine and on the surface. The outfits should include pulmotors, oxygen tanks and breathing apparatus of approved type. There should also be provided stretchers, blankets and waterproof coverings ready for immediate use.

Ques.—Under what conditions would you recommend and use mixed lights in a mine?

Ans.—Under no conditions should mixed lights be used in any mine.

Ques.—State in detail your opinion of the causes of the explosions that have occurred in this and other states and state what, in your opinion, can be done to prevent these disasters?

Ans.—The chief causes of mine explosions are the following: Reckless use of powder and other bad practices in blasting; disobedience of mine workers to the instructions given them and to the rules and regulations of the mine; lack of supervision on the part of mine officials; disregard of the provisions of the state mining law; the improper handling of or meddling with safety lamps.

To prevent these occurrences, a closer supervision of the mine is required and a strict compliance with the mining laws, together with greater mine discipline and a higher regard for safety on the part of mine officials.

Ques.—When does a fireboss' duty in the mine cease and what are the duties of each miner upon entering his working place?

Ans.—The duties of a fireboss in the employ of a coal company do not cease, as long as he is within reach or call. Should any condition develop requiring his presence, it is the duty of a fireboss to respond promptly to a call for assistance. A miner's first duty on entering his place after absence is to observe its condition, examine the roof and reset any timbers that he finds have been displaced.

COAL AND COKE NEWS

What Happened in September

[The bracketed figures in the text refer to pages in the present volume and should the reader desire further information he can obtain it by reference to the pages indicated.]

Sept. 2—Flood invades Mary Lee mine of Alabama Co. at Lewisburg, Ala., and drowns two men [525].

Sept. 3—William G. McAdoo makes report to President saying, "It is probable that adequate transportation for the fuel requirements of the Nation will be available provided the coal production during the warm weather can be maintained at a point that will fully employ the cars requisitioned. (This report was held for some time before publication.)—Preference list No. 2 of the Priorities Division of the War Industries Board is issued, but is not made public till Sept. 8 [514]—United States Fuel Administration revises prices of coal at mines in Wise County, Texas, and provides for summer reductions from these standard prices—Rocky Mountain Mining Institute holds annual meeting in conjunction with American Institute of Mining Engineers; to last till Sept. 6 [633-641].—United States Fuel Administration reduces price of byproduct coke 30c. a ton throughout the United States except in the states of Alabama and Washington [513].

Sept. 4—United States Fuel Administration grants companies the right to charge reasonable switching charges where these have been paid to the shipping railroad for the diversion of coal wherever such diversion has been ordered by the Fuel Administration to relieve a shortage of fuel—Believing that the labor employed in the reclaiming of the good material in breeze dumps at beehive coke plants could be better employed in the work of manufacturing coke, such reclamation of breeze is prohibited by the United States Fuel Administration—United States Fuel Administration forbids any producer in the high-volatile coal-producing districts of the Thacker and Kenova regions of West Virginia and Kentucky and along the Kanawha & Michigan, the Kanawha & West Virginia and the Coal & Coke (West of Dundon) railways and their short-line connections; also in the eastern Kentucky fields along the Chesapeake & Ohio and Sandy Valley and Elkhorn railroads and their short-line connections; also in the Logan and Kanawha districts west of St. Albans, W. Va., along the Chesapeake & Ohio Ry. and short-line connections; also in Virginia along the Louisville & Nashville R.R. in Kentucky along the same road and the Cincinnati, New Orleans & Pacific Ry. and their short-line connections; in Tennessee along the line of the Cumberland Valley Division of the Louisville & Nashville R.R. and along the Middlesborough R.R. to sell, ship or distribute their coal to dealers and consumers for use or consumption in the lower peninsula of Michigan except after a permit has been given [513, 648]—United States Fuel Administration forbids any producer in the coal-producing districts of Ohio and in the coal-producing districts located on the Ohio River division of the Baltimore & Ohio R.R. in Mason County, West Virginia, to sell, ship or distribute coal to points in the lower peninsular of Michigan located on or east of the line of the Grand Rapids & Indiana R.R. and its branches except when granted a permit [513, 648]—United States Fuel Administration grants permission to any Illinois producer to ship to that portion of the State of Wisconsin on and north of a line coincident with the Green Bay & Western R.R. from Kewaunee, Wis., to Amherst Junction and thence coincident with the Minneapolis, St. Paul & Sault Ste Marie R.R. through Abbotsford and Chippewa Falls to Minneapolis, Minn. [513, 648].

Sept. 5—Annual meeting of New York State Retail Coal Dealer's Association.

Sept. 6—Conferring with his railroad chiefs of the Eastern region, William G. McAdoo declared: "There is no chance of another great railroad tie-up such as was experienced last winter, and there is no danger of a fuel débâcle so far as the railroads' part in preventing one is concerned. The roads will be able to handle all the coal that the miners can extract [556]—Judge Edwin B. Parker, the priorities commissioner of the War Industries Board, formulates lists of the priority of works needing new permits or licenses [514].

Sept. 7—Arrangement made by United States Fuel Administration by which the Consolidated Coke Co. of Pittsburgh pays $80,000 to the Steel Company of Canada, of Hamilton, Ont., and to the Thomas Iron Co., of Hokendauqua, Penn., for poor coke delivered to them [557].

Sept. 8—Bernard M. Baruch, chairman of the War Industries Board, lists in Class I for preferential treatment under the new selective-service legislation, plants producing coal, those engaged principally in manufacturing mining tools or equipment, those engaged principally in producing metallurgic coke and byproducts including toluol—Motor runners in four mines of the Delaware & Hudson Co. go on strike [558].

Sept. 9—National Coal Association points out the falsity of William G. McAdoo's statements relative to the ability of the railroads to handle all the coal offered to them [556]—The West Virginia and Kentucky Coal Co., on Smoot Creek, Letcher County, Kentucky, ships its first consignment of coal [714].

Sept. 10—By the fall of a cage in the Protection Island shaft at Nanaimo, B. C., 16 miners lost their lives [617].

Sept. 11—W. J. Murray, chairman of the executive committee of the Victor-American Fuel Co. and a well-known coal expert, dies at La Jolla, Cal. [643].

Sept. 12—Tipple of the Ella Mine of the United Coal Corporation falls on tracks of the Pittsburgh & Lake Erie R.R., carrying down three men who, nevertheless, escape uninjured [618]—Logan Coal Co., of Philadelphia, Penn., is fined $25,000 and money is given to Pennsylvania chapter of the American Red Cross. It is charged with selling coal as smithing coal that was to be used for other purposes, so as to get the higher price. It is required to make equitable return of money to all parties that had been overcharged.

Sept. 14—The United States Fuel Administration announces a revision of the regulations governing the storage of coal by consumers of different classes [602].

Sept. 15—Big production meeting of West Virginia operators held at White Sulphur Springs, W. Va. [605].

Sept. 16—Big strike occurs in the southern anthracite field, the miners demanding the United States Fuel Administration to decide, at once, on the increase of wages to be provided [607]—Annual congress of National Safety Council at St. Louis meets; to last till Sept. 20 [502-503].

Sept. 17—Four collieries of the Delaware & Hudson Co., Grassy Island shaft, Grassy Island slope, the Olyphant and Eddy Creek collieries, return to work [650].

Sept. 18—Senator Myers, of Montana, introduces a bill prohibiting the sale of intoxicating liquor within 5 miles of coal mines for 60 days after Oct. 1.

Sept. 19—Southern anthracite strike practically comes an an end [607]—Meeting of operators, officials of insurance companies, mine inspectors and officials of the Harrisburg headquarters of the Department of Mines convenes in Harrisburg for readjustment of insurance rates particularly for anthracite mines [662].

Sept. 21—The mine workers of District No. 1 of the anthracite region, representing 70 local unions, protest against the declaration that they are not patriotic and promise to coöperate with United States Fuel Administration [650]—Plant of Hazard Coal Co., Hazard, Ky., is destroyed by fire [663]—Gladstone and Michel locals vote not to return to work till single shift is reëstablished—Union leaders in District 18 suggest that an arrangement be made establishing the single shift for 30 days during which time the single shift might be discussed.

Sept. 23—Explosion at the mine of the Franklin Coal and Coke Co., Royalton, Ill., kills 23 men [714].

Sept. 24—Elbert H. Gary, chairman of the board of directors of the United States Steel Corporation, declares in favor of the 8-hour day [650].

Sept. 25—Mine workers at Fernie declare that they will call out firemen, pumpmen and fanmen if their demand for a single shift is not conceded without reservation and a promise made to give all men work within 30 days—C. A. Magrath, fuel controller of Canada, met Pictou County, Nova Scotia, mine workers and operators and suggested a 20c. per hour increase in wage to the former, retroactive and good till Jan. 1.

Sept. 27—Dr. H. A. Garfield denies that he or the Federal Fuel Administrator for New York has issued an order that coal be not used for heating before Nov. 1—Committee on mechanical labor-saving devices in mining appointed — Pictou County, Nova Scotia, strike comes to an end—W. H. Armstrong orders that the Crow's Nest Pass Coal Co. work single shift and proposes that a Royal Commission review the dangers in the mines of the company and report with recommendations.

Sept. 28—The Fourth Liberty Loan campaign for $6,000,000,000 starts.

Sept. 30—Gladstone local in Fernie, B. C., turns down proposition conceding the single shift but providing for the appointment of Royal Commission to ascertain just what attitude should be taken toward the practice of running a mine more than one shift in 24 hours.

Harrisburg, Penn.

Officials of the State Department of Mines are making an effort to learn the number of abandoned mines or workings in both the anthracite and bituminous fields which have been reopened or which it is planned to put back into operation this winter. The number is believed to be greatest in the soft coal field, and there have been reports received here of mines which have been idle for so long a time that weeds and brush grown up about the openings have to be cut away to enable examinations to be made. Some of these are to be started again. In the anthracite field there have been some surveys made to determine how soon certain veins can be reached. If all the plans that have been heard at the Capitol materialize, there will be a large increase in the production of coal next year.

The rapid progress of the Spanish influenza epidemic in the coal regions has had a noticeable effect on coal output, and it is feared that unless the epidemic is checked shortly the output for October will be cut to a greater extent than realized. The military authorities of the State are coöperating with the State Health Department to prevent a further spread of the disease and to more adequately handle the cases now reported.

Fifty-eight deaths in one day was the record for the little mining town of Minersville, in the Schuylkill region, and other mining towns are reporting many deaths. The epidemic has caused a number of collieries to close down entirely. The State Department of Health has ordered all saloons, moving picture houses, churches, etc., to close until the epidemic is over.

Uniontown, Penn.

A drop of 27,000 tons of coal over the output of the preceding record-breaking week is shown in the official fuel production figures for the week ending Oct. 5. The showing was admittedly disappointing, despite the fact that curtailment of power service hampered the output and that an alleged flourishing business in the sale of liquor through the region affected the individual efficiency of the men. The coal shipments for the week were 227,263 tons and the coke shipments 427,449 tons.

Effect of the Spanish influenza epidemic which has hit several plants in the region is causing some concern, the most serious trouble so far being reported at the Continental No. 2 plant of the Frick company,

where drastic steps quickly got the disease under control but only after quite a few cases had been reported.

Especially interesting in this connection just now will be the effect of prohibition in the coke region as a result of the order closing the saloons throughout the state to prevent the spread of the influenza epidemic. Operators and producers for months have been vigorously demanding prohibition, and the results of the closing of the saloons in the county are being followed with more than usual interest. While the sale of liquor has not been entirely eliminated in the region as a result of the order, officials feel that the saloon closing order will have a noticeable effect in the production.

Charleston, W. Va.

Power shortage, late placements and a dwindling car supply as the week progressed figured largely in limiting production in the Fairmont district last week. On the first day of the month the supply—1420 cars—was considered rather a good one. Of this number 1118 cars had been placed at 7:00 o'clock in the morning, but on the same day many mines were operated with difficulty owing to their inability to secure enough power. On the 2d the supply dwindled to 1230 cars. On the same day an order came directing all box cars on all sidings to be shipped west for the shipment of grain, the significance of the order being that it meant that team and truck loaders, for the time being at least, would be no longer supplied even with box cars for the loading of coal. It is estimated that 22 mines in the region will be affected, and that production will be curtailed to the extent of 200 cars of coal a day. Car shortage was at its worst, however, on the last day of the week, when there were but 612 cars supplied, only 387 of them being placed at the usual hour for beginning the day's work. Wrecks and the influenza were said to have upset transportation conditions on the Baltimore & Ohio R. R. Production in the Pocahontas and Tug River District is the second best since last March. Production for the week mentioned reached a total of 469,732. A special drive is being made in the Tug River and Pocahontas districts to reach 2,000,000 tons during October, and gains are being made day by day. The coal will probably be reached unless Spanish influenza affects the man power of the district.

The shipment of coal from the Guyan field is steadily on the increase, the car supply in the district having made that possible. The movement of coal to the lakes from this district will be continued throughout October. Tidewater tonnage is very heavy now and is increasing constantly.

Production in the Kanawha District is now at the rate of 40,000 tons a week more than it was at the close of August. Production during the last week of September had almost reached the high-water mark for the year, but a loss was sustained last week, the total output being only 204,438 tons as compared with 217,000 tons for the week previous, a decrease of 13,000 tons, produced in 6065 working hours. Losses from labor shortage amounted in hours to 794 and production loss from car shortage to 466. Car service for all the mines in the Kanawha region was all that could be desired, but cars were late in being placed.

Production has shown a decrease during the last week in both the New River and Winding Gulf districts, but this week there is said to have been an improvement. Operators contend there are certain neutralizing influences at work in the district. However, coal men are confident that production for October will average well above that for September.

Birmingham, Ala.

Disappointment is noted over the figures for the week ending Sept. 28, when only 383,067 tons of coal were produced in Alabama, against 383,142 tons for the week ending Sept. 21. Coal production in the state during the entire month of September amounted to only 1,544,769 tons.

Explanations continue to point to faulty railroad car service, unsteady labor and natural causes. However, coal mining in the district has been active during the last week, and the hope is again advanced that the official figures for the week ending Oct. 5 will show an increase of at least 17,500 tons over the production of the previous week. There is being made an appeal for renewed efforts on the part of all mine workers and operators to swell the coal production totals, in an effort to make up a portion of the shortage of output. A weekly production of 425,000 tons or more is the goal now being sought.

Within three months coal will be produced at the new mines of the Republic Iron and Steel Co. at Risco, in the extreme western portion of Jefferson County. A large coal washer is being installed at the mines, and the Republic company is spending $500,000 on improvements. Daily production of the new mines, when full operation is begun, is expected to total in the neighborhood of 1200 to 1500 tons.

It is also announced that by January, 1919, fuel production at the mines of the Railway Fuel Production Co. at Parrish will total over 1000 tons of coal daily. Increased production of coal at Getmore, in the lower part of Jefferson County, is also looked for in a short period of time.

Employees are being assured that they will be cared for when their names are reached in the selective service call list. The Alabama Coal Operators' Association has received information from the Production Committee of the National Fuel Administration that pick miners are regarded as being engaged in an essential industry. This information is being given wide publicity throughout the district.

After many promises of service, transportation of coal on the Warrior River will begin Nov. 1, according to a statement made in Mobile by Henry DeBardeleben, Federal Manager of Warrior River traffic. Regular barge service will be inaugurated between Mobile and New Orleans, and Mobile and Cordova, on the Warrior, on that date. Six self-propelled barges will comprise the initial fleet. Other barges will be put on after November 1, as the traffic increases.

Coke production in the Birmingham District continues to be found somewhat short, both in quantity and quality. Attention is being given this commodity, however, with hope of marked improvement by gradual degrees.

Victoria, B. C.

British Columbia's production of coal for the month of August totaled 240,055 tons, which is an increase of 13,467 over July, and the highest tonnage produced in any month so far this year. Vancouver Island takes the lead in comparison with the output of other Provincial collieries, having 145,266 tons to its credit. The Crow's Nest Pass mines are next with 78,971 tons, while the Nicola Princeton District shipped 15,818 tons.

Of the Island companies the Canadian Collieries, Ltd., have the best showing with 71,791 tons, the Canadian Western Fuel Co. following close with 61,200 tons. The balance is accounted for by the smaller collieries as follows: Pacific Coast Coal Mines, South Wellington, 6858 tons; Nanoose Collieries, 2631 tons; Granby Consolidated Mining and Smelting Co. (Cassidy's), 2383 tons; British Columbia Coal Co. (Jingle Pot), 400 tons.

In the Crow's Nest Pass District the Crow's Nest Pass Coal Co. produced 66,457 tons from the two collieries operated, as follows: Coal Creek Colliery, 44,366 tons; Michel Colliery, 22,091 tons; Corbin Coal and Coke Co., 12,514 tons.

The Middlesboro Collieries were the biggest producers in the Nicola Princeton District with a tonnage of 8529, the remainder coming from the smaller collieries.

The new mines being opened on the Island are beginning to count in the monthly production, these recently opened up at South Wellington and Cassidy's having an output of 5530 tons for the month, while it also is to be noted that the Jingle Pot, for months sealed by order of the Chief Inspector of Mines because of fire, is again on the shipping list. But the most remarkable gain is that of the Harewood mine of the Canadian Western Fuel Co., which was recently reopened and last month produced 21,695 tons.

At the other new mine, which is being opened by the Canadian Western Fuel Co. on the farm near Nanaimo, rapid advances are being made. Two shafts are being sunk to tap the Wellington Seam, and one of these struck the coal a few days ago, exposing a seam about 9 ft. in thickness. The other is expected to reach the same seam some time during the present month.

The total production of the coal mines of British Columbia so far this year is 1,822,031 tons. For the same period last year it was 1,535,998 tons. Therefore there has been a gain of 286,033 tons.

PENNSYLVANIA

Anthracite

Mahanoy Plane—The Stanton, Lawrence and Bear Ridge collieries at this place, twice abandoned as worked out, are now producing hundreds of tons of coal daily under Madeira Hill & Co.'s direction.

Mauch Chunk—Hacklebernie, the first anthracite mine in the world opened after the discovery of the hard-coal at Summit Hill in 1794, and closed years ago by the Lehigh Coal and Navigation Co., will shortly be opened by the Mount Pisgah Coal Co., of this place.

Hazleton—The Morea colliery of the New Boston Coal Co., southwest of Hazleton, has been electrified throughout and the use of steam and mules discontinued. Many thousands of dollars were spent in making the change, and no time was lost in producing coal, all the work being done Sundays and at night.

The Hollywood colliery of Pardee Brothers & Co. at Hazleton, abandoned 30 years ago, has been reopened. The operation furnishes employment to about 200 mine workers.

Wilkes-Barre—Damage in excess of $50,000 was caused in the town of Plains on Oct. 9 when a cave-in of coal veins in the Conlon mines let down the earth between a block of houses fronting on Main and Maffett Sts. One wall of the new Plains high school was shattered. Miners had been warned, and there was no loss of life.

Larksville—The Delaware & Hudson Coal Co. has taken steps to aid the men in keeping down their monthly expenses by reason of the increased carfare from Plymouth to the collieries in this district. The officials have placed a small mine locomotive with a string of cars at the disposal of the men. An effort is being made to have several passenger coaches placed.

Ashley—Scarcity of timber for use in and about the mines is giving the coal companies much concern at this time. Though the operators here have a considerable stock on hand, yet they fear they will have difficulty replenishing their stock when cold weather sets in. It is for this reason many of the collieries are buying heavily of timber and using all possible means to secure an ample supply. The Lehigh & Wilkes-Barre Coal Co. has installed a complete milling outfit and is rapidly taking all the available timber from its property, especially on the mountains in the Wilkes-Barre district.

Mahanoy City—One of the largest sales of coal lands that has occurred in the southern anthracite fields for some time was consummated by the delivery recently by the heirs of the late John Farnum to the Lehigh Coal and Navigation Co., of a deed for the Farnum interest in a tract of land long known as the Farnum and McGinnis tract containing 202 acres situate in the boroughs of Mechanicsville and Point Carbon, the townships of Norwegian and East Norwegian and the City of Pottsville and embracing much of Lawton's Hill within its lines. The tract contains rich coal deposits which will in a short time be worked by the Lehigh Coal & Navigation Co. The price paid for the land was $1200 per acre for a fee simple title. Where only the coal reserve was purchased the price was $700 per acre.

WEST VIRGINIA

Logan—The Gay Coal and Coke Co., by opening entry No. 21 to Coal Branch, will be able to give the loaders more cars. A steam locomotive has been purchased by this company in order to insure the loaders a better supply of cars.

Charleston—Having purchased nearly 2000 acres of coal land on Campbell's Creek, Kanawha County, D. Lewis, who has extensive operations in the county, will proceed in the near future to develop the tract acquired by him. It is said that Mr. Lewis paid an average price of $10 an acre for the coal property, which was acquired from Josephine D. Taylor, of New York.

Huntington—The Amherst Coal Co., operating in Logan County, has installed facilities for storing from 8000 to 10,000 tons of coal at a time when cars sufficient to load the coal are not available. The company uses a steam hoist for loading coal into the cars and the company has found it possible to load a railroad car in 22 minutes.

Fairmont—In connection with the recent organization of the Dawson-Connellsville Coal Co., it is the purpose of the new company to double the capacity of the plant acquired by the company together with a 100-acre tract of Sewickley or Mapletown coal located just below Monongah, on the east side of the West Fork River. The company acquired a mine producing 500 tons daily and proposes to increase the capacity of 1000 tons per day. The mine is a drift opening and is drained naturally.

OHIO

Piney Fork—The Piney Fork Coal Co., with headquarters in Columbus, had its gigantic steam shovel at the stripping operation near here buried by a slide, and the operation was idle for about two weeks. It will soon be in operation.

Zanesville—Six miners living near Zanesville and employed in surrounding mines have been placed under arrest by United States authorities on the charge of stirring up disaffection among the miners of that section. The arrest was made by U. S. Deputy marshals and government secret service operatives. The men will be held on the charge of sedition.

KENTUCKY

Jackson—Baker Brothers have purchased coal land on Frozen Creek and plan early developments.

Willard—The Black Raven Coal Co. will install electrical machinery, increasing daily output to 1000 tons.

Madisonville—C. B. Curtis, president of the new Curtis Coal Co., is having some trouble in getting a switch into the company's new property at Madisonville, and has taken the matter up with the officials of the Louisville & Nashville R.R. Co. in order to get action.

Hazard—The Daniel Boone Coal Co. is nearing completion of its new mining camp at Heiner, in the Hazard field, and the third mine of the group will be started about Dec. 1. The company will have a modern camp, with much better features than commonly found in the district. The operations are on a part of the Maynard Coal Co.'s interests.

INDIANA

Vincennes—The Pike Coal Co. mine, near Petersburg, Ind., was destroyed by fire, said to have been of incendiary origin, early on Oct. 7. The loss is estimated at $125,000. The mine had recently been remodeled, the tipple enlarged and the capacity increased to 3000 tons per day. Officers of the company said an effort would be made to rebuild at once.

ILLINOIS

Royalton—Mine rescue teams from Duquoin, Dewaine, Benton and Herrin recovered 14 bodies on Oct 13 from the north mine of the Franklin Coal and Coke Co. The men, with seven others whose bodies were recovered earlier, were killed by an explosion a week before. It will probably be two months before the mine can be operated again.

Danville—The Hartshorn mining interests in Danville, Ill., and Ohio districts have been sold for approximately $2,000,000, the purchasers being Chicago, New York and London capitalists, headed by George C. Moore. The properties consist of the Beech Flat Coal Co., of Ohio, and the Mission Mining Co., Two Rivers Coal Co., Carbon Hill Coal Co. and Hartshorn Coal Co., all of the Danville district. Mr. Moore is well known in Chicago financial districts as one of the receivers for the Chicago & Milwaukee Electric Railway Co., recently reorganized.

Foreign News

Lens, France—British troops on entering Lens found that the coal mines in the city had been entirely destroyed.

Vancouver, B. C.—During the past few weeks it has been reported that the dealers intended again raising the retail price of coal. This resulted in considerable public agitation which has culminated in the announcement from the former that it is not proposed to advance charges. Instead, they explain, and to offset the increased overhead expenses of handling coal, they have decided to stop the screening of coal in Vancouver. The coal hitherto has received screenings both at the mines and at the dealers' bunkers, the latter operation costing, it is figured, about 20c. a ton. Incidentally the merchants assert that the criticism which has been levelled at them is unfair inasmuch as the mine operators have taken much the greater proportion of recent increases in coal prices. They further state that the same coal as that sold on the lower British Columbia mainland brings from $1.50 to $2 a ton more in Seattle, Wash., while the only extra charge the dealers of the latter city have to contend with is an additional towage fee of 15c. a ton.

Personals

C. C. Anderson, of Boise City, Idaho, has been named as state fuel administrator to succeed Frank E. Gooding, who resigned to become a candidate for state senator.

A. L. Rattray, formerly city clerk at Nanaimo, B. C., has accepted the position of accountant with the Granby Consolidated Mining, Smelting and Power Co., at its new colliery at Cassidy's near Nanaimo, B. C.

Lloyd Dock, division engineer for the Rochester and Pittsburgh Coal and Iron Co. at Punxsutawney, Penn., has been made chief engineer of the Coal Run Mining Co. and Tide Coal Mining Co. at Indiana, Penn.

J. T. Morris, superintendent of the Stotesbury, W. Va., operation of the E. E. White Coal Co., has resigned to accept the position of general manager of the Pemberton Coal and Coke Co., with headquarters at Affinity, W. Va.

Sheldon Smiley, chief engineer for the Rochester and Pittsburgh Coal and Iron Co. at Indiana, Penn., has resigned that position to take charge of the Pittsburgh, Penn., office of the Wood Engineering and Manufacturing Co., of Chicago, Ill.

James Renney, overman for the past two years at the Reserve mine, operated by the Canadian Western Fuel Co. at Nanaimo, B. C., has resigned his position and gone into business, having taken over the interests of the MacFarlane Wharf Co., Nanaimo, B. C.

James A. Bier has resigned as chief engineer of the Coal Run Mining Co. and the Tide Coal Mining Co., of Indiana, Penn., to become superintendent of the Horatio mines of the Anita Coal Mining Co. at Punxsutawney, Penn.

Francis John has been appointed overman at the Reserve mine of the Canadian Western Fuel Co., Nanaimo, B. C., to succeed James Renney, resigned, as mentioned elsewhere in these columns. Mr. John was tipple boss at the Harewood mines of the Canadian Western Fuel Co.

Obituary

Steve Harding, division engineer for the Jefferson and Clearfield Coal and Iron Co. at Punxsutawney, Penn., died Saturday, Oct. 5, from pneumonia, superinduced by Spanish influenza. Mr. Harding was engineer for several mines in the infected district and probably caught the disease while at work. He was taken to his home in Clarion, Penn., for burial.

Recent Coal and Coke Patents

Mine Car. M. S. Runsvold, Bisbee, Ariz., 1,276,468. Aug. 20, 1918. Filed Sept. 7, 1917. Serial No. 190,211.

Mining Machine. E. C. Morgan, Morgan Park, Ill., 1,276,249. Aug. 20, 1918. Filed Aug. 15, 1910. Serial No. 577,134.

System of Mining Coal. E. O. Toole, Gary, W. Va., 1,276,952. Aug. 27, 1918. Filed Mar. 16, 1914. Serial No. 824,979.

Mining Drill. J. A. Kaye, Sault Ste. Marie, Ontario, Can., 1,277,220. Aug. 27, 1918. Filed June, 15, 1918. Serial No. 240,152.

Fuel Transfer Mechanism for Stokers. N. E. Gee, Altoona, Penn., 1,276,642. Aug. 20, 1918. Filed Dec. 29, 1913. Serial No. 809,349.

Mining Apparatus. C. J. E. Waxborn, assignor to Jeffrey Manufacturing Co., Columbus, Ohio, 1,276,141. Aug. 20, 1918. Filed Oct. 11, 1912. Serial No. 725,323.

Safety Gate for Mine Shafts. W. H. Finley, assignor Fairmont Mining Machinery Co., Fairmont, W. Va., 1,276,199. Aug. 20, 1918. Filed Feb. 19, 1918. Serial No. 218,054.

Process of Treating Coal. C. H. Smith, assignor to International Coal Products Corporation, Richmond, Va., 1,276,427. Aug. 20, 1918. Filed Jan. 20, 1916. Serial No. 73,106.

Burning Pulverized Fuel. V. Z. Caracristi, assignor Locomotive Pulverized Fuel Co., a corporation of Delaware, 1,274,384. Aug. 6, 1918. Filed Nov. 5, 1913. Serial No. 799,269.

Briquet and Method of Making Same. C. H. Smith, assignor to International Coal Products Corporation, Richmond, Va., 1,276,429. Aug. 20, 1918. Filed Nov. 15, 1916. Serial No. 131,434.

Ignition Tape for Miners' Safety Lamps. F. Fear, A. E. Naldrett and W. C. Nicodemus, assignors to Fred Fear Match Co., Bloomsburg, Penn., 1,275,543. Aug. 13, 1918. Filed Oct. 22, 1915. Serial No. 57,248.

Publications Received

Saving Coal in Boiler Plants. By Henry Kreisinger, Department of the Interior, Bureau of Mines. Technical Paper 205. Illustrated, 24 pp., 6 x 9 inches.

Thirty-first Annual Report of the Bureau of Mines, Mining and Mine Inspection of the State of Missouri. For the year ending, Dec. 31, 1917. Unillustrated; pp. 101; 6 x 9 inches.

Monthly Statement of Coal-Mine Fatalities in the United States, June, 1918. Compiled by Albert H. Fay, Department of the Interior, Bureau of Mines. Unillustrated, 27 pp., 6 x 9 inches.

Trade Catalogs

The Jeffrey Pit-Car Loader. Jeffrey Manufacturing Co., Columbus, Ohio. Bulletin 246. Pp. 8, 6 x 9 in., illustrated. Describes a light, easily portable loading conveyor which performs the most arduous work the loader has to do, resulting in a considerable saving of muscular energy and man power. The use of the loader decreases the cost of obtaining coal.

Industrial News

Centertown, Ohio—The authorized capital of the Centertown Coal Co. has been increased from $160,000 to $250,000.

Jackson, Ky.—The River Side Coal Co. has filed notice of an increase in its capitalization from $10,000 to $30,000 to provide for expansion.

Mechanicsville, N. Y.—William D. Tweedy, 56 Mabbitt St. is considering plans for the reconstruction of a number of coal pockets at his plant.

Russell, Ohio—The No. 6 Coal Co. has been chartered with a capital of $25,000 by D. A. Robinson, J. W. Burnett, B. J. Patch, H. W. Parker and H. A. McAuley.

Hazard, Ky.—The Hazard Coal Co. is having plans prepared for the reconstruction of its power plant recently destroyed by fire, with loss estimated at $5000.

Kilday, Ky.—The J. L. Smith Coal Co., capital $75,000, has been incorporated by J. L. Smith, George F. Noel and J. W. Farmer, and expects to develop coal properties.

Henderson, Ky.—The Charles T. W. Argue Coal Co., Henderson, capital $25,000, has been organized and incorporated by Charles T. W. Argue, W. H. Winstead and F. H. Harrison.

Lexington, Ky.—The Swift Coal and Lumber Co. is said to have acquired additional property in the vicinity of its local holdings, and is planning for early development work.

Houston, Tex.—The Texas Oil, Gas and Mineral Products Co. has been incorporated with a capital of $1,000,000 to develop coal, kaolin and silica deposits in Grimes County. W. C. Munn, Houston, is president.

Centertown, Ky.—The Centertown Coal Co., has filed amended articles increasing its capital stock from $160,000 to a quarter of a million in order to take care of contemplated improvements to increase production.

Chavies, Ky.—The Coneva Coal Co., at Chavies, one of the fast developing eastern Kentucky concerns, has filed amended articles of incorporation in which the capital is increased from $70,000 to $120,000.

Andover, Mass.—The M. T. Stevens & Sons Co. has awarded a contract to the New England Concrete Construction Co., 201 Devonshire St., Boston, for the construction of a new coal pocket at its plant, about 45 x 125 ft.

Chattanooga, Tenn.—The Chattanooga Iron and Coal Corporation is said to be having plans prepared for the immediate reconstruction of the portion of its plant recently damaged by fire, with a loss estimated at $20,000.

Hartland, W. Va.—The Clay County Fuel Co. has filed articles of incorporation with a capital of $100,000 to develop coal properties in Clay County. A. J. Peck, S. A. Moore and A. A. Lilly, all of Charleston, are the incorporators.

Fairmont, W. Va.—The Dawson-Connellsville Collieries Co. has been incorporated with a capital of $120,000 to operate

coal properties in the vicinity of Fairmont. G. G. Wedding, Carl Riggs and W. M. Kennedy are the principal incorporators.

Birmingham, Ala.—The Big Four Coal Co. has been formed with W. M. Holt, J. A. Carr and W. C. Davis as incorporators. The capital stock is $5000, and the company will engage in coal mining operations in this district.

Madisonville, Ky.—The Curtis Coal Co., which recently filed articles of incorporation with a capital of $50,000, is planning for the early development of coal properties in Hopkins County. Ray L. Curtis, of Madisonville, is president.

Washington, D. C.—The United States Government, Bureau of Yards and Docks, has awarded a contract to the Piel Construction Co., Baltimore, Md., for the construction of a new fuel depot at the Government station at Curtis Bay, Md.

Fairmont, W. Va.—The Diamond Coal Co. has been incorporated with a capital of $200,000 to engage in the development of coal properties in the Fairmont district. Warder Cresson, A. P. Brady and H. E. Engle are the principal incorporators.

Barbourville, Ky.—The Ideal Horse Creek Coal Co., recently organized, is planning to inaugurate operations at an early date on the development of approximately 100 acres of coal lands in the Crawfish district of Kentucky. G. D. Bengey is president.

Lansford, Penn.—The Lehigh Coal and Navigation Co. has awarded a contract to Charles H. Schlegel, Mt. Penn, for the construction of 20 new 2½-story, brick miners' residences. Calvin Young, 249 Jameson Place, Reading, is the architect.

Birmingham, Ala.—The Carbon Hill Consolidated Coal Co., of Carbon Hill, Walker County, has been incorporated with capital of $5000. The company was formed by S. R. Fowler and others, and will engage in mining operations in the vicinity of Carbon Hill.

South Bethlehem, Penn.—The Philadelphia & Reading Railroad Co. is taking bids for the construction of a new coaling station and pits in connection with other improvements at its yards at Saucon Creek. The new station will be of reinforced-concrete and steel.

Buckhorn, Ky.—The Buckhorn Coal and Lumber Co., capital $150,000, has filed amendment to its charter in which the capital stock is increased from $150,000 to $250,000 in order to develop properties and make contemplated improvements to increase production.

Memphis, Tenn.—The Memphis Gas and Electric Co. is planning to commence work at an early date on the construction of a new local coal and coke plant, to include a battery of 27 coke ovens, a number of concrete buildings, scrubber house and auxiliary structures.

New Waterford, Ohio.—The Canton Coal Co. has commenced work on the sinking of a new shaft at its local properties to provide for increased operations. Plans have also been prepared for the construction of a new power house at the plant for operation. J. E. Morgret is general manager.

Charleston, W. Va.—The Columbia Coal Co. has been incorporated with a capital of $90,000 to engage in the operation of coal mines in the Charleston field. C. H. Hetzel, Charleston; Charles A. Smith, Chillicothe, Ohio, and Herbert Hannigan, Lexington, Ohio, are the incorporators.

Clay, W. Va.—The Jones-Winifrede Coal Co., whose land is located at Hartland, in the Clay County field, has changed hands, E. E. George and other business men of Philippi having acquired the plant. H. C. Jones, of Logan, was one of those largely interested in the Clay County operation.

Charleston, W. Va.—The Burning Creek Coal Co., of Kermit, W. Va., has been chartered to operate mines in Mingo County. The capital stock is $10,000. Incorporators are: B. R. Bias, C. G. Bias and J. G. Nesbitt, of Williamson; G. R. C. Wiles, of Charleston, and Harry J. Jones, of Kermit.

Chicago, Ill.—The Chicago Pneumatic Tool Co. announces the appointment of A. G. La Pierre as traffic manager and F. O. Southbrook, as manager of the order and production department. The headquarters will be in the home office of the company, Fisher Building, Chicago.

Huntington, W. Va.—The Winifrede Railroad Co., which is a coal-carrying road operated by the Winifrede Coal Co., has been authorized to increase its freight rates from 15c. to 35c. per ton, according to announcement made by A. H. Land, district representative of the Fuel Administration.

Muskogee, Okla.—The Johnson & King Coal Co., Barnes Building, is planning for the immediate development of approximately 400 acres of coal lands at Clarksville, Ark., to have a daily capacity of about 250 tons. New mining machinery and equipment will be installed. Earl H. Johnson is president and manager.

Lynch, Ky.—The United States Coal and Coke Co., Carnegie Building, Pittsburgh, Penn., will build a 1-story (45 x 60) 132 ft. reinforced concrete bin, 40 ft. high, 20 ft. above ground, 45 ft. wide at a cost of about $100,000. Work will be done by day labor under the supervision of H. N. Eavenson, of Gary, W. Va.

Charleston, W. Va.—The Royalty Coal Co., of Morgantown, W. Va., has been incorporated with a capital stock of $50,000 to operate coal mines in Monongahela County. The incorporators are: Glen Hunter, Morris Clovis, Howard Swisher and Don K. Marchard, of Morgantown, and Jesse E. Moore, of Mooresville.

Charleston, W. Va.—The Equitable Byproducts Co., of Pittsburgh, Penn., has been incorporated with a capital stock of $90,000 to manufacture coke and other coal byproducts within the state of Pennsylvania. R. T. Rossell, Frank J. Young, E. C. McHugh, L. T. Sanders and F. L. Soles, all of Pittsburgh, are the incorporators.

Straven, Ala.—The Montevallo-Straven Coal Co., recently incorporated, has perfected its organization and is planning to commence work at once on the development of about 400 acres of coal properties in the Straven district with an initial capacity of 100 tons, to be increased ultimately to about 400 tons. F. E. Dunlap is president.

Charleston, W. Va.—The Big Six Coal Co., which has been successfully operated on Campbell's Creek, Kanawha County, has changed hands. H. T. Smarr and associates having acquired the holdings of the company from C. W. McNulty and others. Mr. Smarr will act as general manager of the mines acquired by him in the deal.

Columbus, Ohio—The G. C. Silcott Coal Co. has been incorporated with a capital of $25,000 by George C. Silcott, Mary A. Summers, Eva M. Silcott, R. M. Snetzer and D. H. Armstrong. The company succeeds the Silcott Coal Co., and will have larger offices on the ninth floor of the Brunson building. It will do a general jobbing business.

Radnor, W. Va.—The Burk Coal Co., Huntington, W. Va., has been organized to operate holdings in the Radnor district. The company controls the Radnor Coal Co. and the Laurel Creek Coal Co., and is considering plans for the construction of a new tipple and the installation of mining machinery for extensive development. John L. Corcoran is president.

Willard, Ky.—In connection with the extensive improvements planned by the Black Raven Coal Co., a large quantity of new mining machinery including coal-cutting apparatus, electrical equipment, screens, and other equipment will be installed. It is planned to have an ultimate output of approximately 1000 tons of coal daily. W. H. Norris is general manager.

Girdler, Ky.—The Steele & Alder Coal Co., recently incorporated with a capital of $18,000, has arranged plans for the immediate development of approximately 150 acres of coal properties in the vicinity of Girdler, to have an initial capacity of about 30 tons daily. New equipment for operation will be installed. W. B. Steele and Rex E. Steele, both of Pounding Mill, Va. are president and vice president respectively.

Chehalis, Wash.—Twenty-five of the city's most prominent business men held a conference recently for the purpose of interesting capital in the development of a plant for the crushing of coal which is abundant in adjacent fields and using it in powdered form at local industrial institutions. N. B. Coffman, A. C. St. John ad W. A. Shoell are prominent in the movement, as well as President A. Campbell, of the Superior Coal Co.

New York, N. Y.—Among recent contributors to the Coal Trade Liberty Loan Committee quota for the purchase of Liberty Bonds are J. E. Berwind, $150,000; Porto Rico Coal Co., $100,000; New Central Coal Co., $25,000; Weber, McLaughlin Co., $15,000; Gavin Rowe, $10,000; Scranton & Lehigh Coal Co., $117,000; Tuttle's Son & Co., $50,000; Bacon Coal Co., $30,000; Delaware, Lackawanna & Western Coal Co. (additional), $1,000,000; and Wilputte Coke Oven Corporation, $53,050.

Charleston, W. Va.—The Clay County Fuel Co., Kanawha National Bank Building, recently incorporated with a capital of $100,000, is planning to commence work at once on the development of approximately 600 acres of coal properties in the vicinity of Hartland. It is proposed to have an initial capacity of about 100 tons daily. William T. George, Philippi, W. Va., is president; A. A. Lilly, A. J. Peck, and S. A. Moore, all of Charleston, are first vice-president, second vice-president and secretary-treasurer, respectively.

Charleston, W. Va.—The Capital issues Committee has approved an issue of $150,000 of 7 per cent, sinking fund gold notes of the Eagle Byproducts Co., the proceeds of which will be used by the company to provide for extensive improvements and additions at its mines in the Paint Creek district, to increase the present capacity. It is understood that the coal produced by the company is in great demand for byproduct purposes, and the company is understood to be planning to increase the output ultimately to approximately 2000 tons daily.

Denver, Colo.—Arrangements are being rapidly completely by the Delaware holding company of the Western Pacific R. R. of California to legally assume ownership and control of the Utah Fuel Co., of Utah. This is a new and big asset for the stockholders, it having been recently set aside for them by the Denver Federal Court in part payment of their $38,000,000 court-affirmed debt against the Denver & Rio Grande R. R. The Utah Fuel Co. owns 26,000 acres of coal lands, which are estimated to contain 170,000,000 tons of coal. Some 800 coke ovens are now at work on the property.

Cleveland, Ohio—The Elliott Electric Co. has removed from 322-328 Champlain Ave. to 813-815 Superior Ave., N. W., where it occupies the entire five floors and basement. The first floor is occupied by the retail store and supply department office. The second floor is devoted to the general office and the machinery department office. The repair shop for the repairing of motors is located on the fourth floor. The remaining floors and basement are utilized to accommodate the large stock of motors and electrical supplies. The retail store is being remodeled, and when completed will be the largest in Cleveland.

Toledo, Ohio—The movement of coal to the upper lake regions from the Toledo docks is going ahead actively. The vessel movement is generally good and those in charge of the lake trade believe that the quota for the Northwest will be reached before the close of navigation. The Hocking Valley docks during the week ending Oct. 5 handled 188,000 tons as compared with 200,000 tons the previous week, making a total of 3,876,000 tons since the season opened. The Toledo & Ohio Central docks during the same week loaded 92,000 tons as compared with 85,000 tons the previous week, making a total of 1,699,000 tons for the season.

New York, N. Y.—The Anthracite Committee of the United States Fuel Administration has announced the 1918-1919 coal allotments for 1650 communities in the State of New York. The total tonnage in domestic sizes for the state is 15,855,300 tons, which is a 12 per cent. increase over the previous year's distribution figures. New York City gets 8,005,975 tons this year, or 872,567 tons more than during 1916-1917. Up the state there are 239 places which get no anthracite; 1345 towns that receive tonnages ranging up to 15,000 tons; 20 communities get over 15,000 tons; 18 places receive over 25,000 tons; 16 over 50,000 tons and 11 cities receive over 100,000 tons each. Rochester receives 599,865 tons; Buffalo, 599,015 tons; Syracuse, 380,212 tons, and Albany 296,058 tons.

Kansas City, Mo.—The investigation into retail coal dealing in Kansas City, conducted by Gregg & Co., of St. Louis, at the instance of the local dealers, has had incidental benefits, in addition to its usefulness in negotiations with the Fuel Administration. One of these beneficial features is the disclosure of inefficient business methods to some of the dealers. In some cases, for instance, the accountants discovered that dealers were making quite inadequate allowances for overhead; in other cases, the owners of the business were not allowing themselves any salaries. Two or three dealers were making no charge to their coal business, for rent of ground owned by themselves, though such rental charges appeared concerning ground which they leased for their coal purposes. In several instances coal dealers were carrying their property on their books at an antiquated value. There were numerous other such factors disclosed, which had prevented the dealer from figuring accurately and honestly on his costs of doing business.

MARKET DEPARTMENT

Weekly Review

Soft Coal Output Well Above Weekly Requirements—Anthracite Production Shows Slight Decrease—Labor Shortage and Poor Car Supply in Bituminous Regions—Influenza Epidemic Affects Hard Coal Output—Zoning Restricts Movement of Illinois Coal

REACTING to the drive for greater tonnages now being made by the Production Division of the Federal Fuel Administration, the bituminous mines during the week ended Oct. 5 shipped 12,585,000 net tons of coal. Though this output is a decrease of 462,000 net tons as compared with production the week preceding, the total not only exceeds the weekly requirements of the country by 4 per cent., but helps to make up 3.2 per cent. of the existing soft coal shortage. Anthracite production during the same week totalled 2,052,000 net tons, a decrease of 19,000 net tons as compared with output the week ended Sept. 28.

Labor shortage and poor car supply, the two bugaboos of the soft-coal operator, are again noticeably to the fore in the bituminous regions. The Fairmont district of West Virginia is one of the sections that by a scarcity of cars has been heavily handicapped in its efforts to meet production quotas. As an aside, it may be particularly appropriate to recall that the Railroad Administration not so long since emphatically stated that all mines would receive a 100 per cent. car allotment based on new ratings, and that cars would be moved to and from the mines with maximum speed and efficiency. So much for promises! Other soft coal producing sections, not so unfortunate as far as cars are concerned, complain of a shortage in man power and are troubled by labor that is restive and too prone to holiday-taking. As contrasted with other years, however, the mine workers have responded well to the demands made upon them.

In the anthracite region production is being seriously curtailed by the influenza epidemic. The disease has already necessitated the closing down of several large collieries, and hardly an operation but has a number of its employees on the sick list. It is estimated that daily production is being reduced from 25,000 to 35,000 tons from this cause, and all possible efforts are being made to prevent the further spread of the disease.

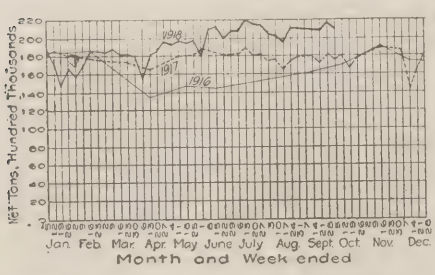
The most carping critic must now admit that the Fuel Administration has amply justified its reason for being. In control of all production and distribution facilities, the Administration has brought to fruition the many plans which it formulated early in the year for safeguarding the nation's fuel supply. In the face of apparently insurmountable obstacles and scathing sarcasm from many quarters, Dr. Garfield and his assistants have steadily labored until chaos has given way to order; and it is gratifying to record that New England and a number of other important industrial centers report ample reserve stocks of fuel against the uncertainties of winter mining and shipping conditions.

There is one phase of the distribution system, however, which seems to demand consideration. The mines in the Standard and Mt. Olive fields of Illinois are confronted with a serious predicament. Consumers who receive their coal supply from these fields have stocked up with fuel to such an extent that the mines in these districts now have no market for their product. At the same time parts of Iowa, Nebraska, the western part of Missouri and certain northern sections would gladly purchase Standard or Mt. Olive coal, but unfortunately zone restrictions prevent the movement of Illinois coal to these localities. It would appear as if a readjustment of the zoning regulations insofar as they apply to Illinois coal would prove of advantage not only to the mines affected, but would also enable certain sections of the Middle West to obtain a much-needed coal supply.

Only the premature closing of the Lake season by severe weather will prevent the Northwest from receiving its allotment of 28,000,000 net tons of bituminous coal by way of the Great Lakes. October, according to the Fuel Administration's schedule, is only a 3,500,000-ton month, yet in the period from Oct. 1 to Oct. 7 a total of 1,006,954 net tons of soft coal, not including vessel fuel, was loaded at the lower lake ports. At this rate the entire deficit for the season to date would be wiped out by Nov. 1.

WEEKLY COAL PRODUCTION

The output of bituminous coal during the week ended Oct. 5 decreased 462,000 net tons, or 3.6 per cent. compared with the week preceding, but exceeded production during the week of Oct. 5, 1917 by 1,774,000 net tons, or approximately 16 per cent. Estimates placed production (including lignite and coal made into coke) at 12,585,000 net tons as compared with 13,047,000 net tons during the week ended Sept. 28, and as against 10,811,000 net tons during the corresponding week of 1918. The average production per working day during the current week is estimated at 2,097,000 net tons, 78,000 net tons lower than the daily average during week of Sept. 28, but 295,000 net tons in excess of the daily average of the same week last year. The production during the week of Oct. 5 while considerably lower than the week preceding, exceeded the weekly requirements by 4 per cent. and the weekly requirements to make up the past deficit by 3.2 per cent.



Production of anthracite during the week ended Oct. 5 is estimated at 2,052,000 net tons, a slight decrease compared to the week preceding and the same tonnage as produced during the corresponding week of last year. Daily average is estimated at 342,000 net tons as compared with 338,000 net tons for the coal year to date, and as against 331,000 net tons during the same period of 1917. The total production for the coal year to date is estimated at 53,703,000 net tons, an increase of approximately 2 per cent. over last year.

Shipments of bituminous coal to New England during the week ended Oct. 5 were extremely heavy and exceeded the coal received by New England during the preceding week by 137,339 net tons, or approximately 30 per cent. Preliminary estimates place shipments during the week at 588,105 net tons, of which amount 180,576 net tons was received by rail through the gateways and the balance of 407,529 net tons comprised water shipments. The rail receipts exceeded the previous week's tonnage by 3 per cent. while the increase in tidewater shipments amounted to 47 per cent. all harbors reporting considerable improvement. Rail receipts during the current week, however, fell 15 per cent. below the weekly average of the coal year to date, while tidewater shipments exceeded the weekly average by 18 per cent.

Increased shipments from Baltimore during the week ended Oct. 5 caused total shipments from tidewater harbors to exceed the performance of the week preceding by 36,365 net tons. Shipments from all harbors during the week amounted to 953,158 net tons, of which total New York and Philadelphia shipped 452,091 net tons, Baltimore 117,509 net tons and Hampton Roads 382,748 net tons. Shipments from New York and Philadelphia exceeded the shipments from the same ports during the week ended Sept. 28, while shipments from Hampton Roads fell slightly. Shipments from all ports except Hampton Roads during the current week exceeded the weekly average for the coal year to date, while Hampton Roads fell behind 7 per cent.

Production of beehive coke coal during the week ended Oct. 5 is estimated at 572,000 net tons, a decrease compared with the week preceding of 38,000 net tons, or 6.3 per cent. The average production per working day is estimated at 95,000 net tons as compared with 102,000 net tons during the week ended Sept. 28. The operators of the Connellsville, Greensburg and Latrobe

CARLOADS OF COAL ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended Sept. 14	Sept. 21	Sept. 28	Oct. 5
Bituminous shipments, 123 roads	223,131	223,631	230,376	222,704
Anthracite shipments, 9 roads	40,699	36,859	40,524	38,550

districts of Pennsylvania report production of beehive coke during the week ended Oct. 5 at 376,433 net tons and the operation of their plants at 75.5 per cent. of their full time, as compared with 76.4 per cent. during the week preceding. Shortage of yard labor increased slightly during the week.

Conditions in the byproduct industry changed but little during the week ended Oct. 5 as against the preceding week. The operators in the United States of byproduct ovens report production during the week at 585,216 net tons and the full time operation of their ovens at 91.9 per cent. as compared with 92.2 per cent. during the week preceding; and of total losses of their full time of 8.1 per cent., 1.3 per cent. is attributed to lack of coal, 1.3 per cent. to labor shortage, 4.8 per cent. to repairs to plants and 0.7 per cent. to all other causes.

Material improvement occurred during the week in Kentucky and West Virginia. In the former state the operators attributed the improvement to repaired plants while no reason was given by operators for improvement in the latter state. A decrease in production occurred in Maryland, Minnesota, New York and Tennessee. Shortage of labor limited production in Maryland and New York, and repaired plants in Tennessee, while the operators in Minnesota attributed their limited production to other causes.

BUSINESS OPINIONS

The Iron Age—Pig iron was produced in September at 113,942 tons a day, the highest rate in the history of the industry, representing a gain of 4600 tons a day over that of August. The September total was 3,418,270 tons, against 3,389,585 tons in August. Yet 14 furnaces blew out last month and seven blew in, making a net loss of seven. The total in blast Oct. 1 was 365. Ferromanganese and spiegeleisen production went above 66,000 tons last month, or about 12,000 tons more than the best previous record. The manganese situation is easing beyond expectation.

Dry Goods Economist—Dry goods business at retail is above normal in many centers, despite the handicaps caused by the spread of influenza and the fact that merchants everywhere are striving to boom the Liberty Loan, in some cases devoting their entire advertising space to the drive. The Government's cotton crop estimate as revised this week indicates a total yield of 11,818,000 bales, a gain of 681,000 bales over the last previous estimate. The increase is attributed entirely to favorable weather in the cotton belt. Prices of raw cotton continue to recede slowly.

American Wool and Cotton Reporter—Wool is arriving all the time at the Boston market from South America and South Africa, and is being put through the Government "machine" as rapidly as possible. Facilities for transporting wool from the wharf to its destination are not very good. Many mills have run out of civilian orders. Others would like to get wool for civilian purposes but are unable to do so because they are not on Government work. Some mills are running with only 60 per cent. of their operatives on account of the influenza epidemic. There has been perhaps a little more buying of cotton on the part of the mills since the decline in prices, but this has been slight.

Bradstreet's — Cumulatively, favorable war news has stimulated the bond market, raised the levels of peace stocks, and begotten false peace sentiment, against which the President has issued a caution. Peace talk, too, has had some effect on trade, which reflects some hesitation, and the pace of industry has slackened, but some responsibility for this is credited to the country-wide epidemic of influenza, which has hampered industry, resulted in the promulgation of health regulations, the closing of some theaters and schools, and finally in restricted buying by the ultimate consumer. The Liberty Loan campaign also has diverted attention from trading, and pleas for peace emanating from the central European belligerents have brought on a more cautious attitude among buyers.

Atlantic Seaboard

BOSTON

Receipts both all-rail and by water still further reduced. Several modern colliers withdrawn from coastwise service. Nothing but light shipments in prospect. Hampton Roads detention less severe, due partly to fewer arrivals. Bulk of Pocahontas output still moving for line and byproduct use. Meanwhile, long lists are issued laying embargoes against plants served both all-rail and from tidewater distributing points. Condition works hardship on regular shippers. Increased shipments overseas in evidence. Baltimore loadings diminish. South Amboy embargoed for a time and only a light tonnage dumped over the Philadelphia piers. Anthracite receipts, both domestic and steam sizes, also diminish. Storrow anthracite comes forward irregularly.

Bituminous—Shipments generally have shown a notable falling off the past fortnight. All-rail receipts, as compared with a month ago, are on the average 20 per cent less, or approximately 150 cars less daily at the five gateways. For the first eight days of October the average number of cars passing was but little over 600 per day, railroad fuel included. Movement of the latter has somewhat increased, so that the reduction in commercial receipts all-rail is greater than 20 per cent. Not only have embargoes been liberally applied against New England consignees, but the latter of their own motion are shutting off deliveries on contracts that were entered into early in the season. The scarcity of labor to unload cars, the difficulty of adding to stocks already piled high, and further the knowledge that coal is now relatively easy to get are all factors in the current situation. New England has practically a four months' reserve, and now that current requirements can be had the all-rail buyers in particular are disposed to look upon fuel needs the coming winter as a problem already solved. Certainly, if we reach Nov. 15 without shipments being cut down too radically this complacent attitude will be amply justified.

The recent withdrawal of several large modern colliers has shown the trade how quickly it is possible for a reaction to set in. It has long been anticipated that for volume shipments abroad it would be necessary to use still more of our fast self-trimming steamers for overseas work, replacing them so far as possible with old type of slow-going boats that would have small chance of escape in submarine zones on the other side. It is understood that shipments must now begin to increase very fast to meet urgent needs in France, Italy and other allied countries, but not until lately was it thought prudent to deprive New England of the coal such a move would mean.

It is a time, however, when deliveries can be diminished with entire safety, although from the standpoint of New England and the flow of coal to tidewater, especially at Hampton Roads, will have to be followed more closely than a few weeks ago was thought would be necessary. The fact that the very largest consumers, the railroads and other utilities, have less in reserve than the average of the industries, will make it very important to see that there is no protracted breaking down in loading at the Virginia terminals. The extent to which receipts here fall off the next month will be interesting to observe.

Dispatch has improved at Hampton Roads. Where a week ago it was taking four to eight days to load bottoms, the average detention is now down to two days, and in some cases less. One day at Lamberts Point the proportion of coal available to boats waiting was about 40,000 to 90,000 tons, a better showing than had been the case for several weeks. The situation will probably show further improvement as there are fewer arrivals. The withdrawal of so many colliers from the coastwise service will mean a considerable reduction in the number of bottoms to load, from week to week. Byproducts requirements will of course continue heavy, and the large tonnage of Pocahontas and other coals moving west, along the line, and for other purposes will mean a large decrease in the tonnage handled over the piers.

While these factors will operate to reduce shipments here the fuel authorities are busy drawing up lists of consignees to whom further shipments should be discontinued. Not only does this apply against coal routed all-rail, but similar lists filed with shippers and forwarders who have both coal and facilities for deliveries inland. In several cases the result has been a distinct hardship to the agencies concerned. There are instances where shippers having their coal forwarded via the New York piers in regular course were not only obliged to move the coal later via Baltimore but were forced to stand heavy requisitions against it in favor of the New England Fuel Administrator, for distribution as the latter elected. The shipper had contracts outstanding with New England consignees who from time to time have been persuaded to take on coal shipped by the New England Fuel Administrator up to a point where the latter decided no further coal should go forward. For the same reason the fuel authorities cease to have coal at Baltimore or elsewhere requisitioned in their favor. The result is that the regular shipper now has his coal on his hands. His customers with whom he has contracts are not permitted to take coal from him, and as to the ultimate disposition of such cargoes as have arrived or are in transit the New England Fuel Administrator is without helpful advice. In other words, the shipper has his coal withheld from him while there is a ready market, but after fuel is no longer in urgent request and arbitrary stock limits are clamped on he is told he may have his coal for such distribution as may be acceptable to the Fuel Administration. When it is urged in some quarters that the game has been played with great skill, the average shipper is in position to answer, "Yes, but you had all the trumps."

Baltimore loadings have sloped off for New England, but there as elsewhere there is in evidence an increased volume of coal for naval and oversea use. The movement to South Amboy was so heavy a week or so ago that further shipments were embargoed to relieve congestion. The same thing was true of the Philadelphia piers, where the recent withdrawal of Reading barges to load at Port Reading rather than at Port Richmond has made a distinct difference. The port of Philadelphia will from now out show a notable falling off in coal clearances.

Anthracite—There is a further sag in the receipts of domestic sizes. In this respect the 50 cars daily of "Storrow anthracite" seem not to mean any increase in deliveries. Apparently this "free" coal is being used mostly to make up arrears of "independent" shippers, usually at the expense of retailers who depend upon the companies who have proved the more reliable sources of supply. The volume of steam sizes has fallen off very largely, due doubtless to the easy situation with regard to bituminous.

The "50 cars daily" of Storrow anthracite come forward more or less irregularly, and are subject to the same discount in actual shipments that has been true of similar arrangements for bituminous. It is hard to get accurate data, for up to the present writing no statement has been given out.

NEW YORK

Anthracite situation active, but domestic sizes are scarce and in heavy demand. Dumpings decrease owing to New Jersey explosion. Dealers must deliver more egg and pea to take place of stove and chestnut. Shipments to New England to be hurried. Bituminous situation easy, with commercial coals in good shape. Railroads continue to take fuel.

Anthracite—The situation continues active, with domestic sizes scarce and the demand heavy. Dealers report that there has been no let-up in the call for fuel and that the outlook is one of continual activity throughout the winter.

Shipments here fail to show an increase consistent with the demand. On the contrary the dumpings for the week closing Oct. 11 show a heavy decrease as compared with the previous week, not altogether the failure of shippers, but because of the disastrous TNT explosions at Morgan, N. J., on Oct. 5, not far from the coal piers and which interrupted work at South Amboy for two days because the workers could not be reassembled. During the period of seven days there were 5154 cars of anthracite dumped at the various piers, a falling off of 1403 cars from the previous week. The local trade as well as the nearby New England trade were seriously affected by the lack of shipments, but hopes to be able to make it up by increased tonnages which must be sent here if the allotment is to be maintained.

Acting upon the advice of Fuel Administrator Storrow of New England, the Anthracite Committee has requested producers and distributors to see to it that various communities in Massachusetts that receive the larger part of their fuel by water shall receive it by Dec. 1 and that weekly reports be sent to the committee by the shippers showing what progress has been made in that direction.

New efforts to conserve fuel are being announced almost daily by State Fuel Administrator Cooke. Dealers have been instructed to restrict sales to those living outside of communities who either have standing or cut wood available for fuel purposes. Mr. Cooke has also announced that in view of the demands of the War Department for stove and chestnut coal for use in camps and cantonments retailers will have to supply their customers with larger proportions of egg and pea coal.

Dealers continue to receive a larger supply of broken than usual to take the place

of egg and stove. The supply of the sizes below pea steadily increases and there has been some cutting of prices by individuals. The companies are taking advantage of the situation to send some to the storage yards.

Current quotations, per gross ton, f.o.b. tidewater, at the lower ports are as follows:

	Circular	Individual		Circular	Individual
Broken	$6.75	$7.50	Buck	$5.10	$5.90
Egg	6.65	7.40	Rice	4.65	5.10
Stove	6.90	7.65	Barley	4.15	4.30
Chestnut	7.00	7.75	Boiler	4.60	
Pea	5.50	6.25			

Bituminous—The bituminous situation is easy, with plenty of commercial coal here to meet all current needs. Receipts have been below the average but there has been no anxiety on that account.

At the local piers there were 5507 cars of bituminous dumped during the week ending Oct. 11 as compared with 6666 cars the previous week, a decrease of 1159 cars. Much of this shortage was, however, due to the discontinuance of operations at the South Amboy piers on Oct. 5 and 6, because of the New Jersey explosions.

For the week ending Sept. 28 there was a considerable decrease of shipments of bituminous coal to New England from this harbor, Government statistics showing a falling off of 14.8 per cent. as compared with the preceding week. However, shipments to all points increased 4 per cent. over the previous week.

Some results of the application of the Government "lightless" night order have been announced. One of the electric light companies operating in Brooklyn reports having saved 6300 tons of coal as the result of the 184 lightless nights since the order went into effect.

The railroads continue to take coal for their needs, but according to some shippers are not paying the bills promptly. Considerable inconvenience has been caused by the action of the railroads on account of the seizure of the coal, consumers who were in urgent need of fuel having been made to hustle in the open market for coal.

Locally the situation is all that can be desired. There is plenty of commercial coals to meet all necessary needs but no surplus for outside calls. Bunker fuel is comparatively easy with enough to take care of demands.

Current quotations, based on Government prices at the mines, net ton, f.o.b., tidewater, at the lower ports, are as follows:

	Mine Gross	F.o.b. N. Y. Gross
Central Pennsylvania:		
Mine-Run, prepared or slack	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of Mine	3.08	5.23
Prepared	3.36	5.51
Slack	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite activity shows no abatement. Dealers deliver short orders. Efforts to move egg and pea. Tonnage below expectations. Full quota assured, but epidemic causes decrease. Good preparation. Steam coals begin to regain strength. No demand for culm. Bituminous in good supply. Coal well distributed. Big plants still embargoed.

Anthracite.—The cool weather brought unusual demands upon the dealers, but by following the suggestions of the local fuel administration considerable headway was made in supplying homes that had no coal. With the increasing severity of the influenza epidemic homes in which there was sickness were given preference, and in many cases where dealers had short supplies the delivery of fractions of tons was resorted to for the first time in many months. This week finds the market unusually short of stove and chestnut, and where any stocks exist they are invariably egg and pea coal. The public shows little tendency to take any but the preferred sizes. In order to change this situation as much as possible Mr. Lewis has just furnished every dealer with a placard calling the attention of the public to the shortage of stove and nut and stating that they are being consigned to the army cantonments, etc. The public is appealed to to use as a substitute a mixture of 60 per cent. egg and 40 per cent. pea. A list of instructions as to how to burn this combination in any heating apparatus is also supplied, and the dealers are expected to induce their customers to change their orders to move these two laggard sizes at this time. Those who call at the dealers' yards are impressed with the official appeal and realize the seriousness of the situation, but as most of the buyers beg for their coal over the telephone the dealers are having much trouble with this class. For this reason it is hoped the fuel administration will use the daily press to help educate the public as to conditions.

The largest shipping company which was compelled to neglect this market last month is consigning much more coal here now. As a whole the tonnage coming into Philadelphia so far this month has been disappointing. The heavy consignments promised to the suburban dealers, who were to have an increase of 10 per cent. immediately, are also much below expectations.

There is an increasing confidence expressed at the offices of the different shippers that the Philadelphia dealers will receive their full quota based on the 1916-17 estimate, plus the increase allowed by the anthracite distribution committee. Naturally the dealers are all growing anxious and impatient and like the householders want to see the coal. From all we can learn we are satisfied that after Nov. 1 the receipts will be heavy, and that by that time the dealers will be more concerned about getting the coal out of their yards than into them. In fact the labor question is growing so serious that by the time severe weather arrives we expect to see much coal bought at the yards, with the consumer arranging for the delivery as best he can. More coal is stored in the cellars than ever before, but the large class of one-ton buyers for the small homes, who always wait until coal is needed, are sure to have trouble in being supplied.

We have made it a point recently to inspect coal as to its preparation as received from various shippers. From personal observation we are of the belief now, when scarcely a dealer would be critical, that coal is coming to market in better shape than in normal times. It is quite true that the larger companies are particularly careful.

The closing of the churches, schools, theatres, etc., on account of the influenza epidemic has been the means of saving much fuel this week, as the weather has been so cool that heating of such buildings would have been necessary.

There is a noticeable bracing in the steam coal market. As a matter of fact the break of a week or ten days since was only felt by the larger shippers. These concerns actually ran into storage yards a considerable tonnage of the sizes below buckwheat. While the market even now cannot be said to have regained its former vitality, still there is a quick market for all of the buckwheat coal that is coming out and almost as much can be said of rice coal. With the sizes smaller than rice there is still a considerable tendency to slackness, but it is thought from now on this will gradually wear away until an active demand is in evidence for every size, with the possible exception of culm. This latter material has not shown any tendency yet to become in active demand. Even with the biggest shippers there is only a stray car called for, mostly in the way of a test by some concern which has not yet tried it. The exemption ruling as to buckwheat has again been placed by the fuel authorities, and it is doubtful whether it will be lifted now until the season is well advanced toward spring.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.25	Buckwheat	$3.40	$4.45
Egg	4.80	6.15	Rice	2.90	3.80
Stove	5.05	6.40	Boiler	2.70	3.70
Nut	5.15	6.50	Barley	2.40	3.30
Pea	3.75	5.00	Culm	1.25	2.15

Bituminous—There is a growing feeling that the bituminous situation is being mastered. At any rate every plant seems now to be getting along without a great deal of difficulty in procuring supplies and most of them are even able to accumulate a little stock, which is the condition being striven for by the distribution committee. Practically all of the big users which had succeeded in getting stocks of 60 days or more in advance are still being embargoed until they reach a 30-day minimum, when they will again be allowed to receive coal.

BALTIMORE

Influenza demoralizes all lines of business. Soft coal continues easy but of poor grade. No relief, despite urgent call, in regard to anthracite.

Bituminous—There is hardly a coal office in Baltimore that has not been hit by the influenza epidemic. All lines of business are more or less demoralized in a city that for days showed from 1500 to 2500 new cases of the disease a day, and a death list of around 100 daily from influenza and pneumonia. The supply of soft coal continues easy here. The main run continues in box-cars, and despite the big meeting in western Maryland recently in the interest of cleaner coal from that section, as well as from West Virginia and western Pennsylvania, in only one line of movement, coal for loading for eastern shore of Maryland points, was any improvement in grade to be noted. The poor run of soft coal is shown in the fact that the fuel administration here has been unable to get even a fair grade of bituminous for the domestic trade, which had been generally advised to push a high class lump soft coal as a substitute for the anthracite that has not arrived.

Anthracite—Baltimore is still in the throes of disappointment as to any possibility of adequate hard coal supply. There is apparently little hope of immediate improvement, and all the appeals of the city to Washington, backed by facts to show that thousands of homes here are entirely out of coal and have no prospect of getting even a little before real winter comes, have fallen on deaf ears, as far as results go. The fuel administrator of Maryland and the chairman of the city committee spent some time in Philadelphia this week in an effort to rustle up a little coal, having been informed that some mining connections with headquarters there were unable to understand why Baltimore was so desperately short when New York is reported fairly well supplied, at least in some boroughs. Philadelphia has enough to meet early requirements, and Washington dealers in some cases have actually been asking that shipments be held up a time as they could not handle all the coal coming through. The statement, therefore, that Baltimore is estimated to have between 30,000 and 40,000 homes entirely without coal, with more than 200,000 tons of undelivered orders on the books and a big tonnage asking recognition here, is hard of understanding. Many of the yards here were without a pound of coal last week, and some dealers had received no coal for a week or more, and then only small amounts.

Lake Markets

PITTSBURGH

Car supplies sufficient, production being limited by labor performance. Low sulphur specifications.

After attending a conference in Washington of the fuel production managers, R. W. Gardiner, production manager for the Pittsburgh district, states that there has been a sufficient car supply for two months past and that the matter of coal production is one of getting the miners to work harder. Fully 20 per cent. of the men employed in the coal industry have enlisted or been drafted, and those who are left must work harder. Much difficulty has been encountered in getting men to work full time, and to work immediately after pay day.

Production of the Pittsburgh district continues on the increase, with car shortages reported only occasionally, but with labor shortage in evidence almost everywhere. Lake shipments are fairly heavy and with the rerouting of vessels to the "fast docks" recently decided upon the full complement of lake shipments may be reached, but only by continuing the movement to the end of the navigation season. Essential industries are well supplied, but there is still no opportunity to stock.

A movement has started among coal operators to increase the limit on low sulphur coal from 0.05 to 0.06 per cent., and this meets with opposition of the steel producers as they have difficulty in meeting the low sulphur requirements in certain government contracts.

Coal jobbers are doing scarcely any business, as consumers who would be allowed coal are generally taken care of by the Fuel Administration; and the zone system greatly restricts the opportunity of jobbers to act. The market remains quotable at the set limits: Slack, $2.10; mine-run, $2.35; screened, $2.60, per net ton at mine, Pittsburgh district, with 15c. brokerage allowed to be charged in addition by recognized brokers.

Recently the local fuel administrator called upon the local distribution manager for 450 carloads of coal weekly additional for retail dealers. As the coal could not be found except by taking it from lake shipments, the matter was put up to the Washington authorities, and as a result of an investigation by a field representa-

tive permission has been given to divert 200 carloads weekly. It is expected that this will take care of the matter temporarily, with the larger supply in prospect when the lake seasons ends.

BUFFALO

Bituminous growing easier. Anthracite not so plenty. Authorities claim that it is sufficient. October more favorable than September.

Bituminous — The trade goes on much the same, though the complaint of shortage is mostly from consumers who have suddenly been deprived of their supply by priority orders. As soon as any concern which has been receiving coal regularly finds it sent to someone else, he sends out complaints to all who are in authority and usually succeeds in getting shipments again. It would seem that a more even distribution would save a large amount of turmoil and complaint. As the output is steadily reported as a good percentage over last year, it would seem to need a very severe winter to produce a famine.

Reports from Canada are conflicting. If a consumer or a town is short it seems to be the practice to claim that the shortage is general, but a well-known dealer of Montreal now in Buffalo says that the situation is easy in his territory. A month or more ago he complained of shortage. At the same time all districts will take all the coal they can get. Recent trips through the state eastward and northward find a pretty good supply in the yards of consumers.

Bituminous jobbers are not generally increasing their business. A few are doing pretty well, while most of them are merely waiting for old conditions to return. There must be a surplus of coal before the middleman is active, and that may be far away. There is complaint that the authorities have made vague promises to help them, but are allowing the trade to fall into the hands of the zone distributors.

Prices, as prescribed by the Fuel Administration, remain at $4.65 for thin vein Allegheny, all sizes, $4.45 for Pittsburgh lump, $4.20 for Pittsburgh mine-run and slack, all veins, $5.85 for smithing and smokeless, $5.60 to $6.10 for cannel, all per net ton, f.o.b. Buffalo.

Anthracite—The complaint of increased shortage through the city continues. In all instances where requests were for coal to be sent to families having the influenza the supply was sent promptly. So it is hard to say whether the city really is badly off or not, though practically every dealer will say so. It will take actual cold weather to determine that.

The list of cargoes loaded to the lake trade shows a number of ports which commonly receive only a single cargo a season, in which case there is usually no freight rate, the coal being bought here by the consignee. The amount for the week is large—122,200 tons—of which 35,800 tons cleared for Duluth and Superior, 31,300 tons for Milwaukee, 16,000 tons for Fort William, 10,100 tons for Chicago, 7200 tons for Ashland, 6400 tons for Escanaba, 6000 tons for Port Arthur, 3200 tons for Racine, 3000 tons for Sheboygan, 1800 tons for Kenosha and 450 tons for Saugatuck.

Freight rates continue at $1 to Racine and Kenosha, 60-65c. to Chicago, 55c. to Milwaukee, 50c. to Sheboygan, 48c. to Duluth, Ashland, Fort Williams and Port Arthur.

CLEVELAND

Withdrawal of all Baltimore & Ohio cars from Ohio coal mines and their transfer for use from the Fairmont field of West Virginia to tidewater is the outstanding feature of the coal situation here. Other roads are seeking to plug up the hole, but the loss in tonnage, especially to the lakes, will be distinctly felt. Labor continues the limiting factor, generally. Coal for domestic purposes has been a trifle more free.

Bituminous—Official notice that the Baltimore & Ohio R.R. would supply no coal cars to Ohio mines in the last half of the week ended Oct. 12 put a decided damper upon the industry. The lake trade is the greatest sufferer, though car supply on the other lines has been increased as much as possible to fill the gap. But even with this loss, car supply is less a limiting factor than labor. Industrial consumers are getting a trifle less coal than they were a week ago, while the domestic trade is benefiting. As against 15 to 20 per cent. of its needs, the retail trade is getting 30 to 40. for the time being.

Anthracite—Occasionally a small lot of anthracite filters through the blockade the zoning system has been put into effect, but receipts for the domestic trade may be said to be negligible. Complaint still is heard from upper lake dock operators to the effect that their quota of anthracite is far from filled.

Lake Trade—Only some unforeseen contingency, such as an early closing of the lake season by a premature winter, can keep the Northwest from getting its desired 28,000,000 tons of bituminous via the Great Lakes, is the consensus of opinion of the better-informed lake coal shippers. October, for example, is only a 3,500,000-ton month according to the Federal Fuel Administration's schedule, yet in the period of Oct. 1-7 a total of 1,006,954 tons of bituminous, not including vessel fuel, was loaded at lower lake ports. At this rate the entire deficit for the season to date would be wiped out by Nov. 1. Operators further point out that no shipments at all are scheduled for December, while in December, 1917, the lake fleet took up more than 660,000 tons. Oct. 9 proved to be the biggest coal-loading day of this season, when a total of 4401 cars, or 219,500 tons was loaded. Diversion of coal cargoes at the head of the lakes from slow to fast dock continues, and complaints of operators against this precedure are decidedly softened.

DETROIT

Efforts to supply the needs of domestic consumers hold the attention of dealers. Speeding of anthracite is promised. Lake trade continues heavy.

Bituminous—Detroit's supply of bituminous suitable for household use is not being increased to the extent that dealers expected it would be from the recent change in regulations governing zone shipments. The explanation is offered by jobbers that domestic lump and other prepared sizes, owing to priority orders, are finding their way into the lake trade.

The change in zone shipping withholds from Detroit and the entire lower peninsula of Michigan the product of mines in Ohio, West Virginia and Kentucky, except when delivery is made for the use of domestic consumers, gas companies, railroads and byproduct plants. This regulation cuts off shipments from the southern fields to industrial and manufacturing plants, and incidentally deprives Detroit jobbers of a large proportion of their trade by taking away their source of supply.

The manufacturing and industrial plants are authorized to provide for their coal requirements by obtaining coal from mines in Indiana and Illinois. Coal from those districts is regarded by many of the local consumers of steam coal as being of an inferior quality. Jobbers report also they are experiencing difficulty in getting coal from Illinois, and that some of the operators in that district appear unable to take care of the new business.

Anthracite—From J. B. Morrow, of the distribution division of the Federal Fuel Administration, Detroit has received assurance that anthracite shipments will be increased at once and that between 80,000 and 90,000 tons will be delivered within the next 30 days. Mr. Morrow also announces Detroit will receive the full 601,000 tons allotted to the city for the coal year. The light shipments so far received are explained as due to the desire to give precedence to movement of coal over the lake routes during the navigation season. The anthracite shipments promised for the month, according to the state fuel administrator, will practically all be required in filling orders already booked from owners of baseburners.

Lake Trade—Lake shipments of bituminous coal are continuing in good volume at an average a little above 1,000,000 tons a week. Vessel capacity for handling the coal is being supplied promptly.

COLUMBUS

With an increased demand for screenings, the coal trade in Ohio is in better shape than a week ago. There is not an oversupply of screenings and mine-run on the market. Lake and domestic tonnage is selling well.

Recent modifications of the embargo against shipping anything except lump coal into Michigan have had the effect of relieving the fine coal situation in Ohio. For several weeks there was an oversupply of screenings, and limits on storage to Ohio consumers were lifted. But the latest modification is to include all of southeastern Michigan in the territory to which screenings can be shipped. As a result there is no oversupply available and the steam market is again about normal. Manufacturing plants are still in the market for a considerable tonnage of fine coal. Public service concerns are well supplied and public institutions are also looked after. Indications point to a steady steam trade for the immediate future.

The domestic trade is also rather active. Dealers are taking time by the forelock, so to speak, and are stocking up for the first cold snap. Retail stocks are fairly large. Some of the dealers are enlarging their storage space in order to be in a better position when the low temperatures arrive. Orders are not plentiful, as fully 75 per cent. of the domestic coal required in central Ohio has been stored by the householder. Retail prices are firm at the levels which have prevailed for some time. Pocahontas is not to be had and there is only a small amount of anthracite available. Pomeroy Bend and the Hocking Valley are supplying the greater part of the domestic tonnage.

Production is slightly increased in most of the Ohio fields, although there is considerable car shortage reported. The lack of cars is most noticeable on the Toledo & Ohio Central and Kanawha & Michigan. Motive power is scarce, and that is the principal reason for failure of empties to arrive at the mines. The Hocking Valley Ry. is now receiving locomotives ordered almost a year ago, and some of the U. S. A. locomotives are diverted to other lines. In eastern Ohio there is still a marked labor shortage which is curtailing the output. Generally speaking, the output is estimated at about 75 per cent. during the past week.

The lake trade is being pushed as rapidly as possible. The vessel movement is active and little time is lost at either end of the journey. Indications point to a complete filling of the requirements of the Northwest before the closing of navigation.

CINCINNATI

Strong demand in all departments. Supply as good as at any recent time, and increasing consumption for heating is noted.

With some raw and cold weather as a further stimulus to consumption in this vicinity, there has been no opportunity for a let-up in the demand for fuel lately, especially in view of the well-advertised conviction of some high authorities that there is not going to be enough coal to go around when the severe weather arrives. With this belief firmly impressed upon the public in general, including the numerous manufacturing concerns which have been unable to secure rating as essential industries, entitling them to a regular supply of fuel under a priority order, it is natural that demand should continue from all quarters at a high rate. Efforts are still being made by manufacturers who have not received priority rating to secure such rating from the authorities at Washington, but there are extremely few instances where such efforts have been successful. The result has been that arrangements for the storage of a larger supply of coal than ever before are being made by these manufacturers, in order to enable them to tide over anticipated periods of shortage without the necessity of suspending operations. Retailers are in the market for about all the coal they can secure, as the cooler weather has produced the usual crop of one-ton orders, and the average dealer is still occupied in making deliveries on orders booked some time ago for fall and winter delivery. The danger of a domestic shortage locally is rapidly diminishing as these deliveries are made, and is not now considered serious.

LOUISVILLE

Domestic coal in better supply, demand little weaker. New regulations allowing stocking of screenings by industrial consumers are aiding situation materially. Operations on much better basis of production.

Lump coal is coming in from the mines in much better quantities than it has, and some of the retailers are again stocking a little surplus of western Kentucky lump, as the demand is not so keen as it has been. All deliveries of eastern Kentucky domestic sizes are being cleaned up as rapidly as received at the present time. The steam demand is generally good, but hasn't been up to production under old regulations.

Wiley B. Bryan, Federal Fuel Administrator for Kentucky, during the week announced that effective at once, the order of Aug. 26, limiting the amount of eastern Kentucky coal stored by public utilities, has been modified as follows: "All restrictions covering the storage of slack and screenings from the eastern Kentucky fields have been withdrawn. This does not apply to the storage of mine-run or prepared sizes of coal from eastern Kentucky, restrictions on which will prevail as cited in the order of Aug. 26. All restrictions are removed covering the storage of coal by industrial or other consumers of all grades of coal mined in western Kentucky." The order of Aug. 26 limited the amount of storage of eastern Kentucky coal by public utilities to a 30-day supply; by preferred industries to 20 days, and non-preferred industries to 15 days. The order permitted the use of only

screenings or mine-run from western Kentucky for current necessities as a condition of retaining reserve stocks of eastern Kentucky coal.

Under the new regulations the operators will be enabled to dispose of all screenings with dispatch. Under the old regulations many of the eastern Kentucky producers had about quit loading out lump coal, as they had no market for screenings. Many had had considerable trouble in disposing of screenings, and preferred shiping nothing but mine-run, which could not be utilized to advantage by retailers unless they had screening facilities.

BIRMINGHAM

Coal trade in this district continues firm. Steam is fairly easy, while domestic demand does not seem to have lost any strength. Production still badly off. Car supply ample in most cases to move all coal mined without delay or interruptions.

The local market, so far as steam grades go, is comparatively easy, some reports indicating a slightly stiffer demand than last week. The production and requirements are perhaps nearer a parity now than before at any time this year. The call for domestic grades has slackened little, if any, and receipts are still inadequate to fill orders in the hands of dealers. Yards have been unable to make any progress in accumulating stock piles for the late buyers who, for one reason or another, are not laying in their winter fuel.

The Alabama field hung up another low-production record for the week ending Sept. 28, only 383,067 net tons being mined for this period. Spanish influenza is invading the mining camps now, and if allowed to spread will seriously cripple operations. It is prevalent in the Walker County field and is already hampering the output in that section. Labor is showing little inclination to speed up, and much time is being lost by mine workers without excuses worthy of consideration. Mines report an adequate car supply in most all instances and there has been no loss of time waiting on loading equipment.

Mines on the Warrior River without rail connection are now being afforded some relief by the wooden barges being used temporarily in moving their coal to the Mobile and New Orleans markets. The steel barges are expected to be in commission in the early part of November and ample service on the river will enable a much larger production from these operations on the river or connected by short rail lines.

Coke

CONNELLSVILLE

Large increase in pig iron output attributed partly to improvement in coke quality, much complaint remaining. Coke production practically unchanged.

The report of pig-iron production in September showed even a larger gain over August than was expected, the rate being about 41,900,000 tons a year, for the whole country, against a rate of only 40,300,000 tons in August. While the progress of the season, bringing lower atmospheric humidity, is credited with part of the improvement, a considerable part is probably attributable to the supply of coke of better quality, a matter to which the Fuel Administration has been giving close attention since the end of August. There are practically no reports of coke shortage, but complaint as to quality is still prevalent.

Production of coke in the Connellsville region shows no great change, but has been decreasing slightly the past few weeks, all in favor of more coal being shipped out of the region, however, as the total of coal coked at home and coal shipped to byproduct ovens has increased almost every week. If more coal from other districts can be found to supply to byproduct ovens it will be possible to resume operations at some beehive ovens in the region recently closed.

Screening operations at old dumps have decreased since the recent reduction in the price limit, but several operations are still actively engaged and there is a fair-sized output of this material, which always finds a ready market as household fuel. The market remains quotable at the set limits: Furnace, $6; foundry, 72-hour selected, $7; screened, over ¾-in., $7.30; clean screenings from old dumps, over ½-in., $5.50, all per net ton at ovens.

The "Courier" reports coke production in the Connellsville and Lower Connellsville region in the week ended Oct. 5 at 330,160 tons, a decrease of 5035 tons.

Buffalo—The trade continues strong, the local by-product plants experiencing considerable difficulty in keeping up their output, on account of the influenza epidemic and the street railway strike. Still there is no complaint from the consumers and the requirement is met somehow. Government prices prevail and govern the by-product output also, on the basis of $7 per net ton for foundry and $6 for foundry at the beehive ovens. Fuel coke is active, jobbers selling all they can get at government prices from $4.84 up.

Middle Western

GENERAL REVIEW

Production keeps up and territory finds it difficult to absorb large tonnage. Screenings and steam sizes weak. Railroad administration practically does away with reconsignment of cars.

For the last three weeks or a month there have been no changes to speak of in the Middle West coal market. Production keeps up under very favorable conditions, and the territory is having a difficult time absorbing the large tonnage produced. Screenings and all steam sizes are weak, and will probably continue so for some time. There is a fair demand for the carefully prepared domestic coals, but it is not as strong as it was during July.

The recent ruling of the Fuel Administration, taking 100 cars per day from the Mississippi Valley, and giving them to the West Virginia and eastern coal fields, is going to be felt, and will eventually strengthen the market. Just how much effect this rule will have on the market will depend entirely upon how long Illinois and Indiana are to be deprived of coal cars for the benefit of the eastern producers. To date, however, the coal carrying equipment forwarded east has had no noticeable effect on either the market or the producers.

A factor which has tended to keep the market weak is a ruling by the Railroad Administration which practically does away with reconsigning. This has caused the coal jobber to buy more cautiously. Instead of purchasing a string of cars to be shipped to a given reconsigning point, and taking a chance on disposing of the coal which is in transit, the jobber now is forced to sell his coal before it is shipped. The result is that the tonnage shipped for the account of various jobbers is falling off to a substantial degree.

Developments of the zone question have turned out as expected, and at the present time Illinois coal will be allowed to move to points within the "summer zone" until further notice. The eventual result will no doubt be that the summer zone will remain for all winter, and probably be enlarged as well. The authorities have taken this step, because in spite of large purchases on the part of a number of railroads the market keeps weak.

CHICAGO

Little interest shown in coal. Domestic coals firm, but retailers do not seem to be adding to their storage piles. Anthracite situation getting worse.

There has been no great strengthening in the Chicago market since last week. On the whole, purchasing agents are little interested in coal. One of the large purchasers has withdrawn from the market, but to counterbalance this a big public utility corporation, with plants in the Northwest, has entered the market, and has purchased practically all the screenings available in the southern Illinois district. Domestic coals of the better grade are firm, but there is no noticeable tendency on the part of the retailers to add to their storage piles. The anthracite situation gets worse from day to day, rather than improves.

MILWAUKEE

Mild weather heading off an impending clamor for coal. Complaint of over-deliveries at the expense of small consumers. Labor scarcity hampers shipments.

Mild, Indian summer weather throughout this section of the Middle West serves to allay to some extent the anxiety of consumers as to fuel supplies for the coming winter, but a storm is bound to break when the freezing period finds thousands of bins bare of coal. To offset the plea of dealers that shortage of help is hampering deliveries, the charge is made that 22 homes on a leading residential street contain an aggregate of 710 tons of coal, while many poor cottagers, who have had their orders in for months, have not received a pound. The matter is to be investigated. The fuel administration office is urging dealers to make deliveries in small lots and authorizes them to suggest any changes in present rules which will facilitate such action. Every effort will be made to avert suffering when real cold weather sets in. Lack of yard help is hindering shipments to interior points. One dock which normally loads 1000 cars per month has been unable to send out more than about 400 cars.

The county authorities have received bids on 500 tons of mine-run steam coal for two public institutions, but no award will be made until samples are given a test.

Cargo receipts for October thus far aggregate 33,271 tons of anthracite and 112,403 tons of bituminous, making the latest revision of the season's receipts 494,709 tons of hard and 2,880,089 tons of soft coal.

ST. LOUIS

The local condition is beginning to get serious on account of no market for Standard and Mt. Olive domestic and steam sizes. Carterville more plentiful and certain large dealers have shut off Carterville shipments on account of domestic demand going to pieces. Country demand easy. Equipment more plentiful and transportation good.

The local situation is one that is receiving serious thought from the operating interests. The last week or two newspaper reports stated that there was going to be a plentiful supply of coal, and a larger tonnage than was anticipated has been put in, which has caused the general public, as well as steam users, to hold up their deliveries, with the result that the retail business is practically at a standstill. Little coal is moving to the retail yards other than that for storage. Steam users who are anticipating putting in storage have stopped, with the result that everything has almost come to a standstill and coal is piling up at the mines in the Standard and Mt. Olive districts. In the course of the next week there may be idle days because of no available market.

In the face of this there is a demand for coal from certain points in Iowa, Nebraska and the north, but on account of zone restrictions these places can receive no Illinois coal. The same pertains to some points in the western part of Missouri, where this coal could move.

The local regulation on the distribution of coal is just as drastic with this surplus as if there was a shortage of 50 per cent. and these restrictions and regulations only have a tendency to demoralize the producing end when they interfere with the distribution end.

The country business on Standard and Mt. Olive coal is pretty well shot to pieces, and there is not much in sight unless the severest kind of weather comes along ahead of time. The mines in the Standard field are plugging along now with plenty of equipment because there is no demand for coal, and transportation has shown considerable improvement. Two-thirds of the field would be idle if the railroad tonnage were withdrawn at this time.

The domestic demand from the Mt. Olive field is better than that from the Standard to outside points, chiefly to Chicago and the north, and some little tonnage from this field is moving to Michigan. There are some reports of a tonnage moving into Canada.

Conditions in the Carterville and Duquoin field have changed little. The car supply is short, but better than it has been. The domestic orders in this field are gradually being caught up with at many mines, although there is far from being a surplus of coal; and this is not likely to occur in this field this winter.

The railroad tonnage continues heavy. As a matter of fact it may be greater now than for some time past because domestic conditions are easier. The tonnage of this coal into St. Louis has been better for the last few weeks than for many months past, and many of the larger retailers have asked the operators to hold up shipments.

New restrictions on retail trade are going into effect, such as the placarding of every car of coal, designating the grade of coal it contains, the licensing of weightmasters, and the stamping of all scale tickets with the grade of coal.

Prevailing market per net ton f.o.b. mines is:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump..	$2.55@2.75	$2.55@2.75	$2.40@2.70
3x6-in. egg..	2.55@2.75	2.55@2.75	2.40@2.70
2x3-in. nut.	2.55@2.75	2.55@2.75	2.40@2.70
Washed:			
No. 1.....	3.05@3.20	3.05@3.20	.....
No. 2.....	3.05@3.20	3.05@3.20	.....
No. 3.....	3.05@3.20	3.05@3.20	.....
Mine Run..	2.35@2.50	2.35@2.50	2.20@2.30
Screenings..	2.17@2.32	2.17@2.32	1.50@1.60

Special preparation on Carterville is 10 cents extra. Williamson & Franklin Co. rate is $1.10. Other fields 95 cents.

COAL AGE

Volume 14 New York, October 24, 1918 Number 17

Spanish Influenza

By Floyd W. Parsons

WE MUST have the necessary fuel to carry on our tremendous war effort. Perhaps the most serious menace at the present moment is the prevalence of the epidemic known as Spanish influenza, which is now sweeping the country. This disease is causing a reduction in the output of coal in nearly all of our important fields, but in central Pennsylvania the losses in production are greatest, averaging more than 100,000 tons per week. Many mines have been completely closed down, and in other collieries the output has been curtailed 50 per cent.

The strictest kind of preventive measures must be put into effect immediately, or we will be obliged to record industrial losses that will be of as great consequence as a major defeat on the battlefield. The remedy for the scourge lies in the hands of each individual. We can render no greater patriotic service now than to exercise a degree of caution and care surpassing anything we have ever done before.

The present disease is no more Spanish than it is Russian, Swedish or Dutch. It is a byproduct of the war and is undoubtedly due to a scarcity of proper food and a lack of warmth. People who are hungry and cold cannot well resist the inroads of the organism that is the cause of this disease. The present influenza germ is serious because it has become strong and healthy in the under-nourished bodies of the underfed people of Europe.

I am not a doctor and cannot speak with the authority of one versed in medicine. However, *Coal Age* is earnest in its desire to help remove the menace, and high authorities versed in diseases of this kind have furnished us with valuable information. Following are a few suggestions, concerning ways to avoid influenza:

Take one-half teaspoonful of bicarbonate of soda in a glass of cool water on arising in the morning. Spray the nose and throat with a standard spray solution such as is easily obtainable from any physician or at any drug store. Drink plenty of pure water one hour before or two hours after meals. In one or more of the glasses it will not hurt to put one-half teaspoonful of bicarbonate of soda or the juice of an orange or lemon. By all means keep the system in good shape and wholly avoid constipation.

People of low physical resistance due to lack of sleep, or to any kind of excess, present the best medium for the spread of the contagion. Liquors and intoxicants should be avoided because of the reduced physical resistance caused by them. Take exercise in the open air. Walk to the mines if possible and sleep in airy rooms. Remove wet and damp clothing at the earliest moment. Do not expectorate in the mines, for the germ will grow and become dangerous in a dark and damp surrounding. Wash hands before eating and have luncheon buckets and pails washed in scalding water once each day.

Miners should not congregate together in the mines and should stay away from men who are sneezing or suffering with colds. Keep your feet warm; wet feet demand prompt attention.

On the first signs of a chill, headache and bone ache, hurry home, and take a hot bath—as hot as you can stand—also a dose of castor oil. Drink hot drinks, preferably hot lemonade, and go to bed. Insist on being placed in a room by yourself and allow only the person nursing you in the room. Keep the windows open but let the room be heated. It has been demonstrated that heat, whether as fire, sunlight or high-temperature water, will destroy the organism.

To avoid pneumonia, which sometimes follows influenza, stay in bed until you are entirely well, and then do not expose yourself outdoors for two or three days after leaving your bed. Ninety per cent. of the pneumonia cases are contracted from arising too soon or from not going to bed immediately after the first chill.

Above all, don't worry. Do your level best to avoid contagion, and remember that by keeping well you are serving not only yourself but your country in its day of dire need.

IDEAS AND SUGGESTIONS

Methods of Tabulating and Computing Latitude and Departure Notes

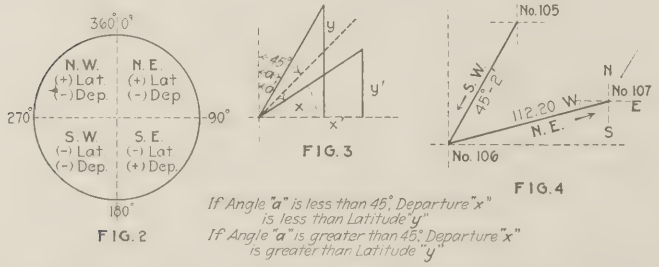
BY O. H. HAMPSCH
Washington, D. C.

A well-defined method of tabulating and computing latitude and departure notes will be found of considerable value in plotting mine maps and ascertaining the distance between known or given stations. In Fig. 1 is shown a method of keeping notes that may be used in a record book, together with all computations for a ready reference.

The thirteen columns tabulated as shown form a complete record of each station, giving distance, bearing, angle, location, latitude and departure, which should be recorded from some base line or monument as a zero departure if possible. It will be of much convenience in record if the actual computations and figures

1	2	3	4	5	6	7	8	9	10	11	12	13
FROM STA	TO STA	HOR. ∠S TO RT	BEARING	DIST	+ N. LAT.	− S. LAT	+ E. DEP	− W. DEP	TOTAL LAT	TOTAL DEP	REMARKS	STA.
105	106		S16°24'W						−12.163	−243.121	Intersection 4th Entry	106
106	107	42°-1'	N58°25'E	112.20	58.792		95.594		+46.629	+147.527	In 4th left Entry	107

FIG. 1



FIGS. 1 TO 4. METHODS OF TABULATING AND COMPUTING LATITUDE AND DEPARTURE NOTES

can be made on the opposite side of the book—that is, with the record of stations on the left-hand side and computations and figures on right-hand side of the book. This will make it easy for reference to any particular station.

Figs. 2 and 3 are sketches which can be referred to by the computer when in doubt as to the relative sign of the latitude or departure for each quadrant (Fig. 2), and whether the latitude or departure is of the greater value (Fig. 3). Fig. 4 shows a simple sketch the computer may make to indicate the relative position of one station to the other and the direction or bearing each angle makes in reference to the other.

Any method of turning angles may be used, duplication, angles to the right or by quadrants, all of which of course give the same bearing and result. I have used the method of turning all angles to the right from the backsight to the foresight, and column 3, Fig. 1, may be changed from "horizontal angles to the right" to any method that may be used in any particular case.

Is It the Miner or the System?

The average human being is not loath to saddle the brunt of a situation upon an object or person most likely to bear it without retaliation. Following this general rule, the blame for the coal shortage has been thrust upon the miner, "digger," "loader," or whatever many have chosen to call him. He has been made the goat.

Is the miner, however, actually to blame for the coal shortage, or is it the system under which he labors in the average mine? Many mines, it is true, have no system at all, merely being operated according to tradition or supposition.

Despite the fact that many of the mine workers are foreign-born, an injustice is done many of them by baldly stating that they are unpatriotic; that they are un-Americanized. These men are just as human as the operator who employs them, and they will respond readily to the right kind of treatment. The average foreign-born mine worker has been forced down rather than up the social scale.

Suppose you, gentle reader, were a miner toiling in the bowels of the earth, breathing dust and continually risking your life. Could you perform your work if you were sworn at by every boss or sub-boss or other flunky in the mine? If you complained because of the lack of track or timbers or what-not, and somebody told you, "Aw, go to hell and get some," would you feel that you were a good American?

WHY MANY MINERS BECOME DISGRUNTLED

Suppose you loaded a carful of clean coal and then had it stolen by some thief who changed the checks. Would you feel like a good American if somebody laughed at your efforts to explain your troubles? And, if they promised to straighten it out and never did, would you feel like putting in a full day's work every day?

Suppose you told the office that you would need a certain amount of timber and track, so that you could start work early the following morning; and then found when you got to your place that there was nothing to help you make your place safe or rails on which to push the cars. Then suppose you wasted half a day chasing the mine foreman so he could get you fixed up. Wouldn't all of this talk about increased production strike you as being extremely ludicrous?

This condition does not exist in every mine, but it does exist in more mines than any of us have any idea of. Many of our large mines have a sympathetic and progressive management, but there are an appalling number of little fellows who get out a large tonnage as best they can; and by little fellows I do not mean wagon mines. I mean companies whose production runs 100,000 or 200,000 tons a year.

Most of these latter mines have a superintendent and a mine foreman, but these men cannot work efficiently for they have to do all of the "bossing," all of the clerical

work, and look after supplies, purchases, repairs and anything else under the sun. They must listen to the complaints of the daymen, the miners and the higher officials. An angel would give up in despair. As a consequence, they do just as you and I would do, just slide along as best they can and hit the high spots and miss the low spots; and the cleaning out of the "low spots" oftentimes determines the success of a mine or its failure.

Why not let the mine superintendent be a real superintendent? Why make an office boy, a clerk or a rancorous pessimist out of him? Why not fix it so that he can make his mine foreman be a real mine foreman for once in his life? He wants to be efficient and helpful to the miners, but he is so weighed down with his own woes that he justly feels that no one else has a right to unburden himself to him.

Give your foreman enough good helpers to carry out his orders, and then give him the authority to see that they are obeyed. You can hold him responsible, solely responsible, and he will be glad of it; for then he will have a chance to produce results. No man grows quite so fast as the man who is given a chance and is then held responsible for results. All superintendents are held responsible for the production and all foremen are held responsible for the conditions underground, but do they have the right kind of a chance?

The answer is bound to be a negative one, and just so surely is the shortage in desired production to a very large measure directly due to the lack of harmony which is brought about by the overworking and harassing of your first assistants.

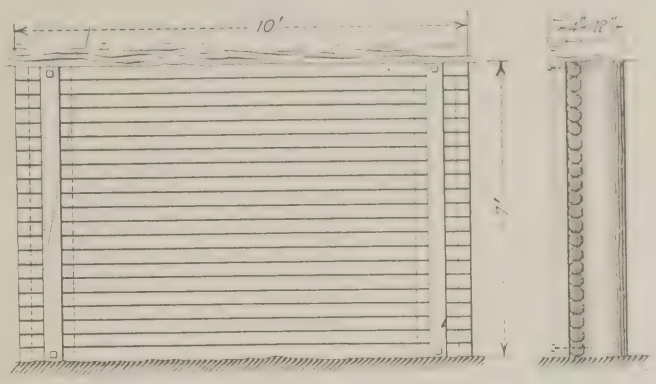
It will cost you more money for a while, but for a very short while. In the end you will get greater production; and greater production is needed to back up our boys over there who are battling for humanity's sake, who are battling so that your family and my family will have a decent world to live in.

Spikeless Batteries

By Joseph Lawrence
Sugarloaf, Penn.

In building batteries in the mines it is customary to construct them of two props to which poles extending transversely are nailed. The props are about 7 ft. long and 12 in. in diameter while the poles are approximately 10 ft. long and 4 in. thick. These poles, 21 in number, are usually fastened to the props at either end with one 60d nail or spike.

The number of spikes used is thus 42 and as each



HOW THE USE OF SPIKES WAS OBVIATED

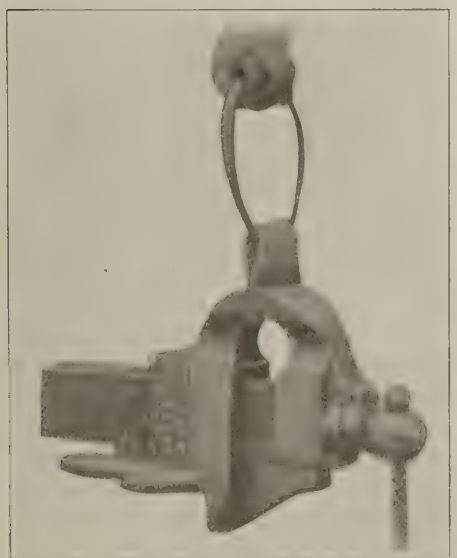
costs about ½ cent the entire cost for nails is 21 cents. Not only is this expense high but spikes of this size are becoming difficult to obtain.

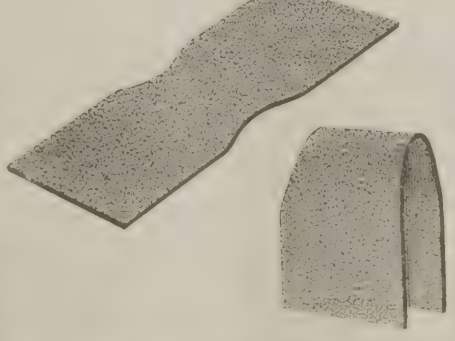
In order to obviate the necessity of using spikes at all I have followed the practice shown in the accompanying illustration. In this construction two extra poles of suitable length are placed parallel with the props and outside of the transverse poles. These outer pieces are held in place by a 12-in. rag spike or drift bolt at either end. These pierce the top and bottom transverse poles and hold them and all the others firmly.

Carrying a Heavy Vise

Two practical suggestions for carrying heavy vises are shown in Figs. 1 and 3. The carrier shown in Fig. 1 consists of a large iron ring on which a piece of rubber tubing is slipped to prevent the ring from cutting into the hand. A piece of leather belting is cut as shown in Fig. 2, folded over the ring and clamped in the vise jaws.

In Fig. 3 a wooden bar of suitable diameter and length is clamped in the vise jaws for carrying purposes. In this last application both hands can be used on very heavy vises. It is simple devices like these that make hard tasks easy.







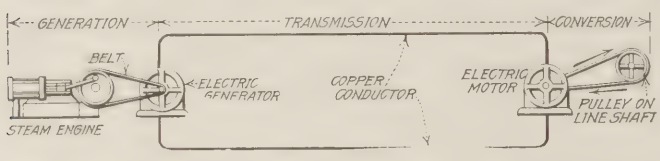
FIGS. 1 TO 3. TWO SIMPLE SUGGESTIONS FOR CARRYING A HEAVY VISE

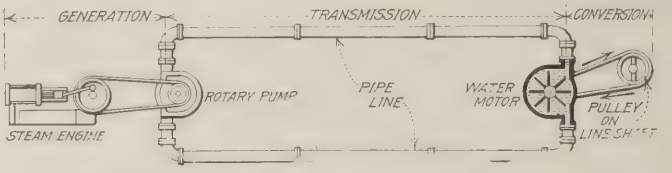
Fundamental Relations Between Direct- and Alternating-Current Circuits

By TERRELL CROFT
University City, St. Louis, Mo.

SYNOPSIS — *The theory of electricity is here dealt with. This theory is extremely interesting but requires a somewhat vivid imagination for its comprehension. Fundamental electrical units are also defined, as well as such terms as conductivity and resistivity.*

THE electron theory states that all matter is made up of molecules, of which there are millions of different kinds. Molecules are made up of atoms, of which there are but 92 different varieties; that is, there are but 92 elements now known. All atoms are composed of electrons, which are minute particles of negative electricity held normally in place in each atom by a positively charged something which has been named the "nucleus." The electrons thus interlocked in the atoms are, it is believed, constantly revolving at great speeds in regular circular orbits around the positive nuclei. In this they may be said to resemble the eight satellites which rotate about the planet Saturn. In a normal atom the amount of negative electricity





FIGS. 1 AND 2. AN ELECTRIC (LEFT) AND A HYDRAULIC CIRCUIT (RIGHT) FOR THE TRANSMISSION OF ENERGY

of the electrons is exactly neutralized by an equal amount of opposite or positive electricity of the nucleus. Thus a normal atom exhibits no external sign of electrification. The different kinds of atoms (the elements) differ only in the number of and the arrangement of the electrons and in the magnitude of the positive nuclei which compose them. The lighter elements have few electrons; the heavier elements many. A normal atom of any given element always has the same number of electrons and a positive nucleus of the same magnitude. Hydrogen, it is believed, consists of one electron and a corresponding positive nucleus. Uranium, the heaviest element, has probably 92 electrons and a correspondingly greater positive nucleus.

Thus everything about us, all matter, is composed of electricity. The electrons can, under certain circumstances, be forced from the atoms. The positive nuclei, so it is believed, cannot be moved from the atoms. Electrical phenomena occur when some of this electricity (electrons) is moved or when the electrical balance which normally obtains within the atoms is disturbed.

Electrons are exceedingly small. It is estimated that each has a diameter of about a five million, millionth of a centimeter $\left(\frac{1}{5{,}000{,}000{,}000{,}000}\text{ cm.}\right)$, or about a thirteen million, millionth of an inch $\left(\frac{1}{12{,}700{,}000{,}000{,}000}\text{ in.}\right)$ An electron weighs about one-forty-six billion, billion, billionth of an ounce

$$\left(\frac{1}{46{,}100{,}000{,}000{,}000{,}000{,}000{,}000{,}000{,}000}\text{ oz.}\right)$$

or about a seventeen hundredth $\left(\frac{1}{1700}\right)$ as much as does an atom of hydrogen.

It is evident that there is in the universe a certain definite amount of electricity. Electricity can neither be created nor destroyed. It can, however, be forced to move and thus transmit power or produce electrical phenomena. Electrical energy (not electricity) can be generated by forcing electrons to move through certain paths where it is desired that they should move.

An electromotive force (e.m.f.) is the name given to that tendency or force which makes electrons move or tends to do so. Thus, if an e.m.f. is impressed across the two ends of a wire, it will force the electrons of the atoms to move from atom to atom in the direction of the e.m.f. around in the wire, assuming, of course, that a closed conducting path is provided. A lightning flash is a movement of electrons through the atmosphere caused by an e.m.f. or voltage existing between the clouds and the earth.

An electric current consists of a movement or flow of electrons. Thus that which we call an "electric current" is merely a shifting of these electrons from atom to atom. If an electric current flows in a wire or in anything else, there is, then, a flow of electrons in that wire or thing. The coulomb is the unit of quantity of electricity and is somewhat analogous to our unit of quantity of water—the gallon. A coulomb of electricity comprises approximately five million, million, million (5,000,000,000,000,000,000) electrons.

The ampere is the unit of rate of flow of electricity and is analogous to "gallons per minute" in hydraulics. The ampere represents a rate of flow of one coulomb—that is, five million, million, million electrons—per second. It has been internationally agreed (recommended by the Chicago International Electrical Congress of 1893 and legalized by act of Congress 1894) that the ampere is "that unvarying current, which, when passed through a solution of nitrate of silver in water in accordance with standard specifications, deposits silver at the rate of 0.001118 gram per second."

Resistance is the name given to that opposition which

is offered by the materials to the movement of the electrons—that is, to the flow of an electric current—in them. The electrons of some materials, the metals for example, can be moved from atom to atom within the material with relative ease—that is, by the application of a small e.m.f. The materials in which the electrons can be easily moved from atom to atom are called "conductors." On the other hand, it is difficult to move the electrons from the atoms of other materials, such as air, glass, mica and porcelain. Such materials are called "insulators." However, there is no perfect conductor and no perfect insulator. All materials offer some opposition to the establishment of a current and there is no material in which a current cannot be established provided the impelling e.m.f. is sufficiently great. Witness again the lightning flash.

The ohm is the name given to the unit of electrical resistance. It affords a measure whereby the degree of opposition of the different materials to the establishment of an electric current in them may be measured. Practically speaking, the international ohm "is represented by the resistance offered to an unvarying electric current by a column of mercury at the temperature of melting ice, 106.3 centimeters long and having a cross-sectional area of 1 square millimeter."

A piece of No. 14 B. & S. gage copper wire of the size ordinarily used for branch wiring in lighting circuits 380 ft. long has a resistance of 1 ohm. A piece of No. 10 B. & S. gage copper wire 1000 ft. long has a resistance of almost precisely 1 ohm.

The volt is the unit of e.m.f.; that is, it is the unit whereby the tendency to establish electric currents may be measured. By international agreement, 1 volt is that e.m.f. which will establish a current of 1 amp. through a resistance of 1 ohm.

Electric Current Is Like a Hydraulic Flow

The general analogy between hydraulic and electric circuits should be appreciated. An electric circuit (Fig. 1) comprises conducting wires which are composed of readily moved electrons. These wires are arranged in air or in some other insulating material which tends to prevent the egress of electrons from the wire. Hence when a voltage developed by a generator, or by some other means, is impressed across the ends of the wire the electrons are forced to move around in the wire and through the conducting members connected to it. By the utilization of properly designed devices these moving electrons may be made to do work—to transmit electrical energy. Note that the copper transmission wire resembles a hole through the air through which the electrons can be moved with relative ease. Air is an insulator, so electrons can be moved through it only with the greatest difficulty.

Similarly, the hydraulic circuit of Fig. 2 comprises a pipe line full of water. The pressure developed by the pump will cause the water in the circuit to move and thus turn the water motor. Just as the electric circuit is full of electrons or electricity, the hydraulic circuit is full of water. Electricity may be thought of as resembling a non-compressible, weightless fluid which permeates all space.

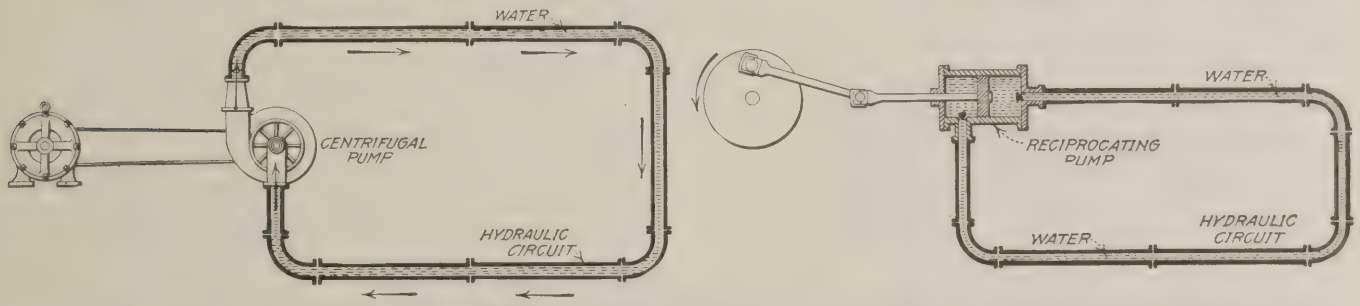
Ohm's law states the relation between current, resistance and e.m.f. It is merely a restatement, as applied to electric circuits, of the general law which governs all physical phenomena: The result produced is directly proportional to the effort and inversely proportional to the opposition. In an electric circuit the current established is the result. The e.m.f. which establishes it is the effort and the opposition is represented by the resistance. Thus it may be written for an electric circuit:

$$I = \frac{E}{R} \quad \text{(amperes)} \tag{1}$$

$$R = \frac{E}{I} \quad \text{(ohms)} \tag{2}$$

$$E = I \times R \quad \text{(volts)} \tag{3}$$

Here I = current in amperes which flows in the circuit or in the portion of the circuit under consideration; R = the resistance of the circuit or the portion of the circuit under consideration in ohms; E = the e.m.f. in volts across the circuit or the portion of the circuit under consideration.



FIGS. 3 AND 4. HYDRAULIC ANALOGY TO DIRECT-CURRENT (LEFT) AND TO ALTERNATING-CURRENT (RIGHT) GENERATOR AND CIRCUIT

Ohm's law may be applied to an entire circuit or to a portion of a circuit. When applied to an entire circuit the amperes in the entire circuit equals the volts across the entire circuit divided by the resistance of the entire circuit. When applied to a portion of the circuit the current in that portion of the circuit equals the voltage across that portion divided by the resistance of that portion.

Electric currents may be divided into two general classes: (1) direct currents and (2) alternating currents. A direct current is one which flows always in the same direction. A direct electric current is analogous to the hydraulic current which would be produced in a pipe circuit (Fig. 3) by a centrifugal pump which causes the fluid to flow always the same way. An alternating current is one the direction of which is reversed at regular intervals. An alternating electric current is analogous to an alternating fluid current which would be circulated in a hydraulic circuit (Fig. 4) by a reciprocating pulsator.

Further classifications of direct currents are: (1)

Continuous currents—which are steady, non-pulsating direct currents, (2) constant currents—which continue to flow for some time in the same direction and with unvarying intensity and (3) pulsating currents—which are regularly varying continuous currents.

The electrical resistance of a conductor is determined by various factors. Thus the resistance of any conductor will vary with: (a) The material of the conductor, (b) directly as the length of the conductor, (c) inversely as the area of the conductor and (d) the temperature of the conductor. That is, the properties of a conductor, which determine the opposition which it offers to the flow of an electric current (electrons)

TABLE I. PROPERTIES DETERMINING FLOW OF CURRENT IN HYDRAULIC AND ELECTRIC CIRCUITS

	Of Water Current Through a Pipe	Of Electric Current Through a Wire
1	Diameter of pipe	Diameter of wire
2	Length of pipe	Length of wire
3	Material of pipe or its internal smoothness	Material and temperature of wire

through it, are (see Table I) somewhat analogous to those which determine the flow of fluid currents in hydraulic circuits.

The circular mil (circ.mil) (Fig. 5) is the area of a circle $\frac{1}{1000}$ in. in diameter. The areas of electric conductors are usually measured in circ.mils. The

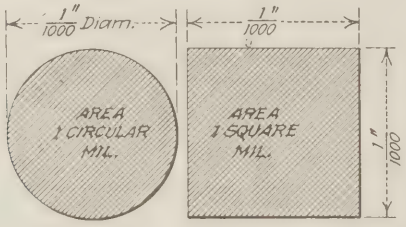


FIG. 5. SQUARE MIL AND CIRCULAR MIL

area of any circle can be expressed in circ.mils by squaring its diameter expressed in thousandths of an inch.

Thus, since $\frac{3}{8}$ in. = 0.375 in., the area of a circle $\frac{3}{8}$ in. in diameter would be 375 × 375 = 140,625 circ.mils. The area of a circle 0.005 in. in diameter would be 5 × 5 = 25 circ. mils.

The square mil (sq.mil) (Fig. 5) is the area of a square having sides $\frac{1}{1000}$ in. long. Areas of rectangular conductors are sometimes measured in square mils. Areas in square mils are obtained by multiplying

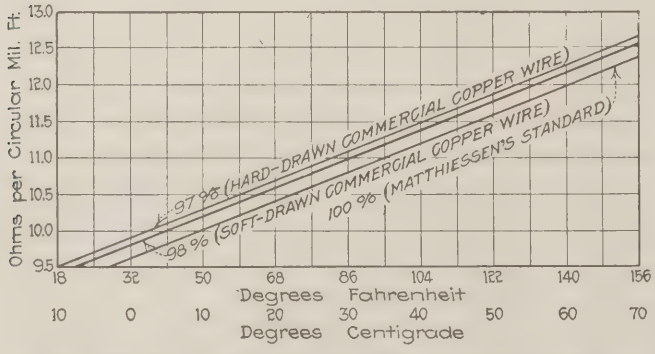


FIG. 6. GRAPHS SHOWING THE RESISTANCE PER CIRCULAR MIL-FOOT OF COPPER OF DIFFERENT CONDUCTIVITIES AT DIFFERENT TEMPERATURES

It is usual to specify that soft-drawn copper shall have 98 per cent. conductivity and hard-drawn copper 97 per cent. Hence, commercial copper wire has about these conductivities

together the length and breadth of the rectangle expressed in thousandths of an inch.

Thus, the area of a rectangle ½ in. wide and 2 in. long would be 500 × 2000 = 1,000,000 square mils.

To reduce square mils or square inches to circular mils or the reverse the following equations may be used: Square mils = circ.mils times 0.7854; circ.mils = square mils divided by 0.7854; circ.mils = square inches divided by 0.0000007854; sq.in. = circ.mils times 0.0000007854.

The circular mil-foot (circ.mil-ft.) is the unit conductor. A wire having a sectional area of 1 circ.mil and a length of 1 ft. is a circular mil-foot of conductor.

Resistivity is specific resistance which may be expressed in ohms per unit volume; for example, re-

TABLE II. APPROXIMATE RESISTIVITIES—SPECIFIC AND RELATIVE—OF CONDUCTORS*

Conductor	Resistivity = p (Resistance of 1 Circ. Mil-Ft. in Ohms) 0 Deg. C. or 32 Deg. F.	23.8 Deg. C. or 75 Deg. F.	Relative Conductivity (As Compared with Copper)	Relative Resistivity (As Compared with Copper)
Silver, pure annealed	8.831	9.674	108.60	0.925
Copper, annealed	9.590	10.505	100.00	1.000
Copper, hard-drawn	9.810	10.745	97.80	1.022
Aluminum (97.5 per cent. pure)	16.031	17.699	59.80	1.672
Zinc (very pure)	34.595	37.957	27.72	3.608
Iron wire	58.702	65.190	16.20	6.173
Nickel	74.128	85.138	12.94	7.726
Steel (wire)	81.179	90.150	11.60	8.621
Brass	43.310	.....	22.15	4.515
Phosphor-bronze	51.005	.....	18.80	5.319
German silver	127.800	.....	7.50	17.300
Gray cast iron	684.000	.....	.....	.....

* International Textbook Co.'s "Electrical Engineer's Handbook." See Croft's "American Electricians' Handbook" for more complete table.

sistivity may be expressed in ohms per centimeter cube or ohms per inch cube. However, it is usually most convenient, in practical work, to express and deal with resistivities in ohms per circ.mil-ft. (Refer to Table II). For practical purposes the resistivity of commercial copper wire (Fig. 6) at ordinary temperatures may be taken as 11 ohms per circ.mil-ft.

Conservation of First-Aid Supplies

A great many of the mines keep a supply of first-aid material on each level of the mine, such as triangular bandages, compresses, roller bandages, adhesive tape, iodine, etc. These supplies are placed on the different levels for the sole purpose of rendering first-aid to the injured. They are usually kept under lock and key, but in many instances the locks are broken and the supplies are taken out and used for various purposes.

The triangular bandages are often used to wrap broken hose or for "sweat rags," the adhesive tape to wrap broken hammer handles or the bottom of carbide lamps. This is a gross injustice to the company, which spends thousands of dollars annually for first-aid material. We can leave the company out of it entirely and say it is a gross injustice to the man himself. He cannot tell when he is going to need some of those supplies for a personal injury, and the bandage which should be on his head or arm may be on his air hose.

A hose cut with a rock may be repaired on top and made as good as new, but an arm cut with a rock and not given proper first-aid treatment is often lost. Let us get together and conserve the first-aid supplies and use them for the purpose for which they were intended. They are hard to get now, because Uncle Sam needs them for the boys "over there."—*Anode.*

Increasing Coal Mine Efficiency—II

BY CHARLES E. STUART
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SYNOPSIS—*In a general way, cutting machines are quite similar in their power requirements to locomotives. The proper means and speeds for driving mine fans as well as properly maintained air courses sometimes result in enormous economies in power. Fluctuating loads on the mine generating station or substation should be avoided as far as possible. This is often much more nearly possible than many operators believe.*

III—An Analysis of Performance of Cutting Machines

THE general considerations which govern the utilization of a mine locomotive, in order that maximum efficiency may be obtained, apply in a similar manner to the cutting machine. There are, broadly speaking, the same elements of avoidable and unavoidable loss of time. There is also the need of so developing the mine that the cutting machine can be used at its rated capacity. Bad power conditions and inefficient handling are factors to the same degree, as in the case of the locomotive, and there is the same loss in productive effort.

The ideal method of working a cutting machine is to give one machine a section containing sufficient places to enable the machine runners to cut each place every other day, letting the loaders clean up in the same manner. If this be done, the machine runners usually stay on one entry and go into the rooms consecutively instead of running all over the mine to cut a place here and another there, thus consuming more time in tramming than in cutting.

In some of the large mines in Pennsylvania and Illinois these ideal cutting conditions are very nearly attained. In one case with which I am familiar, the depth of the undercut has been proportioned to the width of the room and the height of the coal, in order to give just enough coal for the loaders to clean up in one or two full days. This enables the maximum effort to be put forth by the loader and machine runner.

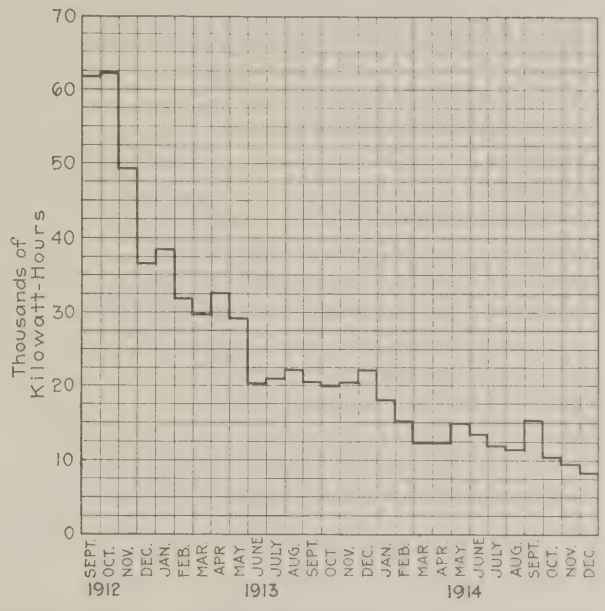


FIG. 6. RESULT OF IMPROVEMENTS IN VENTILATION ON POWER CONSUMED

TABLE II. RECORD TAKEN THROUGH A PERIOD OF 31 DAYS, USING A SULLIVAN SHORTWALL CONTINUOUS CUTTER

September 3 to October 12, 1917

Date	Total Places	Rooms	Width, Ft.	Headings	Width, Ft.	Narrow Places	Width, Ft.	Total Face, Ft.	Average Cut, Depth, In.	Total Hours Worked	Time Waiting for Places, Etc., Hr. & Min.	Actual Hours Work	Time per Place, Min.	Height of Coal, Ft.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Sept.														
3	5	..	..	3	14	2	14	70	84	10:00	6:40	3:20	40.0	5½
4	5	2	24	2	14	1	14	90	82	10:00	6:20	3:40	44.0	5½
6	9	2	24	3	14	4	14	146	81[2]	10:45	6:10	5:35	37.2	5 to 6
8	2	2	12	..	..	..	..	24	83	4:15	3:30	0:45	22.1	5½
11	9	2	24	5	24	2	14	196	85	3:45	1:05	4:40	31.1	5½
12	9	3	28	4	14	2	14	168	84	6:45	1:45	5:00	33.3	5½
13	12	6	24	5	14	1	14	228	80	8:00	1:60	6:10	30.1	5½
14	12	7	25.6	4	14	1	14	250	84	10:00	3:50	6:10	30.1	5½
15	11	6	24	3	14	2	35	266	84	6:30	1:00	5:30	30.0	5½
17	10	10	25	..	..	..	..	250	83	6:20	1:05	5:15	31.0	5 to 6
18	8	4	31.5	4	14	..	..	182	81	8:00	3:00	5:00	37.4	5½
19	9	6	26.3	3	14	..	..	200	82[2]	10:30	5:30	5:00	33.3	5 to 6
20	5	4	24	1	14	..	..	110	84	8:00	0:30	2:30	30.0	5½
21	15	8	24	7	14	..	..	290	84	7:45	0:45	7:00	28.0	5 to 6
23	9	8	24	1	14	..	..	206	85	5:45	0:45	5:00	33.3	5 to 6
24	10	7	24	3	14	..	..	210	83	5:00	1:00	4:00	24.0	5 to 6
25	12	11	31.5	1	14	..	..	360	83	8:00	1:05	6:55	34.7	5 to 6
26	14	4	24	5	14	5	20.8	270	81	7:30	1:00	6:30	27.12	5 to 6
27	9	7	22.5	2	14	..	..	186	86	10:50	5:35	5:15	35.0	5 to 6
28	6	2	29	3	14	1	16	116	80	10:00	7:35	2:25	24.1	5 to 6
29	13	10	24	1	14	2	14	282	84	6:30	0:45	5:45	26.7	5 to 6
Oct.														
1	19	13	24	..	..	6	14	395	83	9:00	1:05	7:35	25.0	5 to 6
2	10	7	24	2	14	1	14	207	82	7:00	2:30	4:30	25.0	5 to 6
3	18	11	24	7	14	1	14	376	84	9:30	1:10	8:20	27.14	5 to 6
4	7	8	24	1	14	1	16	150	84	3:45	0:40	3:05	35.0	5 to 6
5	12	8	24	2	14	2	14	248	81	6:35	0:55	5:40	28.4	5 to 6
6	5	3	24	2	14	..	..	100	86	4:30	1:30	3:00	36.0	5 to 6
8	21	9	24	11	14	1	14	284	84	10:00	1:25	8:35	24.11	5 to 6
9	13	9	15.8	2	14	2	14	198	83	7:30	0:35	6:35	30.5	5 to 6
10	13	6	24	4	14	3	14	242	85	8:00	1:45	6:15	28.11	5 to 6
11	5	3	24	2	14	..	..	100	84	4:00	1:30	2:30	30.0	5 to 6
31	317	184	24.2	93	14.3	40	15.6	6,391	83.26	231:00	73:10	157:50	29.87 Min.	66 in.

Table II shows a record taken through a period of 31 days, using the Sullivan shortwall continuous cutter. During this time 317 places were cut, or an average of 10.22 places per day. Column 12, headed "Time Lost Waiting for Places," shows that 73 hours 10 minutes were lost. The runner's report shows that probably 75 per cent. of this delay could have been avoided.

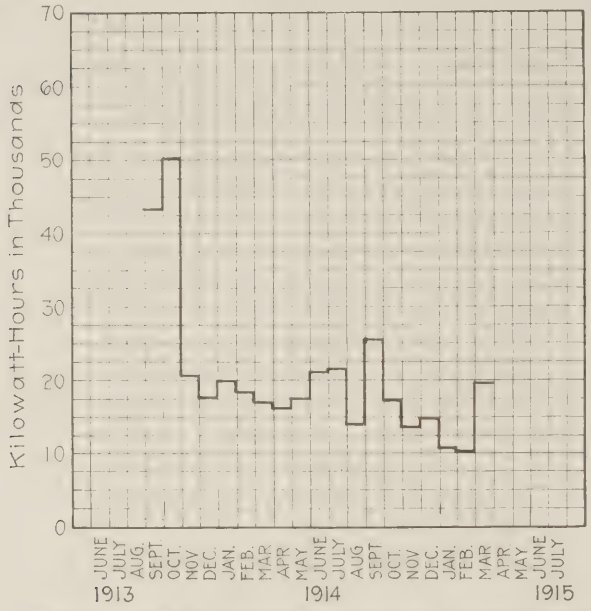


FIG. 7. POWER CONSUMPTION OF A MINE FAN

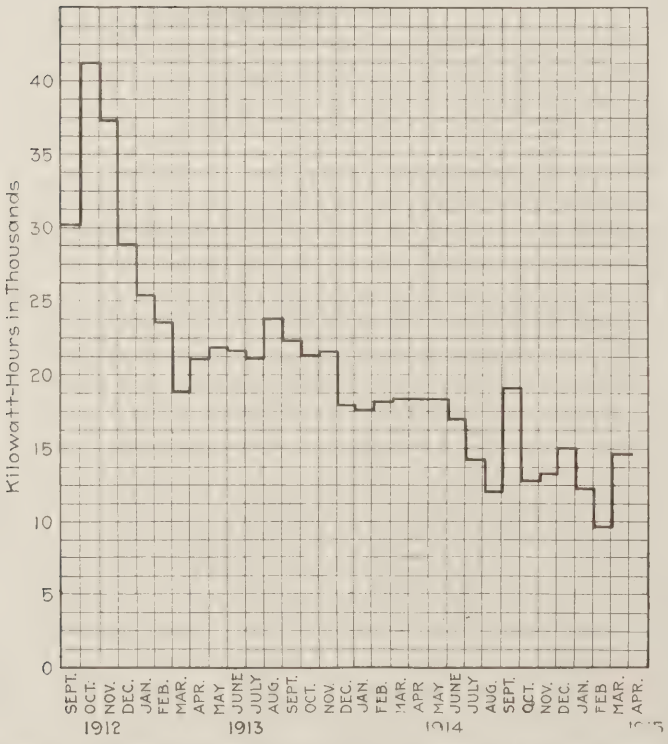


FIG. 8. POWER CONSUMPTION OF A MINE FAN, SHOWING RESULT OF VENTILATION IMPROVEMENTS

These delays were designated as arising from such causes as "blocked by motor," "no more places cleaned up," "off the track," etc. Since the average time consumed in cutting a place was a little less than 30 minutes, it is probable that 100 additional places could have been cut if these delays had not occurred, making a total of 417 places, or an average of about 13 places per day. The average noted in Table II is above the usual. There are cases where runners have cut from 17 to 22 places in 10 hours, these being, however, record runs.

Table III represents tests of power consumption of Sullivan room-and-pillar machines, with a 6-ft. 6-in. and 10-ft. 4-in. cutter-bars. It also gives the comparative economies of machines. There is no information contained in these tables which would not be of interest and value as determined at every property using a cutting machine. These tests and supplementary observations develop the following facts: The first cost of the machines is practically the same. Repairs on the longer bar machines are less than those on the shorter machines; they are heavier throughout and have fewer parts relatively. Experienced men can cut as many

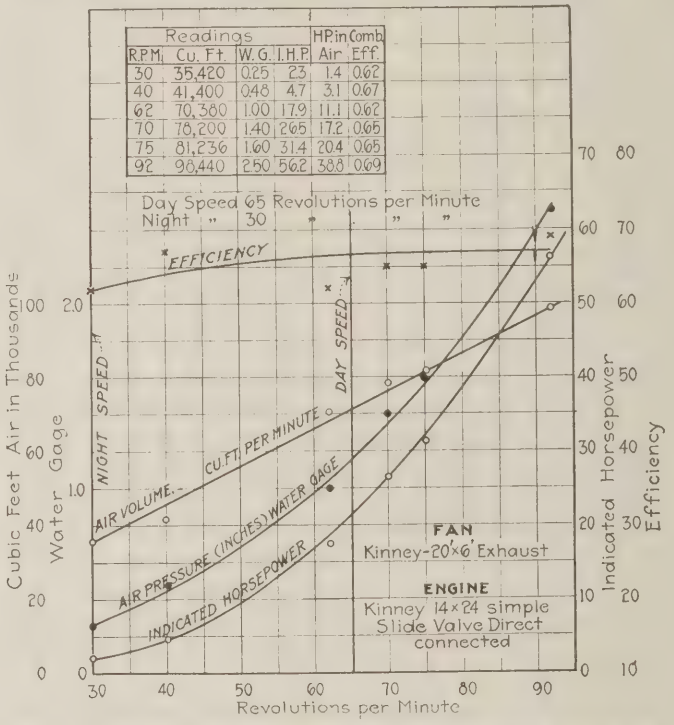


FIG. 9. POWER REQUIRED BY STEAM-DRIVEN MINE FAN

places with the long bar machines as with the short bar machines if voltage is maintained. Loaders after the long bar machines use less powder per ton of coal, as the same total amount of powder is used per place.

IV—Power Demand and Consumption of Mine Fans

Figs. 6, 7 and 8 show the results of alterations made with the object of reducing power consumption and power demand of mine fans. These alterations were preceded by investigations and tests which developed the following facts: (1) The fans were handling an amount of air in excess of the requirements of the mine; (2) large proportions of this air failed to reach the working faces, due to leakage, defective stoppings, brattices and similar reasons; (3) the air pressure, as shown by the water gage, was unduly high, owing to the air current being carried in too few splits.

These conditions were corrected by carrying to the faces the full amount of air required for good ventilation and by reducing the speed of the air current. Stoppings were repaired, and stone was substituted for timber in their construction. The speed of the air

TABLE III. TESTS OF POWER CONSUMPTION OF SULLIVAN ROOM-AND-PILLAR MACHINE WITH 6 FT. 6 IN., AND 10 FT. 4 IN. CUTTER-BARS AND COMPARATIVE ECONOMY OF MACHINES

Power Consumption of 6 ft. 6 in. Sullivan Mining Machine—No. 10 Mine—No. 3 Seam

1913 Date	No. Pkes. Cut	Watt Hours per Square Foot Undercut														Trolleying			Total Aver. Power		Dimensions			
		Unloading			Placing		Sumping		Cutting		Pulling Out		Loading		Power in Place									
		Min.	Max.	Aver.	Min.	Max.	Min.	Max.	Min.	Max.	Aver.	Min.	Max.	Aver.	Min.	Max.	Aver.	Aver. Dist.	Aver. Power	Aver. Power Per Sq.Ft. Undercut	Per Place	Per Sq.Ft. Undercut	Width of Cut	Depth of Cut	Sq.Ft. Undercut	Height of Coal, Ft.
7/7	6	0 1515	0 555	0 255	0 0833	1 53	0 5645	2 5	5 13	3 195	14 5	21 37	16 97	0 77	1 667	1 042	0 357	1 39	0 83	19 4	29 6	24 8	794	167	1 778	2,402	25 6	15 6	6 0	94	6½
7/8	7	0 1515	0 512	0 344	0 256	1 515	0 281	1 363	5 0	2 4	11 07	17 41	14 5	0 53	1 791	0 875	0 303	2 12	0 74	14 78	25 42	19 1	665	139	1 447	1,969	20 5	16 3	5 3	96	6½
Total, Aver.,	13			3 938			5 354		35 97		2 765	203 32	203 32	15 62	12 377	0 95			10 16	0 78		282 5	21 75	9,419	1,975	20 797	28,197	297 1	22 84	208 0	73 0	5 61	1,236	95	
		0 3025			0 4127																			724	152	1 598	2,170	22 3	16 0	5 61	10 0			
Power consumption of 10 ft., 4 in., Sullivan Mining Machine.—No. 11 Mine—No. 3 Seam.																																	
6/25	3	0 05	0 263	0 1295					1 32	2 32	2 14	14 0	21 0	18 0	0 526	3 75	1 673	0 10	0 158	0 119	18 63	24 45	22 0	787	404	2 095	24 2	19 6	9 8	192	6½
6/27	4	0 117	0 25	0 173					3 385	5 35	3 76	16 3	18 9	17 5	0 555	1 43	0 809	0 175	0 715	0 422	20 8	24 8	22 8	758	388	2 24	4,333	25 0	17 5	9 87	173	6½
6/28	2		0 597	0 23	0 2895	0 513	0 382		3 87	8 45	5 67	16 2	21 15	18 2	0 474	1 24	0 73		0 685	0 263	21 22	31 9	25 5	860	440	3 895	4,320	28 5	16 0	9 5	152	6½
6/30	5	0 192	0 429	0 314	0 321	1 0	0 657	2 155	4 51	8 75	11 76	15 7	23 6	15 7	0 143	1 39	1 357	0 143	0 486	0 35	15 85	34 6	22 6	650	333	2 36	3,420	25 0	14 0	9 8	137	6½
7/1	2	0 294	0 389	0 343	0 222	0 235	0 228	2 39	3 14	4 0	13 45	16 3	19 3	16 3	0 294	0 667	0 485	0 1177	0 222	0 1712	17 1	24 2	20 6	600	307	1 75	3,907	22 3	17 5	10 0	175	6½
Total, Aver.,				3 796			4 505		61 63		3 855	274 5	17 17		17 47	1 09	4 665	0 292						12,263	766	38 325	128,063	400 2	25 05	265 8	147 8	9 24	2,610	163	6½
		0 237			0 282																					2 39	4,054		16 6	9 24			

COMPARATIVE ECONOMY IN COAL OF SAME THICKNESS:

Average width of place (wide and narrow), 16 ft.
Average depth of cut 6 ft. 6 in. bar, 5.61 ft. of 10 ft. 4 in. bar, 9.24 ft.
Number of square feet undercut per place with 6 ft. 6 in. bar, 89.8 sq.ft.; with 10 ft. 4 in. bar, 147.8 sq.ft.

Power per place @ 1½c. per kw. hr. with 6 ft. 6 in. bar, $\frac{22.8 \times 89.8 \times 1.5c.}{1000}$ = 3.1c.; with 10 ft. 4 in. bar = $\frac{25.1 \times 147.0 \times 1.5c.}{1000}$ = 5.6c.

Labor per place	100.0	
Total cost per place, labor and power	103.1	110.0
Total cost per square foot undercut' labor and power	1.15c.	115.6c.
Saving by 10 ft. 4 in. bars	31 per cent.	0.79c.
For rooms with two tracks, 36 ft. wide		
Number square feet undercut (same depths as above)	202.0 sq.ft.	332.6 sq.ft.
Power per place @ 1½c. per kw.-hr.	$\frac{22.8 \times 202 \times 1.5c.}{1000}$ = 6.9c.	$\frac{25.1 \times 332.6 \times 1.5c.}{1000}$ = 12.5c.
Labor per place	125.0	128.0
Total cost per place, labor and power	131.9c.	140.5c.
Total cost per sq.ft. undercut	0.65c.	0.42c.
Saving by 10 ft. 4 in. bars	35.4 per cent	

First cost of machines is practically the same; repairs on longer bar machine will be less than on shorter machine, as it is heavier throughout, and has fewer parts, relatively; experienced men can cut as many places with longer bars as with shorter ones, if voltage is maintained, and, in addition to above, loaders use less powder per car, as same total amount of powder is used per place.

current was reduced by: (a) Institution of added splits; (b) cleaning up falls of slate in the courses and tunnels; (c) by the use of additional air courses where possible.

The fans are now run at the speed required to obtain the quantity of air needed under corrected conditions. At night, on Sundays and holidays, half the amount of air is handled. In order to give the full amount of air for the remaining periods, two-speed motors were installed. In one case a change was made from steam to electric drive. Records show that while the steam drive was in use, the power consumption amounted to the equivalent of 4¼ kw.-hr. for every ton of coal mined. A constant-speed motor, when installed, cut the consumption of power for each ton of coal to 2½ kw.-hr., making a 70 per cent. saving by installing this one-speed motor. After about four months' service, a two-speed motor was installed and the fan was run at full speed during the operative period of the day, and at half speed at other times. The amount of power for each ton of coal then dropped to 6 kw.-hr., securing a 310 per cent. saving over the one-speed motor and a 600 per cent. saving over the steam drive.

I might emphasize that these data were compiled at a property which first used power manufactured at its own central station. Later it purchased power. The cost of these and other elaborate investigations, the results of which have made this property famous throughout the country for its efficient methods, represents a negligible fraction of the economies produced.

Figs. 9 and 10 show tests made on engine-driven mine fans in the Pocahontas coal fields. There is developed together with other information the horsepower required at different speeds and for different air volumes. These curves should be carefully considered in conjunction with Figs. 6, 7 and 8. The latter, as previously stated, show what may be done by proper investigation and adjustment.

V—Analysis of Power Demand and Consumption in Relationship to Capacity and Production

The demand on the generating plant of a coal mine or on the substation in cases where power is purchased is of a sharply fluctuating character. Fig. 11 shows the reading of a graphic meter taken at a 200-kw. substation. The extreme peaks are the result of short bad grades. The mine locomotive, when encountering these grades, momentarily

Fan, 14′ Jeffery Exhausting
Engine, 17″x18″ Chandler and Taylor

READINGS				H.P. IN AIR	COMB. EFF. %
SPEED-R.P.M.	WATER GAGE	CU. FT AIR PER MIN.	I.H.P.		
60	0.5	71,500	12.8	5.6	0.44
80	0.9	104,000	22.8	14.7	0.65
90	1.2	*117,500	28.8	*19.3	*0.67
100	1.4	*132,500	36.8	*25.9	*0.71
104	1.5	137,000	45.0	32.4	0.72

* Estimated from Curve

Normal Operation, Day-10 Hrs. at 95 R.P.M. Night and Holidays-8 Hrs. at 65 R.P.M.

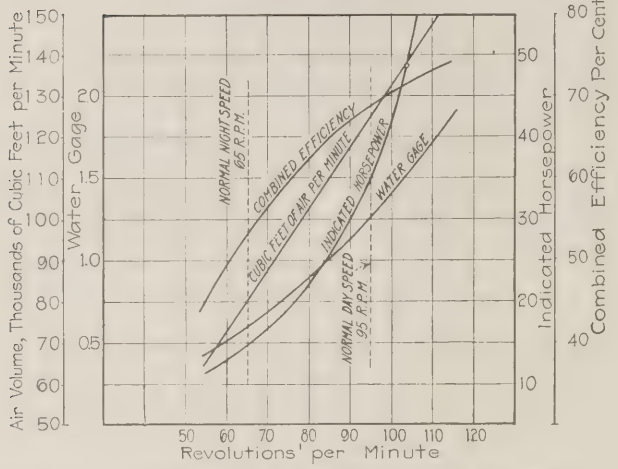


FIG. 10. CURVES OF A STEAM-DRIVEN MINE FAN

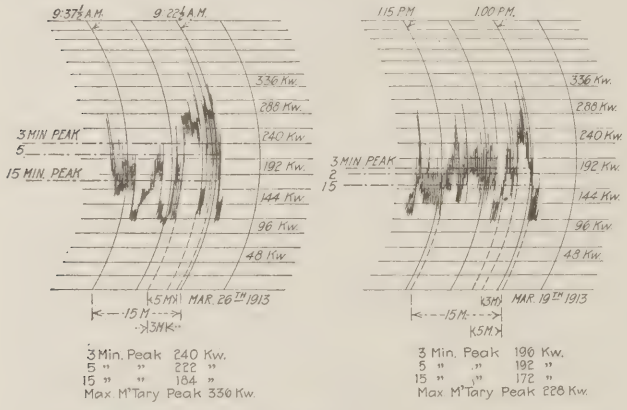


FIG. 11. DEMAND CURVES ON A 200-KW. PLANT

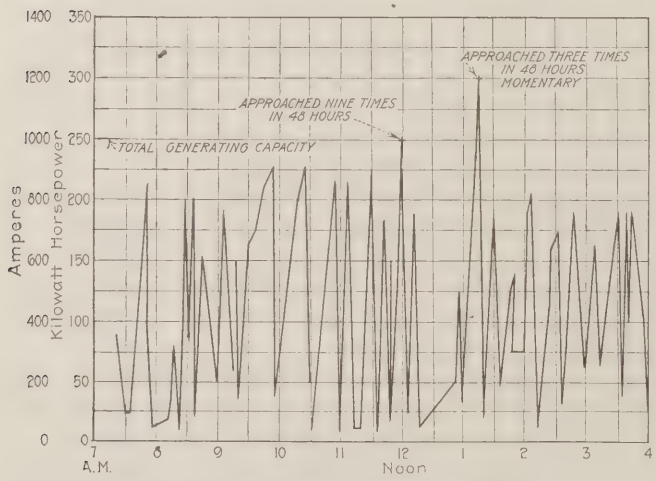


FIG. 12. ANALYSIS OF A MINE LOAD

loads up the station. Few mines are above criticism in this respect. With a large percentage of mines the load on the generating or converting station is largely composed of more or less avoidable demands.

Moreover, to an extent that is rarely appreciated, such conditions create a "bottle neck" to the entire haulage system. Thus a 10-ton mine locomotive on

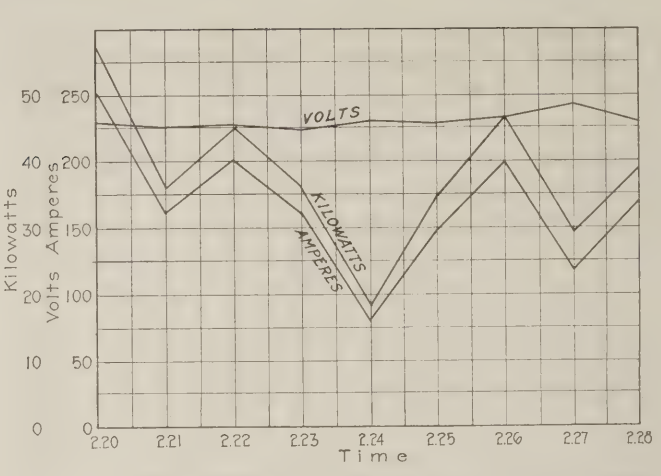


FIG. 13. POWER CONSUMED BY AN 80-HP. LOCOMOTIVE, PULLING 20 EMPTIES

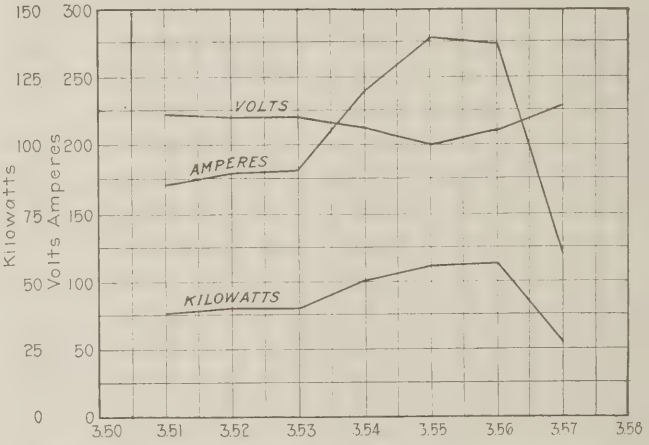


FIG. 14. POWER CONSUMED BY AN 80-HP. HOIST, PULLING 12 LOADED CARS

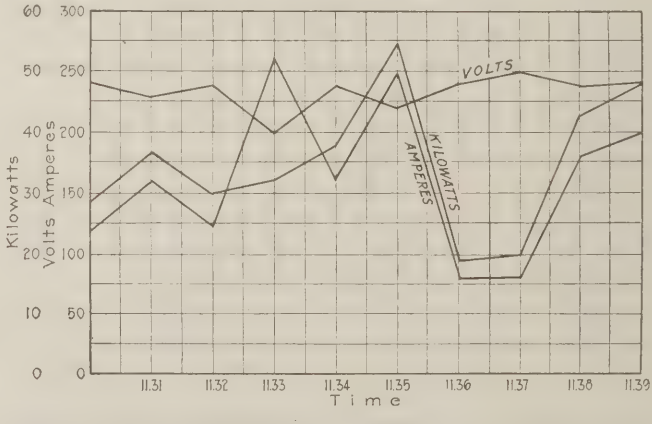


FIG. 15. POWER DEMAND OF TYPE B LOCOMOTIVE OF 80-HP., HAULING 6 LOADED CARS

level track should haul 31 loaded cars of 4 tons each. The same locomotive on a 6 per cent. grade will haul eight 4-ton cars, thus showing a decrease of 281 per cent.

It will be seen that the grades may be the determining factor in the number and weight of locomotives required, the capacity of the generating station or substation; also as to the weight of rails, the power demand and the power consumption.

Fig. 12 shows the analysis of a load as observed between the hours of 7 a.m. and 4 p.m. From the chart the plant seems to be as well loaded as is conservative. It was, however, desired to add to the load as shown a hoist demanding 150 kw. at full load, or

an additional 600 amp. In order to determine whether the generating plant could take care of such an additional demand, a test was run on those loads, which were the factors for consideration.

Figs. 13, 14, 15 and 16 show the demands of the locomotive and hoist on different dips. Adding the hoist load in this instance simply necessitated preventing the maximum demands of the locomotives occurring simultaneously. Where grades could not be reduced or avoided, there were two practical methods available to flatten the haulage demand; one, that of a simple signal-

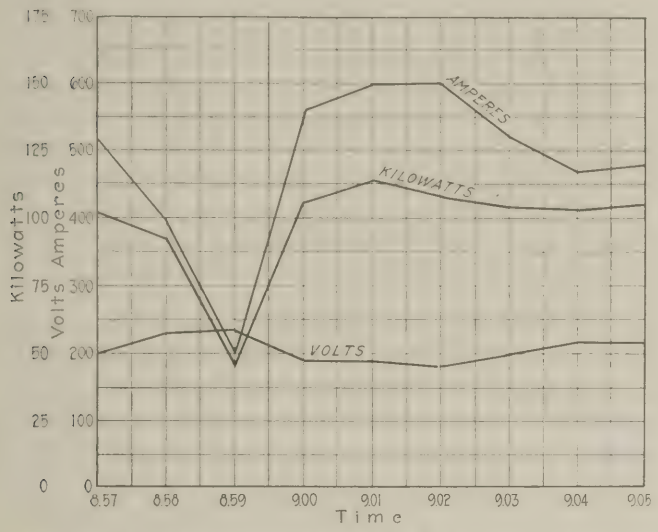


FIG. 16. POWER CONSUMED BY 2-F LOCOMOTIVES OF 200-HP., HAULING 14 CARS

ing device which would indicate trips on grade; the other roughly scheduling the main haulage locomotives.

The majority of mines on careful examination and test from an electrical and mechanical standpoint will develop the following facts: (1) By systematizing the load, a steam station or substation apparently overloaded with the breaker tripping many times a day, resulting in loss of speed and efficiency, can be operated in a normal manner. (2) Conversely, many stations apparently fully loaded can take on more cutting machines or locomotives without addition to either substation or steam station, as the case may be.

Table IV, showing a monthly analysis of power consumption, was made with the instruments belonging to the mine investigated. The cost of the instruments necessary to such an analysis is negligible compared with the savings which have resulted from their use.

It is characteristic of the mine as of the factory that

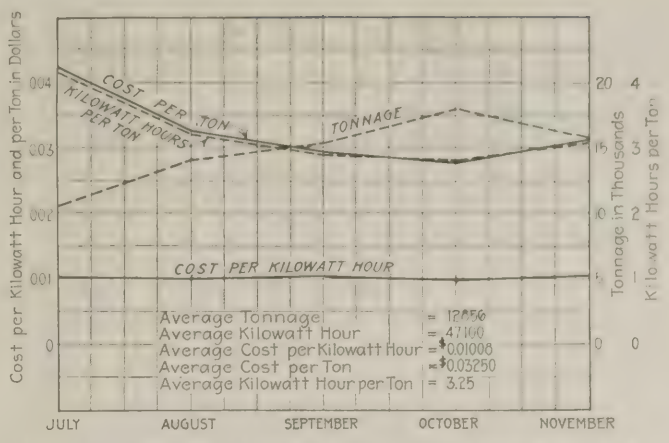


FIG. 17. OUTPUT, CONSUMPTION, COST PER TON AND PER KILOWATT-HOUR OVER 5 MONTHS

there is more or less idle machine operation. This is particularly true where a mine is equipped with more than one converting or generating set. It is, moreover, generally appreciated that machinery is operating at its highest efficiency when approximately fully loaded. While the characteristics of power demand in a mine make full load operation of most of the equipment out of the question, at the same time through analyses such as the foregoing, and through systematizing, the power consumption and demand of many mines have shown marked reduction. This in turn has been reflected to a valuable extent on the cost sheet.

There is a psychological aspect to this as in many other cases of economies produced and demonstrated.

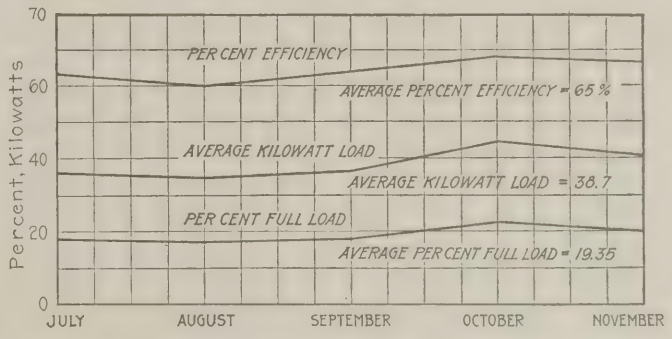


FIG. 18. RATIO OF AVERAGE CONSUMPTION TO FULL LOAD CAPACITY

An organization trained to give thought to such points will invariably give thought to other possibilities for reducing costs and for increasing the efficiency of operation.

Figs. 17, 18 and 19 develop graphically important facts

TABLE IV. MONTHLY ANALYSIS OF POWER CONSUMPTION

(Alternating Current Power Consumption, Kilowatt-Hours)

	Town Lighting	Town Pump	Substation Lighting	Shop Lighting	Tipple Lighting	Barn Lighting	Shop Power	Supply House	Rock Hoist	Car Haul	A.-C. Line Losses	Conversion Losses	M.G. Set Efficiency	D.-C. Meter	Total
July	2,225	528	31	10	..	..	260	..	530	290	250	14,906	63.0	25,570	44,600
August	1,925	1,548	21	17	..	..	280	..	610	280	250	16,499	60.0	24,670	46,100
September	2,400	.....	20	32	..	..	320	..	600	350	250	15,068	64.0	26,660	45,700
October	2,550	.....	5	27	12	2	290	..	830	470	200	13,694	70.5	32,620	50,700
November	2,750	.....	8	60	7	2	300	4	860	450	200	14,329	67.7	29,430	48,400

(Direct Current Power Consumption, Kilowatt-Hours)

	Pneumelectric Machines	Chain Machines	Mine Pumps	Town Pump	Booster Fans	Robinson Fan	Mine Office	Stone Crusher	Cutting Props	Haulage	Total
July	230	3,180	9,971	922	605	4,192	3	560	...	6,417	19,153
August	202	4,138	5,681	1,219	490	4,695	3	560	230	7,454	24,670
September	403	4,280	7,020	1,041	506	4,800	3	...	...	8,607	26,660
October	385	7,216	7,846	896	498	4,718	5	...	..	10,056	32,620
November	736	5,904	7,149	1,054	450	4,365	7	...	..	9,765	29,430

concerning the power requirements of a mine. Fig. 17 gives the tonnage output monthly of the mine investigated through a period of five months. There is shown also the monthly kilowatt-hour consumption, the monthly cost per kilowatt-hour, the monthly cost per ton and the kilowatt-hour consumption per ton. The increased or decreased cost of power corresponding to variation of production is also indicated.

Fig. 18 shows the ratio of the average power consumption to the full load capacity of the substation. It shows also the average hourly kilowatt output of the station. In addition, the efficiency of the station is indicated. This information is provided to correspond to the monthly statement shown in Fig. 17.

It will be observed that the average percentage of load—that is, the load factor of this station, which is

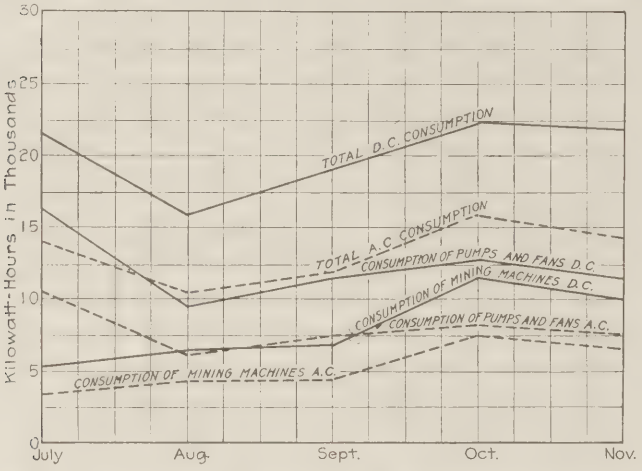


FIG. 19. THE IDEAL CONDITIONS OBTAINABLE THROUGH USE OF ALTERNATING CURRENT

a 200-kw. station—is 19.35 per cent. and that this average corresponds to the average tonnage of 12,856 tons per month.

Fig. 19 shows the ideal condition that can be obtained by using alternating current as far as possible. This figure shows the monthly consumption in kilowatt-hours of inside fans, pumps and mining machines, both on a basis of using alternating-current motors and direct-current motors. It is shown that the saving by using alternating-current motors would average 7233 kw.-hr. per month.

The foregoing is an excellent illustration of where the question is one of applying purchased power, or power from a mine power station generating alternating current. A large proportion of mines when equipping with purchased power continue all of their motor-driven apparatus on a direct-current basis. It can be readily shown, or in fact deduced from the figures used, that where alternating current is available a change-over would result in a decreased cost as incident to decreased power consumption, as well as demand, which would fully justify the change. But most important is the desirability of not loading up the substation with a load that can be more cheaply and reliably carried by stationary transformers.

(To be continued)

Based on the mortality statistics of the allied armies, a soldier's chances are twenty-nine chances of coming home to one chance of being killed.

Coke Making in New South Wales*

An excellent silvery coke from the bituminous coal of the Newcastle (N. S. W.) district has been made for upward of fifty years in beehive coke ovens. One beehive plant was erected in the Southern Coalfield in 1891, at which, by crushing the small coal, a superior hard coke was produced. The large smelting plants at Broken Hill and others formerly imported the whole of their coke supplies from Germany, the north of England, or from South Wales. When the huge deposits of lean copper ores at Mount Lyell (Tasmania) and elsewhere were being developed, proposals to use Australian coke led to the making of practical experiments. These showed that the steam coal of Illawarra, although higher in ash and in fixed carbon than bituminous coal from Newcastle, produced a harder coke, cellular in structure and better adapted to withstand the pressures in large furnaces, while its ash content was not materially higher than in coke from Newcastle. To make one ton of Newcastle coke fully two tons of coal are used, while from 26 to 27 cwt. of southern coal only are required.

Mount Lyell began the erection of ovens at Port Kembla, and soon after the Broken Hill Proprietary erected a larger plant at South Bulli. South Clifton Colliery erected a plant of beehive ovens, and other smelting and private companies have erected large batteries of ovens near the other collieries. The saving in the cost of coke to the Broken Hill company must have been considerable.

It was early found that rectangular ovens handling large quantities of coal, saved time and expense in charging, enabled the coke to be pushed out by electrical or hydraulic pushers or rams, and gave better results than beehive ovens. Careful consideration was given to the adoption of byproduct ovens, but the proposal was abandoned as impractical with southern coal on account of the low yield of tar and ammonium sulphate in the lean coals, the great cost of importing (in part due to the excessive tariff) and erecting byproduct apparatus from Europe, and the additional cost of sending the products to Europe.

A modification of the Welsh or Thomas oven gained favor. The first battery was erected with side and bottom flues measuring 21 x 4 x 5½ ft. Smelting companies erected ovens measuring 30 x 2 ft. 9 in. by 6 ft., with horizontal side and bottom flues. Other firms adopted larger ovens 30 x 6 ft. 8 in. by 6½ ft., and 30 x 8 x 5½ ft., some with vertical flues and some without. All the batteries use slack coal, crushed fine. Eight companies have up to the present erected 602 ovens.

With the exception of the beehive plants all the others use hydraulic, electric or steam pushers and levelers. One employs a Buchanan compressor and charging-box in which the pulverized material is pushed into the oven. This machine also quenches the coke by sprayers. In the majority of the plants a portion of the waste gases is employed to raise steam for use in the coke plant or for the generating plants at the mines.

The numerous difficult conditions imposed by wage boards have considerably increased the already high

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*From a paper by Dr. R. J. N. Robertson, presented at the Nottingham meeting of the Institution of Mining Engineers, Sept. 13, on "Recent Developments in the Coalfields South of Sydney."

cost of labor at the ovens. The excessive overtime imposed for work done between noon on Saturday and Monday morning has necessitated alterations of the usual practice of working ovens continuously, and charges are now adjusted so as to avoid Saturday afternoon or Sunday drawing. It has been found most suitable to burn for 72 hours. The higher temperature required for 24-hour burning necessitates the use of a higher quality of firebrick than has yet been made in Australia, the cost of which from Europe would be prohibitive.

The output of the wider coke ovens is nearly double that of the narrower ones, which, owing to labor restrictions, cannot utilize the advantages inherent in the arrangement of flues that they possess. The coke can be quenched in the wider ovens, and this avoids the dust and heat that largely contribute to the increased cost of labor and other hampering conditions. With the exception of one battery, the various ovens are charged through three or four openings from large larries. The doors are raised and lowered by hydraulic power.

In the year 1892 Newcastle produced 12,262 tons and the Southern district 5595 tons of coke; in 1914 Newcastle produced 28,264 and the Southern district 276,536 tons, which in 1915 was increased to 333,619 tons. A comparative analysis of the cokes produced are given in the following table:

COMPARATIVE ANALYSES OF COKES

From	Moisture, Per Cent	Volatile Hydro-Carbon, Per Cent	Fixed Carbon, Per Cent	Ash, Per Cent	Sulphur, Per Cent	Specific Gravity
Coöperative Colliery, Newcastle	1.87	0.27	88.77	10.45	0.04	1.814
Nuanderra, Southern District	0.21	0.15	87.55	11.50	0.45	1.934
Hoods, South Wales, (B. Hill, Central)	0.36	0.37	88.86	9.70	0.71	2.032
Hamburg, Germany	0.35	0.55	88.58	9.20	1.32	1.831

An Investigation of Concrete Houses

An idea of how some concrete houses are regarded by the occupants is given by Milton Dana Morrill, architect, New York City, in his report of his own personal investigation. The investigation was made prior to a housing enterprise on which Mr. Morrill is now engaged. The group to which Mr. Morrill refers in the portion of his report here quoted was erected under his own direction. [The work has been described in *Coal Age* May 31, 1913, under the title of "Concrete Houses at Lackawanna Mine."—Editor.]

On Nov. 30-Dec. 1, 1917, I inspected a group of 40 reinforced-concrete dwellings at Nanticoke, Penn. These have been occupied for the last four years. The houses contain seven rooms, with outside toilet, no electric or gas lighting. The houses are piped for cold water only. The monthly rental is now $10. The older residents of the group still get their houses for $8, which was the established rental of four years ago. These houses have solid concrete walls, concrete floors, partitions, stairs and flat concrete roofs. The only woodwork is for windows and doors and their frames. The entire structures are of cinder concrete. Steel forms were used throughout the building operation; the marks of these forms show plainly inside and outside the houses, as no plaster or other finish has been applied, the concrete being painted only—except on six of the 40 dwellings, where the interior was finished with a skim white coat of plaster. These form marks give to the work a rough and unfinished appearance, both inside and out. From a structural standpoint, the houses seem to be standing well, with no repairs except a coat of paint since they were completed. The permanency of this construction for industrial houses is here clearly demonstrated, although the finish here given is too crude for the better class of industrial dwelling.

The renter is not particularly interested in the permanency of the house construction; neither does he give any particular value to the fireproof or sanitary quality of his house.

In order to get the tenants' viewpoint after living in these houses for several years, a list of questions was compiled and put to 15 different families in the group.

The questions asked were as follows:

1. How long have you lived in this house?
2. Have you ever seen any dampness in the house?
3. Do you find your house comfortable—warm in winter, cool in summer?
4. How many stoves do you have?
5. How much coal do you burn per month?
6. Do you like the casement or swinging windows?
7. Do you like the combination bathtub and washtubs installed in the kitchen?
8. What covering do you use on the concrete floors?
9. Do you find the floors cold or hard to the feet?

Many Facts Brought Out By Questions

These questions, together with observation, brought out the following facts:

Each seven-room dwelling was heated by the kitchen range and one large stove in the living room, requiring on an average of one ton of coal per month. All the families found the combination washtubs and bathtub a convenient and a useful fixture. Practically all the families would prefer the usual sliding windows instead of those with casement or swinging sash. In all the houses inspected the concrete floors were covered with rugs, in the living rooms, and with linoleum in the kitchens. In some of the answers given there was some variation, so it may be helpful to give these answers in detail. For indentification the facts brought out by the tenants have been put down under the house number where each inquiry was made.

Dwelling No. 303—Four years' occupancy. No dampness, but walls sweat on wash day. House very cool in summer.

No. 309—Four years' occupancy. No dampness. Concrete floors found hard on the feet.

No. 325—Three years' occupancy. Walls sweat on wash day. Rather have wood floors to live on.

No. 315—Had just been vacated and was being washed out before arrival of new tenant. The floors were being flushed with soap and water and scrubbed with a broom. A dwelling of this construction can be cleaned very thoroughly. There are no concealed spaces in the construction to harbor vermin or insects.

No. 326—No dampness found. House found warm in winter, cool in summer.

No. 936—Four years' occupancy. No dampness found. Concrete floors not found cold, but would prefer wood covering.

No. 939—Four years' occupancy. Would prefer wood floors.

No. 921—Four years' occupancy. No dampness found. Even temperature, cool in summer and warm in winter.

No. 923—No dampness observed. Construction preferred having wood floors. Cement floors not found cold, but wood floors preferred—"easier to fasten carpets down."

No. 924—No dampness found, but concrete floor found hard.

No. 934—Walls sweat on wash day. Finds house warm in winter, very cool in summer. States that did not like concrete floors at first, now finds them O. K.

No. 327—One year occupancy. No dampness found. Casement windows preferred. More air in summer. Wood floors preferred.

No. 333—Occupancy one year and three months. Cellar found damp. Finds house cool in summer, about like wood house in winter.

In the six dwellings where the walls were finished with a skim coat of white plaster directly over the concrete

walls, this has given considerable trouble. Steam from washing has loosened this thin plaster coat, and much of it has had to be replaced.

This investigation of these concrete houses would seem to show that cinder or slag concrete, when properly made and reinforced, is a satisfactory construction for the walls of dwellings. It would further show that it is necessary to furr such concrete walls if sweating is to be eliminated. The investigation further shows that to get an attractive and permanent exterior finish these concrete walls should have a stucco finish.

While the concrete floor has many advantages from a permanent fireproof and sanitary point of view, this investigation shows clearly that the tenants much prefer a dwelling with the usual wooden floors.

The permanency of this construction is at once apparent. These houses will require an occasional coat of paint and the doors and windows might after many years have to be replaced, but otherwise there seems to be no reason why these houses should not be as good in 50 or even 100 years as they are to-day.

These houses were designed and built to accommodate the families of the average mine laborer, whereas from the inquiry made they are occupied to a large extent by the families of the mine foremen. These men receive higher wages and could afford to rent and would gladly occupy better finished houses, with modern conveniences, such as electric lights, bathroom and furnace heat, if such houses were available close to their work—*Concrete,* September, 1918.

Percentage of Sizes of Fresh-Mined Anthracite Produced by 12 Leading Producers, 1913-1916

Size	1913	1914	1915	1916
Lump	00.7	00.3	00.3	00.3
Broken	06.7	06.9	06.8	07.4
Egg	12.6	11.9	11.8	12.4
Stove	19.0	20.6	20.9	20.8
Chestnut	24.3	23.2	23.2	22.7
Total	63.3	62.9	63.0	63.6
Pea	12.4	12.8	12.9	12.1
Buckwheat	13.2	13.2	13.4	13.7
Rice	05.7	05.4	05.2	04.3
Barley	03.2	03.4	03.2	02.6
Boiler (birdseye)	02.1	02.2	02.2	03.4
Screenings (silt)	00.1	00.1	00.1	00.3
Total	36.7	37.1	37.0	36.4

Novel Brick and Concrete Work

Some interesting underground construction is being carried on at one of the large mines of the Northwestern Mining and Exchange Co., in Clearfield County, Pennsylvania. The shaft station at the foot of the hoisting shaft is built entirely of brick to a point at which the company thought the roof would support itself. It was found that it would not, and Fig. 1 shows the new steel cap-pieces in place supported by wooden timbers which will shortly be removed and replaced by



FIG. I. STEEL CAP-PIECES SUPPORTED BY WOODEN TIMBERS

a concrete sidewall. The illustration also shows the brick arch work at the shaft station.

Fig. 2 shows an important junction point in the mine. The tracks in the foreground go to the shaft bottom. The entry from which the cars are coming

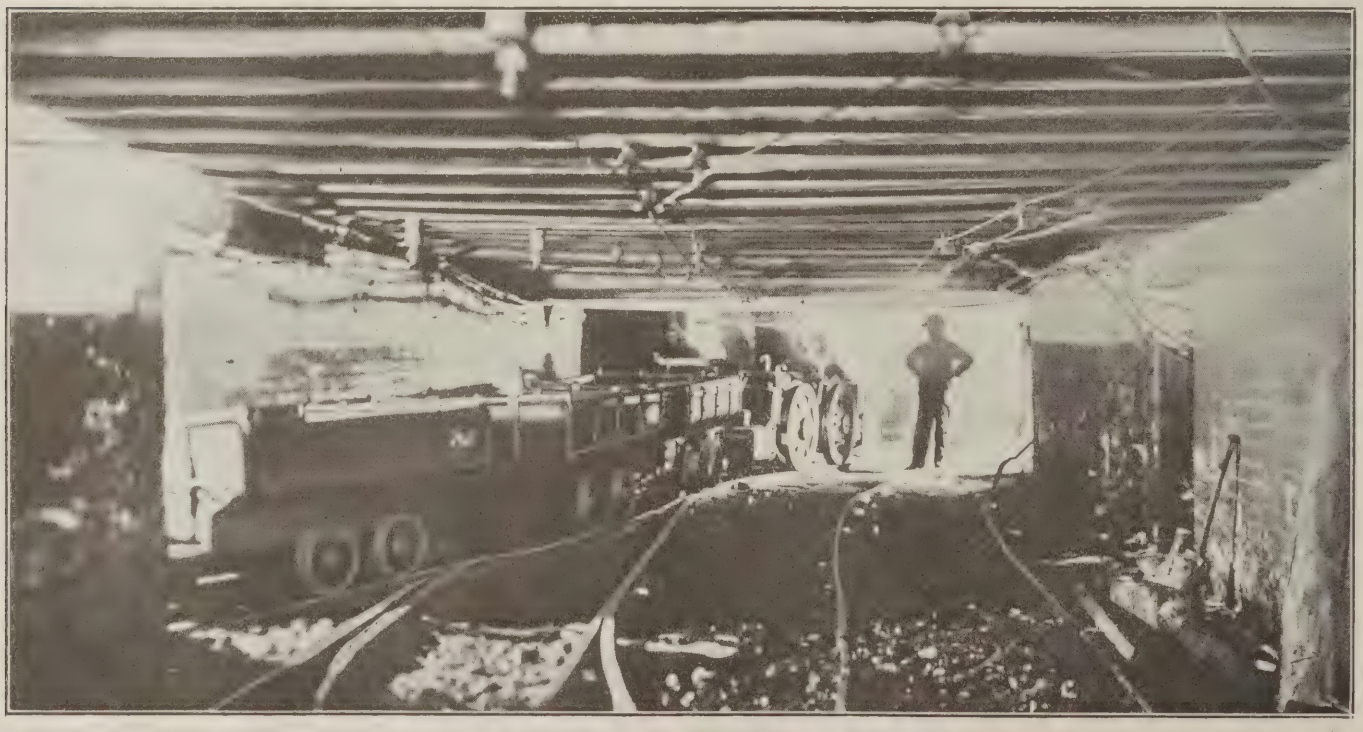


FIG. 2. IMPORTANT JUNCTION POINT IN THE MINE; NOTE BRICK WALLS AND ROOF OF STEEL I-BEAMS



FIG. 3. SHOWING HOW BRICK PIERS COMPARE WITH OLD WOOD TIMBERS

is the empty track, the two entries in the background going to different parts of the mine. It will be noticed that the walls are of brick and the roof of steel I-beams. This type of construction is used at all important junction points in the mine where the roof will not support itself.

In Fig. 3 a new "stunt" in the use of brick piers is shown. These piers are 8 x 30 in. and are set up on as straight a line as possible. Across the top of these piers a 60-lb. steel rail is laid, giving a bearing for the I-beams that would not ordinarily come on top of the piers. To the left of the illustration the old wood timbers can be seen standing, but these will shortly be replaced by brick piers.

The trolley wires are supported from the I-beams. Two pieces of steel are bolted to the beam, these projecting downward, a block of wood being fastened between them. To this block of wood the hanger for the trolley wire is fastened.

Coal Production for First Half of 1918

Bituminous coal production during the first half of 1918 was 311,216,000 tons. This is an increase of 12 per cent. over the previous high record made during the same period of 1917. Anthracite production from Apr. 1 to Sept. 28 was 51,651,000 tons. This shows an increase of 2.1 per cent. over last year's record. The figures are those of C. E. Lesher, the geologist in charge of coal statistics for the United States Geological Survey. They were made public by the Fuel Adminstration with the following comment:

These production records were established in the face of many handicaps, chief of which was a reduced man power at the mines. It is estimated that the draft took between 50,000 and 60,000 coal miners during the last year, while probably as many men left the mines to work in other war industries.

By working more regularly than ever before the men who remained at the mines have been able to offset this loss in man power. Responding to appeals to their patriotism, which have been made directly to them by representatives of the Fuel Administration, the miners generally have been working full days and full weeks and foregoing many of the holidays and vacations which they were accustomed to take in the past.

Car shortage has limited production during the last six months. The weekly reports show that from 4 to 18 per cent. of full time has been lost by lack of cars for loading. In most districts, however, there has been a material improvement in this respect during the last few months. The loss of time during the last week of September was 6 per cent.

A factor that may tend to curtail production during the current month is the appearance of Spanish influenza in many of the mining districts of the east. Every effort is being made by the mine authorities to prevent the spread of the epidemic, but temporarily, at least, the precautionary measures that have had to be taken, as well as the disease itself, will have an adverse effect on the production returns from certain districts.

Although the bituminous tonnage of the last six months broke all previous records, it was still 10,897,000, or 3.4 per cent. short of the requirements for that period. Because of the great increase in the demand for coal for the nation's war industries and other military purposes, the requirements for the last six months exceeded those of the same period in 1917 by 44,315,000 net tons, or approximately 16 per cent.

The deficit in bituminous production must be made up in the second half of the production year by a still further increase in production, by conservation, which will reduce actual consumption below the estimated requirements, or by a combination of both.

Terms Used in Timbering

Certain terms are used in connection with timbering work in Illinois mines. Thus a "collar bar" is a timber used to hold up top and is placed parallel to the entry and across the room neck; this is the only place in the mine where such a timber is found. A "cross bar" is a term used to denote a timber which is placed at right angles to an entry. It may be found at any point on an entry.

Purchase of Mining Machinery and Supplies

By C. E. BOWRON
Birmingham, Ala.

SYNOPSIS—*Mining machinery is of two general classes—that built for long service and that built to operate for a short time only. Several considerations must be taken into careful account when buying equipment. Per pound prices by themselves are hardly comparable unless the machines in size, weight, capacity and design are nearly identical or at least closely similar.*

THE judicious purchase of mining machinery and supplies demands careful consideration of many factors. All mining men are familiar with machinery and apparatus at various plants which is "too good to throw away," but "not good enough to keep." Too much machinery has been bought and is still being purchased on a price rather than on a cost basis. Thus the cost of a piece of machinery does not end with the payment of the original invoice, and to get at its true lifetime cost we must add the expense of keeping it in an efficient state of repair and also the cost of operating it.

A first consideration that must be given attention is the duty required from a machine, its probable cycle of operation and its probable life. We can afford to pay more for a piece of machinery intended to yield many years of service than for one expected to give only a few months' service; more for a piece which must operate 24 hours a day than for one to operate 1 hour daily; or when, by paying more, we insure against breakdowns and gain in economy of operation.

Expensive Versus Cheap Machinery

In a great many lines of machinery at least two grades exist. It will be found upon careful investigation that there are usually good reasons for the more expensive grades, perhaps not always apparent to casual inspection. Among these are heavier or more economical design, higher grade metals, more expensive finish, higher grade workmanship, interchangeable parts built to templet, extra attachments, etc. In some lines the cheaper designs are termed "competitive" and are those offered when the simplest, plainest and cheapest thing that will do the work for a while is wanted. One is rarely surprised at their breakdown and early failure. For example, in looking over some old proposal sheets I find two boiler feed pumps offered for the same duty, one a 10 x 7 x 12 duplex piston pump, plain fitted, weighing 1740 lb., price $290, and the other an 8 x 5 x 12 duplex, outside-packed plunger pump, bronze fitted, weighing 3500 lb., price $1050.

After a survey of the requirements, it is therefore the part of wisdom, in asking for proposals, to advise some of the leading specifications or to state fully the required duty to be performed, with some statement as to the grade or economy of the machine desired. Proposals may thus be all made on the same grade of machinery and therefore be truly competitive. Furthermore, they may then be compared relative to the fine points of difference. It is wise to purchase machinery a little too large rather than just up to the capacity desired, or a little too small, as mining plants often have a disconcerting way of "growing too big for their breeches."

The specifications sent out and the proposals received, for machinery of any size or importance, should be the subject of conference between responsible officials such as the master mechanic, engineer, superintendent or others. There are entirely too many men entrusted with the specification and purchase of machinery whose experience is limited, who are not familiar with the values involved, or who are hidebound or perhaps prejudiced in favor of a certain make because they are familiar with it only. Experience in buying will, in the course of time, enable one to confine inquiries to those firms whose goods have been found satisfactory and yet secure sufficiently diversified bids from which to choose.

New Machinery Should Be Investigated

Machinery of new design, even when brought out by reputable concerns, must be bought with caution and with strong guarantees. Some years ago I purchased an air compressor of new design (now a familiar one) from one of the leading manufacturers. It so happened that this firm had built numbers of this type of machine in smaller sizes, but the machine bought was the first one of its size. While on the whole its performance was satisfactory, the makers made perhaps two dozen changes in small details when my employers purchased a second machine a year later, most of the changes resulting from our experience with the first machine.

Proposals should include full specifications on machinery or apparatus offered, advising sizes and dimensions of leading parts, description of metals to be used, weights, power required to operate (in the case of power-consuming machinery) and other essential data, accompanied by blueprints and photographs where necessary to give a clear idea of appearance or construction. It is sometimes like pulling teeth to secure essential data for comparison, from some firms who perhaps fear to disclose the secrets (?) of their designs.

Having in hand a number of proposals, these should be listed on large ruled sheets, showing names of bidders, with the various data in columns, so that the eye can follow each item all the way through the various bids. Prices should be reduced to the same basis—that is, all either f.o.b. factory or delivered at destination. Proposals should be carefully examined to see that all proper or desired items are included. Thus with engines, one maker may include a continuous oiling system worth possibly several hundred dollars, while another may include plain oil cups; one may include throttle valve, foundation bolts and washers, and another may not. Do not take it for granted that anything will be furnished unless it is included in the spec-

ifications or shown on the plan, forming a part of the specifications or proposal.

The price per pound may be worked out and compared. These per pound prices must be viewed with caution, however, and not be taken by themselves. With machinery of absolutely the same class and design, and approximately the same weight, they are a fair general criterion and in any case are a rough guide. It is a possibility, however, that the builder of a steam engine or air compressor, for example, may put an excessive and unnecessary amount of metal in a bedplate or other casting, which might make his product cheap per pound. If this extra weight were evenly distributed throughout the machine, this might be highly advantageous. It is necessary, therefore, in connection with a consideration of relative weights, to examine carefully the relative sizes of similar parts such as shafts, flywheels, rods, pins, bearings, the thicknesses of cylinder walls, etc., to see if the extra weight is justified. There are cases where builders still adhere to original patterns, too heavy in some details but satisfactory in service, rather than go to the expense of a new set of patterns; others, were they to redesign their machines, would make them somewhat heavier. Thus the criterion of weight alone will not by itself answer, but must nevertheless be carefully considered.

Relative Speeds of Machinery Important

In the case of machinery such as pumps, motors, engines, compressors, etc., the relative speeds of the machines offered should be taken into consideration. Slow-speed electrical machinery, especially, is necessarily more costly to build than that designed for high speed, since it involves the use of more copper. Slow-speed machinery in general would be expected to last longer and require less repairs than high-speed, as witness some of the old corliss engines still doing duty with very fair efficiency. In the case of air compressors, it would seem fair to compare their capacities and unit values at the same piston speed rather than on their nominal displacements at varying speeds.

The economy factor, in the case of power-consuming apparatus, should receive careful attention. Thus in the case of a large mine pump operating 12 to 24 hours per day, we could afford to pay a good deal more for a machine with an efficiency of 80 per cent. than for one with 60 per cent. efficiency. Let us assume a concrete example, say an electrically driven mine pump to handle 450 gal. per minute against a head of 500 ft., including pipe friction. There is thus $450 \times 8\frac{1}{3} \times 500 \div 33{,}000 = 56.8$ hp. in the water.

We are offered a triplex pump with an efficiency of 80 per cent., costing with motor $5500; and a centrifugal pump with an efficiency of 60 per cent., costing with motor $3500. Which shall we buy for a permanent installation, assuming that we can afford the more expensive machine? At 85 per cent. motor efficiency in both cases the horsepower inputs to the motors would be $56.8 \div 0.80 \div 0.85 =$ say 84 hp. in the case of the triplex and $56.8 \div 0.60 \div 0.85 =$ say 111 hp. in the case of the centrifugal. If power costs 1c. per kw.-hr. or $\frac{3}{4}$c. per hp.-hr., and the pump is to work 12 hours every day, the triplex would save in cost of power per year $(111 - 84) \times 12 \times 365 \times \frac{3}{4}$c. = say $887.

If from this we deduct 12 per cent. interest and depreciation on the $2000 difference in price between the two pumps, we would have $647 per year net saving, or, if we consider that the triplex would cost more for upkeep, say only $500 per year. If money is worth 6 per cent., we would be justified in spending $500 \div 0.06 =$ say $8000 for the triplex rather than accept the other pump for nothing, under the conditions assumed.

When a Cheaper Pump Is Advisable

If on the other hand the pump, to assume an extreme example, had to work only one hour per day instead of 12 hours, the saving in power would only amount to $\frac{1}{12}$ of the above figure, or $74, which would not equal the interest and depreciation on the extra investment required, and the purchase of the cheaper pump would be advisable. It might well be noted, although not germane to this article, that the common method of operating direct-acting steam pattern pumps underground with compressed air is one of the most wasteful power operations encountered at a coal mine.

In some lines of equipment it will be found that makers have closely agreed on base prices, leaving a decision as to purchase entirely to the relative merits of the goods. In other lines not only will prices be close together, but also general design and dimensions, and at times a decision gets down to a matter of personal preference based upon the general reputation of the maker or to personal familiarity with the several lines offered.

There will be found, for example, a marked similarity in design, dimensions and weights of several makes of large gyratory crushers as built by three or four manufacturers. There are sometimes proposals which are difficult to compare where designs, dimensions and all other details are widely different and where the question of suitability for the intended purpose is involved, making the purchase largely an engineering study: The various types of stokers and boilers furnish a good example of a case of this kind.

Should Exercise Care in Buying All Supplies

The same discrimination shown in the purchase of machinery, as has been roughly dwelt upon above, may well be exercised in the purchase of all kinds of apparatus and current supplies. To this end it is essential that proper records be kept showing the life and service obtained, together with first costs and unit costs. Under this head may be included such items as wire ropes, mine-car wheels and axles, belting, hose, packings, etc. Some simple form of card index will cover the needs of the average plant and the keeping of these records need not become burdensome. I recall one plant where records showed a saving in the monthly oil bill by the substitution of oil costing 50c. per gallon for oil costing 30c.

The same difference in grades, previously mentioned in machinery, will be found in many lines of supplies. Thus in rubber belting there exists a "standard" or competitive grade, with a better and perhaps a "best" grade and also a cheaper grade. In buying a pair of shoes or a suit of clothes you expect to get about the grade of stuff you pay for. In like manner the same applies when you are purchasing mining material; and you will not get something for nothing.

The larger mining companies with their well organized engineering, accounting and purchasing departments are of course buying along the general lines set forth above, but it seems that it is quite as important for the smaller company or operator to see that money is spent to the best advantage, with all factors thoroughly considered. It is hoped that such individuals and firms may find a useful idea or two in what has been written.

Where Government Runs the Coal Mines

Frank A. Henry, the United States Consul at Puerto Cabello, sends the following report on the coal mines in Venezuela:

"The only coal mines in the Puerto Cabello consular district that are being actively worked are located near Coro, in the State of Falcon. During 1917 these mines produced 4716 tons (of 2204.6 lb.) of the 20,164 tons produced for the whole country. The principal coal mines in Venezuela are situated near Guanta, and recent press reports indicate that production there has recently been increased to 70 tons per day. As imports of coal in 1916 amounted to 20,600 tons, of which 9100 tons were brought to this port, it is evident that local production will have to be very considerably increased before dependence on imported supplies will cease.

"The Coro mines are owned by the Venezuelan Government and operated through an administrator, who



also holds the same position for the Government-owned railway from Coro to its port, La Vela de Coro, about 9 miles distant. In his report for 1917 to the Minister of Fomento, the administrator called attention to the following conditions affecting the operation of mines. The methods of working are primitive in the extreme. Pick and shovel are the only implements used in mining. Lack of a suitable pump often results in the flooding of the mine and consequent suspension of work.

"Transportation conditions are equally primitive, and the necessity of hauling the coal several miles in small carts adds greatly to its cost. The extension of the La Vela-Coro R.R. a few miles to the mines would be the best solution of the transportation problem, but short of this the administrator has recommended the purchase of three motor trucks for this purpose. There are no storage places for the coal either in La Vela or Coro, nor is there any machinery for handling it at the water front. Only sailing lighters are used for loading vessels, and the charges, $0.77 per ton, add considerably to the cost of the fuel on board ship.

"The quality of the coal mined is said to be improving as the exploitation of the mine advances, and there is a good demand for all that can be produced. It is sold to the Government departments at $4.63 per ton and to private individuals at $7.72. During 1917, 4716 tons were extracted, the minimum production having been 126 tons in July and the maximum 645 in September.

During the year the cost of operations amounted to $25,760 and the receipts to $45,414. At the beginning of 1917 there was a stock of 4358 tons on hand, which was reduced to 60 tons at the end of the year. The sales during the last three years have been as follows: 1915, 2604 tons; 1916, 3637 tons; and 1917, 9014 tons.

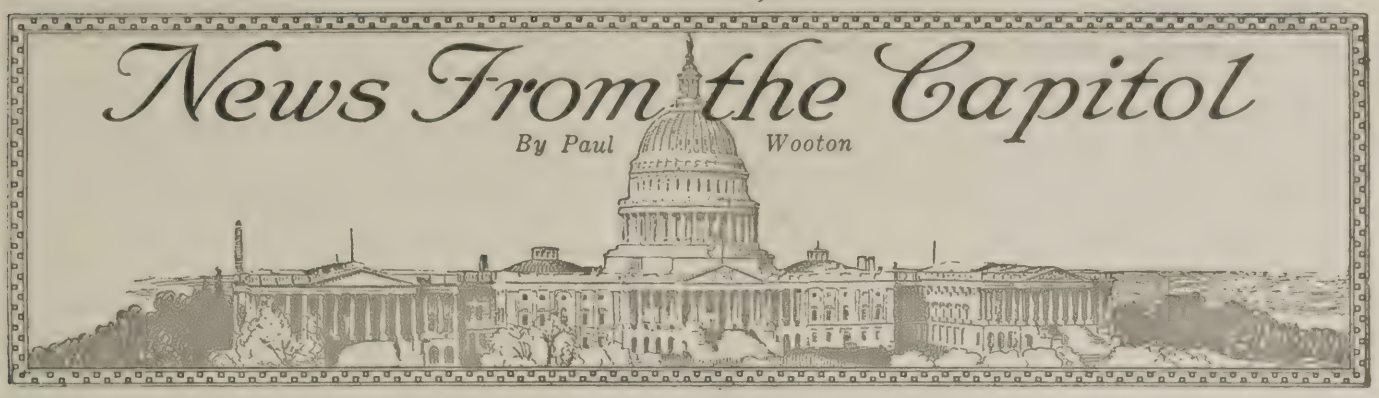
"Due to the great demand for coal in Venezuela at present, owing to the cost and difficulties in importing from Great Britain and the United States, there is every reason to expect an increased output during the current year, although the same general methods of exploitation as formerly are likely to be followed."

Legal Department

DUTY TO INSPECT MACHINERY.—The duty of a coal operator to provide reasonably safe machinery and appliances in operations affecting his employees' safety does not end with the installation of safe machinery, etc. There is a continuing obligation to maintain a continuing oversight and inspection to avoid defects which may naturally be expected to arise from time to time. For example, the fact that brake shoes controlling the operation of cages in a mine shaft were safe when installed did not relieve the operator from liability for an accident occurring through a defective condition of the brakes afterward developed and permitted to remain so long as to raise an inference of negligence. (United States Circuit Court of Appeals, Eighth Circuit; Barrowman vs. Northern Central Coal Co.; 246 Federal Reporter, 906.)

PROVING NEGLIGENCE OF OPERATOR.—A coal operator, or other employer, is not to be charged with responsibility for injury to an employee on a theory of negligence in permitting some dangerous condition to exist, in the absence of proof that the employer knew or ought to have known of the defect in ample time to have remedied it before occurrence of the accident. On question being raised as to whether an operator was negligent in retaining an inexperienced jack setter to assist in the operation of a mining machine, resulting in injury to plaintiff, a member of the machine crew, it must be presumed, in the absence of proof to the contrary, that the jack setter properly inspected a mine roof before setting up a jack, although there was a fall of rock at that point when plaintiff, in the course of his duties, afterward removed the jack. (Missouri Supreme Court, Haggard vs. McGrew Coal Co., 200 Southwestern Reporter, 1072.)

TAXING MONTANA COAL DEPOSITS.—The provision in the Montana constitution that "the annual net proceeds of all mines and mining claims shall be taxed" applies to all mineral deposits and makes them taxable only when capable of yielding proceeds. But where an owner of lands conveys them, reserving underlying coal and the right to use the surface for the purpose of exploring and mining the coal, the fact that until development the coal would not be subject to taxation does not avoid taxation of the value of the surface rights reserved, they constituting a separately taxable interest in land. In such case, in determining the value of the reservation of right in the surface, the cash value of the land, less the underlying minerals, is to be ascertained as if the entire property were vested in one person, and an equitable apportionment made by the assessor between the grantee of the property, subject to the reservations, and the reserving grantor. (Montana Supreme Court, Northern Pacific Railway Co. vs. Musselshell County, 169 Pacific Reporter, 53.)



Increased Coal Storage Authorized

Increased storage of bituminous coal by consumers was authorized on Oct. 16 in regulations issued by the United States Fuel Administration. All classes of consumers, except Class 1, as defined by the War Industries Board, were authorized to increase their reserve stocks, and those heretofore not on the preference list were authorized to lay in additional reserve supplies. Consumers in Class 2 may store their coal up to the limits now imposed on Class 1. Consumers heretofore in Class 3 will receive the facilities heretofore accorded to Class 2, and consumers in Class 4 have been allotted the opportunities heretofore reserved for Class 3. Consumers not on the preference list are allowed the stocks formerly permitted Class 4 concerns.

The regulations, it was announced, will stand until further notice, and it was stated that, under them, an opportunity is afforded every industrial consumer for laying in at this time some reserve supply of bituminous coal. Regulations in detail are as follows:

CONSUMERS IN CLASSES 1 and 2.

Maine, 135 days.
Massachusetts, Vermont, New Hampshire, Northern New York, 105 days.
Connecticut, Rhode Island, Southwestern New York, 90 days.
Southeastern New York and New Jersey, 60 days.
Delaware, East Pennsylvania, Maryland, District of Columbia, Virginia, North Carolina, South Carolina, Georgia, Florida and Western Ohio, 45 days.
Western Pennsylvania, West Virginia, Eastern Kentucky, Eastern Ohio, 35 days.
Lower Michigan, 90 days.

CONSUMERS IN CLASS 3

Maine, 120 days.
Massachusetts, Vermont, New Hampshire, Northern New York, 90 days.
Connecticut, Rhode Island, Southwestern New York, 75 days.
Southeastern New York and New Jersey, 50 days.
Delaware, Eastern Pennsylvania, Maryland, District of Columbia, Virginia, North Carolina, South Carolina, Georgia, Florida, Western Ohio, 40 days.
Western Pennsylvania, West Virginia, Eastern Kentucky and Eastern Ohio, 30 days.
Lower Michigan, 75 days.

CONSUMERS IN CLASS 4

Maine, 105 days.
Massachusetts, Vermont, New Hampshire, Northern New York, 75 days.
Connecticut, Rhode Island, Southwestern New York, 60 days.
Southeastern New York and New Jersey, 40 days.
Delaware, Eastern Pennsylvania, Maryland, District of Columbia, North Carolina, South Carolina, Georgia, Virginia, Florida, Western Ohio, 35 days.
Western Pennsylvania, West Virginia, Eastern Kentucky and Eastern Ohio, 25 days.
Lower Michigan, 60 days.

Consumers not on the preference list are limited to the following stocks:

Maine, 90 days.
Massachusetts, Vermont, New Hampshire and Northern New York, 60 days.
Connecticut, Rhode Island, Southwestern New York, 45 days.
Southeastern New York and New Jersey, 30 days.
Delaware, Eastern Pennsylvania, Maryland, District of Columbia, Virginia, North Carolina, South Carolina, Georgia, Florida and Western Ohio, 30 days.
Western Pennsylvania, West Virginia, Eastern Kentucky and Eastern Ohio, 20 days.
Lower Michigan, 45 days.

There is no restriction on the stocks of screenings which may be accumulated by either preference or non-preference consumers, nor is there any restriction on the stocks of Indiana, Illinois or western coal which consumers in any class may obtain. Supervision of the accumulation of stocks in accordance with these limits will be exercised by the several State Fuel Administrators, who are authorized to make exceptions where special conditions make it necessary.

To Investigate Alaskan Coal Fields

To confer with officials of the Alaskan Engineering Commission relative to the coal resources of the Anchorage district and to make a personal inspection of the Matanuska field is the mission of a special Federal commission appointed by Secretary of the Interior Franklin K. Lane. The members of the Federal commission are E. O. McCormick, vice-president of the Southern Pacific R. R., chairman; George Watkins Evans, of the Bureau of Mines, University of Washington, Seattle, Wash.; George C. McFadden, chief engineer of the Chicago Coal Co., and L. A. O. Gabaney, geologist, of Chicago. The commission is now at work in Alaska.

Special Fuel Commission Named

Appointment of a special commission of the United States Fuel Administration to inquire into conditions and government regulations affecting the coal industry in foreign countries was announced on Oct. 15 by Fuel Administrator Harry A. Garfield. The commission will consist of Walter E. Hope, who joined the Fuel Administration on Sept. 19, 1917, as Director of the Bureau

of State Organizations; S. Brinckerhoff Thorne, of New York, coal expert, and James H. Allport, one of the engineers to the Fuel Administration. They will sail soon for Europe.

Mr. Hope went to the Fuel Administration from New York where he is a member of the law firm of Maston & Nichols. He is a graduate of the New York Law School, and of Princeton, where he was editor of the *Daily Princetonian.*

Mr. Thorne is a graduate of Yale, '96, and is president of the Temple Coal Co. and of Thorne, Neal & Co., coal distributors. At college he played three years on the 'varsity football and was captain of the team the last year. Since then his business has been coal.

Mr. Allport is a consulting engineer of national reputation. Prior to his connection with the Fuel Administration he was connected with many companies. He attended the University of Pennsylvania, taking special courses, and lives at Phillipsburg, Center County, Pennsylvania.

Railroads Moving More Coal This Year

An increase of 11.7 per cent. in the bituminous coal loading in the eastern region took place between Jan. 1 and Sept. 30 as compared with the corresponding period of 1917. This is based on a report to the Railroad Administration by A. H. Smith, the regional director. The percentage of increase or decrease on the various roads is as follows:

	Cars	Per Cent.		Cars	Per Cent.
B. & O.	115,985	31.0	N. Y. C.	188,287	2.8*
B. R. & P.	183,271	9.0	Penn. West.	463,706	21.0
Cent. Ind.	2,757	70.0	P. M.	8,633	5.0
C. I. & L.	31,433	28.0	P. & S.	43,567	3.0*
C. I. & W.	5,094	67.0	T. & O. C.	87,271	18.0
C. C. C. & St. L.	155,231	4.0	T. St. L. & W.	13,341	
D. T. & L.	8,559	1.6	Wabash	52,298	12.0*
Erie	24,537	1.0	P. C. & Y.	11,938	5.0
H. V.	107,642	11.0	W. & L. E.	70,492	29.0
K. & M.	58,479	2.7			

* Decrease.

Increase in the number of cars loaded in 1918, up to and including the week ending Oct. 5, over the corresponding period of 1917, is 682,112 cars. Coal loaded by all roads during the week ended Sept. 28, and compared with corresponding week of 1917, is as follows:

	1918	1917
Total cars bituminous	226,345	190,467
Total cars anthracite	40,524	42,008
Total cars lignite	4,040	3,679
Grand total cars all coal	270,909	236,154

A summary of reports for week ended Oct. 5, 1918, based on actual reports from most roads, but with the results of some roads estimated, follows:

	1918	1917
Total cars bituminous	209,432	186,699
Total cars anthracite	38,550	42,079
Total cars lignite	3,452	3,122
Grand total cars all coal	251,434	231,900

One of the most promising features of the car situation, as it applies to movement this winter, is the fact that 31,794,000 cars of grain had been moved up to Oct. 1, as compared with 4171 cars for the same period of last year.

A review of the coal budget is to be made by the Fuel Administration, in light of the six-months' figures. Some realignment of tonnage will take place.

Anthracite Shipments for September, 1918

The shipments of anthracite for September, as furnished to the Anthracite Bureau of Information, amounted to 6,234,395 tons as compared with 6,372,756 tons for September last year and 7,180,923 tons for the month of August this year, showing a decrease over September of last year of 138,361 tons, and a decrease as compared with August this year of 946,528 tons. The small production in September as compared with August is due principally to the fewer number of working days last month; five Sundays and one legal holiday (Labor Day) reducing the number of working days in September to twenty-four, whereas there were twenty-seven working days in August.

The average daily shipments in September of this year were 259,766 tons against 254,910 tons for the corresponding month of last year, a record which, considering labor conditions at the present time, indicates that the anthracite industry is not laggard in its duty to the Government and the public. The shipments by companies were as follows:

	September, 1918	September, 1917	Coal Year, 1918	Coal Year, 1917
P. & R. Ry.	1,231,435	1,246,100	7,996,029	7,562,874
L. V. R.R.	1,167,784	1,258,922	7,694,157	7,370,946
C. R.R. of N. J.	571,147	559,581	3,574,745	3,536,845
D. L. & W. R.R.	927,608	973,529	6,071,574	6,214,638
D. & H. Co.	736,497	698,731	4,775,049	4,471,142
Penna. R.R.	433,068	422,482	2,866,556	2,869,645
Erie R.R.	703,363	717,129	4,587,653	4,556,139
N. Y. O. & W. Ry.	157,387	155,886	1,045,026	1,018,010
L. & N. E. R.R.	306,106	340,396	2,012,602	2,069,626
Total	6,234,395	6,372,756	40,623,391	39,669,865

Influenza Affects Coal Output

Coal production will be cut down 5 to 50 per cent. in the various producing districts by the influenza epidemic, according to reports reaching the Fuel Administration. It is believed, however, that the higher figure mentioned hardly is a conservative estimate. Nevertheless, the Fuel Administration is taking no chances. James B. Neale, the director of production, has been authorized to open temporary hospitals wherever it is practicable.

Brief Washington Notes

Suspension of automobile, motor-cycle and motor-boat racing for the period of the war has been requested by the Fuel Administrator.

To assure the Senate that he approves of liberal account being taken of depletion and the extra hazard in coal mining, Dr. Garfield appeared before the Finance committee Oct. 15. The session was executive.

A new set of coal zone orders, which will consolidate all the summer's modifications and changes is soon to be issued by the Fuel Administration. Owing to the multiplicity of separate modification orders difficulty often is experienced in keeping up with them all.

Collection of reports of mining engineers in the course of its war work made clear to the Bureau of Mines the great value of having such technical and economic information on file at all times. As a result the Bureau has begun a systematic effort to collect all such reports available. A file also will be maintained of the quarterly, annual and other reports of mining companies.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The anthracite wage problem has not yet reached complete solution though that may come at any time. The proposed wage schedule will be found with appropriate comment on page 789 of this issue. Meantime the production of coal is proceeding smoothly in the anthracite region. No labor troubles are now occurring and the only interference with output arises from the influenza. Minersville, in the Southern field, is so grieviously afflicted that it has been necessary to call on the Army Ambulance Corps at Allentown, 51 of the army surgeons from that city having been obliged to locate in and about that section.

Central Pennsylvania production has been checked by two adverse influences—the victories in France and the Spanish, or should it be the German, influenza. As for the victories, they have been enthusiastically followed by the mine workers of the Keystone State and the miners were so much impressed by the importance of the Allied advances that they were quite prepared to hear that the Kaiser had surrendered, so prepared, indeed, that when the rumor circulated that the long-hoped-for event had occurred they not only ceased buying Liberty Bonds, but left the mines to celebrate. Unfortunately the story was not true and was made only the less likely by the untimely celebration. By the premature closing of the mines the time when the Kaiser will be "smothered with coal" becomes only more remote.

The cause of the trouble is declared to be German propaganda, but unfortunately it is not necessary to imagine any such source. The story was already in the minds of everybody, ready to be given spread and credence. There is altogether too much of a disposition to believe that the battle is over. A little reading of British and American casualty lists and the account of U-boat activity will act as a corrective for such excessive optimism. The Germans are not yet beaten. It is still not impossible that the British will so far outrun their artillery that the Germans will be able to turn on them as the French turned on the Germans at the Marne.



Courtesy "American Coal Miner"

THEY ARE NOT HOISTING BOOZE—BUT COAL

The Germans by their apparent yielding did the Liberty Loan sale no little injury and shut down several mines. In Winber alone the loss in production of the Berwind-White Coal Mining Co. was 6000 tons. Along the Southfork branch near Johnstown, Penn., there was a loss of 4000 tons. The Portage branch in the same vicinity produced 2000 tons less fuel. At Ehrenfeld, Nanty-Glo, Beaverdale and other operations of the Pennsylvania Coal and Coke Co. the idle mines failed to produce their regular quota of 3000 tons per day. These are only a few of many mines affected. The action of the miners was widespread, and operators would do well to warn everybody in authority against spreading rumors about Allied success unless it is duly verified from Washington.

A number of excellent suggestions regarding the combating of Spanish "flu" have been spread broadcast by the Central Pennsylvania Coal Producers' Association. It might be well to add a few others: Avoid facing any person too closely when talking. Some people have an unpleasant way of crowding their faces into the faces of their friends when trying to enforce an argument. It is a rude and dangerous habit at any time and it is worse now than ever.

SHOULD AVOID COMMON TOWEL AND WASHBOWL

Avoid the use of the common towel. Your own manners may be cleanly, but you cannot tell how others have acted in using that public utensil. Avoid the common washbowl unless it has been sterilized or properly scalded. Some men make a practice of cleaning their nasal passages when washing, and merely pouring out the water does not cure the evil. The scum found on the sides of every washbasin shows that such cleansing is inefficient.

Where pillows are removed from beds for sunning and ventilation—and the practice is surely to be recommended—their exchange should be avoided. Every effort should be made to let every person have his own pillow, his own towel and his own washrag. Someday we shall not only have them, each for himself, but we shall have them properly marked so that identification will be unquestioned.

We should be wary of everyone. The "cured" may carry the germs. The fact that they are well may only show that they have built up a defense. They are not harmed any longer by the germs, but that is because they have the power to counteract any evil influence they might have on the person harboring them. It does not show that the germs are destroyed or incapable of infecting other persons. "Typhoid Mary," in perfect health, harbored typhoid germs for years and infected all who came in contact with her. She was finally interned.

PENNSYLVANIA SUFFERS FROM GRIP AND ALIENS

In seven places in central Pennsylvania the mines have been closed by influenza while as many more have had their production cut as much as 50 per cent. The mines closed were those at Wishaw, Eleanora, Florence, Soldier, McIntyre, Coal Run and Conifer. Ernest, Finleyville, Clymer, Dixonville, Rossiter and the Broad Top regions were operated with greatly reduced forces.

The people of central Pennsylvania and especially the miners are determined to exclude from the mines the unpatriotic enemy aliens who will not mine coal and are trying to make trouble. The Pennsylvania State Constabulary at Punxsutawney will help in the roundup. Samuel Lakatosh, an Austrian enemy alien, employed at the Potts Run Land Co.'s mine, at Boardman, was placed under arrest by Constable Thomas B. Reilly, of Clearfield, after a running revolver fight. This man mined only 16 tons for the month ending Sept. 21—about three ordinary days' work. He spent his time, not in mining coal, but in visiting his fellow aliens, declaring to them that they "had no business

getting out coal to kill their brothers in Austria." Personal notice is being served on some 300 or 400 Austrians that they must report regularly for duty and get out a full day's output or they will be interned.

The wage increases of the New River and Winding Gulf regions, granted at the close of last year, were based on the irregularity of the miner's opportunity to work. The mine workers readily saw that the increases should go only to those suffering by that irregularity. They were quite content that the "monthly men," who were paid as much whether the mines worked or were idle, should receive the same wage as before. But times have changed. The railroads are supplying all the coal cars needed, and the day worker now gets as steady work as he desires and quite a little more than some of the less diligent would wish to receive.

The monthly man, who was fortunately situated before, now feels he is discriminated against. The increase which was granted for the short time suffered by the day man, in his belief, is the right of the monthly man also. Thus wages climb steadily upward on the inequalities of our industrial situation. The mine workers of District No. 29, which embraces the New River and Winding Gulf districts, at a special convention held Oct. 8 at Beckley, passed a resolution notifying the operators that they would strike if the full wage increase of $1.40 a day were not granted to monthly men.

Monthly Men Want Increase of Day Men

So far there has been no strike and a vote on the question of striking is said to have resulted unfavorably to any such action. However, just consideration should be given to the increased cost of living, and the monthly men might well be granted an increase if it can be shown that they are entitled for this reason to an increased emolument. The shortage of miners has in most cases increased the "turn" in the mines so that not only more days' work are secured but more tonnage is put out per day worked. The contract miner is in clover and the monthly man should not be dieted on thistles.

The miners contend that under what is known as the "Washington agreement," as it was adopted at a conference November, 1917, the words "monthly men" were not inserted in the form in which they appeared in the original Washington agreement. The mine workers contend that the operators have taken advantage of this variation in phraseology and have refused to pay the advance of $1.40 a day to monthly men.

West Virginia is fast becoming unionized. It was formerly the stronghold of the nonunion operator. Now there are few parts without union locals. The change in the Fairmont (W. Va.) region has extended now to those mines in Kentucky owned by the Fairmont interests—the Consolidation Coal Co. Vice-president Petry of District 17 has just returned to Charleston from the Big Sandy section of Kentucky, where he spent several days recently. He organized on his trip the mines at Auxier.

Patriotic Miner Earns $716 in a Month

The largest wage paid in Monongalia County to any coal miner was probably that paid during the month of September to Lawrence Finzel by the Hartman Run Coal Co., whose mines are near Sabraton. The payroll of the company shows that he received $716.40 for the month of September. He loaded 417 cars or 730 tons during the month. In the first half of the month he loaded 201 cars and earned $281.40. In addition he earned $57 for labor performed Thus he received a total of $338.40 for the first two weeks in September.

In the last half he loaded 216 cars, earning $378, thus making the grand total — "grand total" is right — of $716.40. If he keeps up the rate Finzel will make $8596.80 a year, an annual income which few industrial managers can duplicate.

The miners of the United States Coal and Coke Co., on Tug River, are not content with the regular day's run. For three successive Saturdays these men have gone back to work after supper, and the result of their patriotic work has been the shipping to market of 20,900 tons more than would have been shipped had this sacrifice not been made. When one thinks how men look forward to Saturday, their sacrifice appears almost heroic. If you would visualize the result of the patriotism perhaps it can best be done by remembering that the output made by this overtime work would fill 418 railway cars of 50 tons capacity.

Reports of large earnings also come from the West. John Crawford, the state inspector of coal mines in Utah, states that the average wage in the mines of Carbon County will run between $10 and $15 a day. At present the men are working six days a week. A few exceptional men at the Black Hawk and Standard mine in July and August made each month as much as $455, $460, $530 and $533 for machine work. Under normal conditions it was exceptional for a man in Carbon County to make $100 a month. Now quite generally men are receiving $250 a month and even more. The shifts are only of 8-hour duration. The data at present available show that there is no probability of any shortage of coal in the region served by the Carbon County fields.

Must Have Good Houses for Mine Men

The drive to secure men at the mines, in which the union is participating, has moved Walter Nesbit, secretary and treasurer of District 12 of the United Mine Workers, (Illinois, in other words) to protest against overlooking the housing provisions whenever men are being sought. He does not believe that there is much need for a campaign when housing facilities are good, and the dwellings are as attractive as they are around Springfield. He suggests that the United States Employment Service should inquire into this matter when preparing to secure men for a plant.

"You cannot expect men to bring their families to live where there are no adequate housing accommodations," he said. "Even when they have no families, men who work



Courtesy of "The Retail Coalman"

LABOR MUST STAY, FOR COAL IS VITALLY NECESSARY

as hard as miners need to be decently housed. Men will not go to work where they have to live in tents and mine bunks if they have the opportunity to live where they can get better housing conditions."

Nesbit said an application has been made to him by an operator whose mine was at a distance, asking for a large number of miners, but when he found that the men would have to live in tents he would have nothing to do with it. But Nesbit and the other union officials will coöperate fully with the Government in its efforts to get former miners back into the mines. The efforts in the drive are to be concentrated mainly on that class. The many men who have left the mines in recent years will be reached through the unions and will be urged to return to the mines and remain there until the war has been won.

Anthracite Wage Increase Proposed

On his return from Washington, Oct. 12, James Matthews, president of District No. 9 of the United Mine Workers of America and hence a member of the Anthracite Conciliation Board and a member of the board which was formed to suggest the terms of a new wage scale, revealed the nature of the contract which had met with the approval of the latter board. This contract is to be submitted to a committee composed of the various War Labor Boards and then to Dr. H. A. Garfield, the United States Fuel Administrator. It seems quite sure of approval by both of them, and the scale will doubtless become operative if the mine workers do not oppose it as containing less than they desired in the matter of wages and pay for overtime.

The recommendations mentioned are as follows and are placed in juxta-position to the terms of the contract of Nov. 17, 1917, so that they may be readily compared:

Proposed New Anthracite Wage Agreement

a. Contract hand and machine miners shall be paid an advance of 40 per cent. on their gross earnings. b. Consideration miners shall be paid an advance of 25 per cent. plus $1 a day for each day worked. c. Contract miners' laborers shall be paid an advance of 40 per cent. on their earnings. As this increase of 10 per cent. over the agreement of Nov. 17, 1917, is less than $1 per basic shift, the difference between said increase of 10 per cent. in the rate and $1 per basic shift shall be assumed by the operator. d. Consideration miners' laborers shall be paid an advance of 25 per cent. plus $1 a day for each day worked. e. Day machine miners' laborers who received not less than $2.72 per day shall be paid an advance of 25 per cent. plus $1 per day for each day worked.

f. Outside blacksmiths, carpenters, electricians, machinists, foremen, hoisting engineers on shafts and slopes where employment is limited by law or by the award of the Anthracite Coal Strike Commission to 8 hours a day and engineers working on a 12-hour shift basis shall be paid an advance of $2 a day for each day worked. All other outside company men who received $1.54 or more per day, shall be paid an advance of $1.80 a day each day worked. g. Inside engineers and pumpers working on a 12-hour shift basis shall be paid an advance of $2.20 per day for each day worked. All other inside company men who received $1.54 or more per day shall be paid an advance of $2 per day for each day worked. h. All employees paid by the day who received less than $1.54 per day shall be paid an advance of $1.20 a day for each day worked.

i. Monthly men coming under the agreement of May 5, 1916, shall receive an advance per day for each day worked equivalent to that provided for their respective occupations under paragraphs f and g.

j. The advance of $2.20 a day, $2 a day, $1.80 a day, $1.20 a day and 25 per cent. plus $1 a day, provided above, are to be applied to a day whether 8 hours or more, as established under the agreement of May 5, 1916. Any proportionate part of a day to be paid a proportionate part of the advances herein provided.

k. The employees of stripping contractors paid by the day, working on the basis of a 9-hour shift, shall be paid the same increase per hour worked that is provided for outside company men working on an 8-hour basis.

The new scale provides an increase to contract hand and machine miners of 12 per cent. over the contract of Nov. 17, 1917. Consideration miners get an increase of $1 per day. Contract miners' laborers get an increase of 7.692 per cent. but as this is less than $1 per day, an increase of $1 is assured them. Consideration miners' laborers get an increase of $1 per day and so do such machine miners' laborers as received not less than $2.75 a day under the contract of May 5, 1916.

Outside engineers working a 12-hour day put a dollar more daily into their pockets. Outside blacksmiths, carpenters, electricians, machinists, firemen, hoisting engineers on shafts and slopes, where employment is limited by law or by the award of the Anthracite Coal Strike Commission to 8 hours a day, receive an increase of $1.10 a day. All other outside company men who got, under the contract of May 5, 1916, $1.54 or more per day ($2.54 under the contract of Nov. 17, 1917) now receive 90c. a day more than under the contract of Nov. 17, 1917.

Inside engineers and pumpmen working on a 12-hour shift get $1.10 more per day than under the agreement of Nov. 17, 1917, and all other inside company men who under the contract of May 5, 1916 received $1.54 or more per day ($2.54 under the contract of Nov. 17, 1917) now get $1 more per day than under the contract of Nov. 17, 1917. All day men who under the contract of May 5, 1916, received less than $1.54 a day ($2.14 under the contract of Nov. 17, 1917) get an increase over and above the contract rate obtained under the contract of Nov. 17, 1917 of 60c. per day.

The revisers of the old contract seemed to have approached the matter in a commendable spirit. The anthracite miners had a degree of justification in their demand for a better wage, if for one moment the fact be overlooked that they were bound by a contract that could not be broken without a breach of faith. It must be conceded that the scale was much lower than in the bituminous region and in many cases so much lower that it was impossible to explain the fact away satisfactorily by calling attention to the great inequality in the regularity of operation normal to the two mining regions. The old contract is as follows:

Anthracite Wage Contract of Nov. 17, 1917

a. Contract hand and machine miners shall be paid an advance of 25 per cent. on their gross earnings. b. Consideration miners shall be paid an advance of 25 per cent. on their earnings. c. Contract miners' laborers shall be paid an advance of 30 per cent. on their earnings. d. Consideration miners' laborers shall be paid an advance of 25 per cent. on their earnings. e. Day machine miners' laborers, who received not less than $2.72 a day, shall be paid an advance of 25 per cent. on their earnings.

f. Outside engineers working a 12-hour day, cross-shift and firemen shall be paid an advance of $1 a day for each day worked. All other outside company men, who received $1.54 or more a day, shall be paid an advance of 90c. a day for each day worked. g. Inside engineers and pumpmen, working a 12-hour cross-shift, shall be paid an advance of $1.10 a day for each day worked. All other inside company men, who received $1.54 or more a day, shall be paid an advance of $1 a day for each day worked. h. All employees paid by the day, who received less than $1.54 a day, shall be paid an advance of 60c. a day for each day worked.

i. Monthly men coming under the agreement of May 5, 1916, shall receive an advance per day for each day worked, equivalent to that provided for their respective occupations under f and g.

j. Advances of $1.10 a day, $1 per day, 90c. per day and 60c. per day, provided above, are to be applied to a day, whether eight hours or more, as established under the agreement of May 5, 1916; any proportionate part of a day to be paid a proportionate part of the advances herein provided.

k. The employees of stripping contractors, paid by the day, working on the basis of a 9-hour or 10-hour shift, shall be paid the same increase per hour for each hour worked that is provided for outside company men working on an 8-hour basis.

EDITORIALS

Importance of Spreading Safety Work

AS A result of the well-attended and well-managed Congress of the National Safety Council in St. Louis, safety in that city made remarkable progress. It will be remembered that the meeting lasted from Sept. 16 to Sept. 21. It was a remarkable week, with an unbroken record of security from fatal accidents, except when an intoxicated man fell from his wagon into an excavation. That was the only death from accident in St. Louis, East St. Louis, Madison, Granite City and Venice in the week lasting from 8:30 p.m. Sept. 14 till 12:15 a.m. Sept. 22—a remarkable record in view of the great business activity which the pressure of the war has engendered.

Just a year before, in those same cities, 24 lives had been lost from accident within a single week. In the week before the Congress met ten lives had been the toll from that cause. In the whole year 1917, 510 lives, an average of nearly ten a week, had been taken by accident. Yet in the entire week of the Congress but one life was lost.

The week was dubbed "Safety Week" by proclamation of the mayors of the five cities. The newspapers, within the limits permitted by the United States Government, which is trying to save print paper as well as lives, gave the safety movement admirable support. They could not print extras, or they would have done so; for they had made preparations to give the movement that kind of publicity.

It was heralded far and wide that the week of the Congress was to be a "No Accident" week. At all the schools, public and parochial, talks were given on safety. Every child took home a letter relating to accident prevention and a bulletin proclaiming the same good story. The churches preached safety; the Roman Catholic Archbishop of St. Louis advocated it in a pastoral. The police force had daily drills to emphasize safety and were for the first time assembled for a talk about the importance of that part of their duties. It is quite likely that these 1600 men, who were enthusiastically behind the movement, had much to do with its success.

There were moving-picture exhibitions advocating safety in the many parks and recreation grounds of the city. It is said that 100,000 workmen and their families saw these pictures, and at the moving-picture houses at least 50,000 persons saw the safety films. The 40,000 owners of automobiles received a letter on the need for caution, and with these letters went safety stickers for the wind shields of their conveyances. A half million pay envelopes with safety mottoes were used during the week by employers in paying their men. The fire department also gave exhibitions which stimulated the general interest. At all the clubs which met during the week, and some met on purpose, addresses were given on safety. The large civic clubs—16 in all—were thus approached in the safety campaign.

St. Louis thus received safety, not in the unwelcome guise of an admonition from a self-righteous employer, but as part of a great national campaign. It came to the St. Louisan and to his wife and children as a movement of his own. And he embraced it. It went to his home. He heard it from his wife and from the lips of his child; he was confronted with it when he went to worship on Sunday and when he met with his friends at his favorite club during the week.

In the mining districts we cannot get "Safety First" if we treat the problem as a cold business proposition. It must not only be given the touch of nature which makes us all akin, but it must be made universal. The words "Universal Safety," which appear on the seal of the National Safety Council, express the idea well. We cannot get real safety so long as we keep our efforts narrowed to the straightened limits of the plant.

It must go all through the mining village; it must take in every one, male and female, young and old, and it must include every occupation in which any of the habitants are engaged. It must come at every angle and radiate from every center—office, surface plant, mine, church, school, club and press. Some are best approached in one direction, some in another. Let the employer be broad, and remember that the worst form of propaganda is the direct approach from employer to employee. Yet despite its imperfections, the more direct course is the one easier put in operation and therefore has the greater advantages. But while seeking safety of the employee by direct methods the indirect method of interesting everybody and creating a universal spirit of safety should never be overlooked.

Cold-Weather Instrument Work

DUE to the effect of varying temperatures on transits and levels during cold weather, many an hour is lost in winter surveying work. When the transitman enters a mine the instrument is often at a temperature well below zero. As a result, a heavy sweat which turns to hoar frost breaks out all over the instrument; or, to speak more correctly and so satisfy purists, the vapor in the air condenses on the cold surfaces of the instrument and promptly congeals.

This sweat beclouds the object glass and eyeglass, and sometimes even gets between the double lenses of which the object glass is composed. This causes no little delay. A long sight through the inevitable fog on the glass is difficult or impossible, and the transitman is prone to put his instrument to one side while he does other work or "joshes" the men on the job until such time as the transit has reached a temperature more nearly approximating the temperature of the mine workings.

Perhaps he tries to clean the lens. This is a job that seems endless, for the temperature of the lens being

only slowly bettered the mist settles on it as fast as the moisture is removed. If the instrument man has set up his instrument, traffic on the road is suspended, and the working forces of the mine are delayed to little or no purpose.

But the cleaning of the lens may have a worse effect. All rags and cloths taken into a mine are apt to be dirty, either from the slate and coal dust which fall from the roof and rib respectively into the surveyor's pocket, or from the dust flying in the air, or, in the case of a handkerchief, from the dirt and dust rubbed from the face and hands. If a silk rag, a chamois skin or a banknote be used, the damage to the lens may be, it is true, so small as to be immaterial. But a dirty linen or cotton cloth is almost sure to scratch the lens when used for its cleansing. A few such cleanings, and the clarity of the lens is markedly destroyed.

The moisture, moreover, settles all over the instrument and lights on the graduations. These also are easily scratched, if wiped by an uncleanly rag. Furthermore, if the water were just pure water, it would not be so bad. It seems likely that it is rarely pure in mines where explosives are being fired and the air is full of smoke. Because of this smoke it is usually acid water, and it tends therefore to corrode the instrument. An unprotected vertical arc soon becomes almost unreadable, and even the effect on the horizontal limb is quite noticeable.

But there are other sad possibilities. The water gets between the horizontal plates, and if it does not dry before the transitman comes out of the mine the plates will freeze together, or at any rate enough ice will form between them to make their relative movement difficult. If, then, the transitman wants to measure an angle when he reaches the surface, he finds it either impossible or difficult. At times the instrument would rather screw off at the head than turn in the manner designed. It then becames necessary to light a fire or go into some house and warm the instrument before a stove.

In the house the steaming kettle has probably filled the air with moisture, and again the transit is coated with a film of liquid; and even if it does thaw out, it is no sooner asked to officiate than it freezes again and the situation is unchanged. Back to the house goes the transitman with his little train of aides.

This is all very well if the instrument man likes a warm spot, if he is not anxious to get his work done and if his company is cheerfully willing to put up with the situation. But transitmen are not always so disposed. They are busy men, and often work late at night and till the early morning; and even when they do their best they are regarded as abnormally slow.

So a little thinking on this difficulty would surely be well worth while. An instrument should never be allowed to get unduly cold on its way to the mines even when a long trip has to be made. A quilted hood should be provided for it, and even then this should be warmed before a start is made. The hood should be tied tightly about the tripod head so as to exclude the cold air. This hood would also serve to protect the instrument against dust.

The instrument will undoubtedly get cooled on its way to the mines, and if by chance it is cold enough to sweat, the best plan is to seek a warm place as soon as the work is reached. A warm, smokeless heading on the way to work is usually available, or some old working where decaying timber raises the temperature above the normal. It is useless to hold up the regular mine work by a chilly instrument which will not operate. The instrument man can usually find some work to do while the instrument is reaching a normal temperature, especially if he has planned his work before leaving the office.

Instruments quite frequently get wet from rain and melting snow. Every opportunity should be taken during cold weather to dry them out. Otherwise the plates and the screws, both for leveling and adjusting, will become gummed and the result will be that time will be lost. There is often far too much haste to get away in the morning. An instrument, warm and properly protected, is a *sine quâ non* for a good day's work in the mine.

The tendency of an instrument to become covered with moisture on entering a warm room and so to be unruly when taken out to work, if in the meantime it does not get dried out, furnishes a reason for tightly covering an instrument with a quilted hood before entering the office. A stand in which the instrument can be placed without boxing is, therefore, to be strongly recommended.

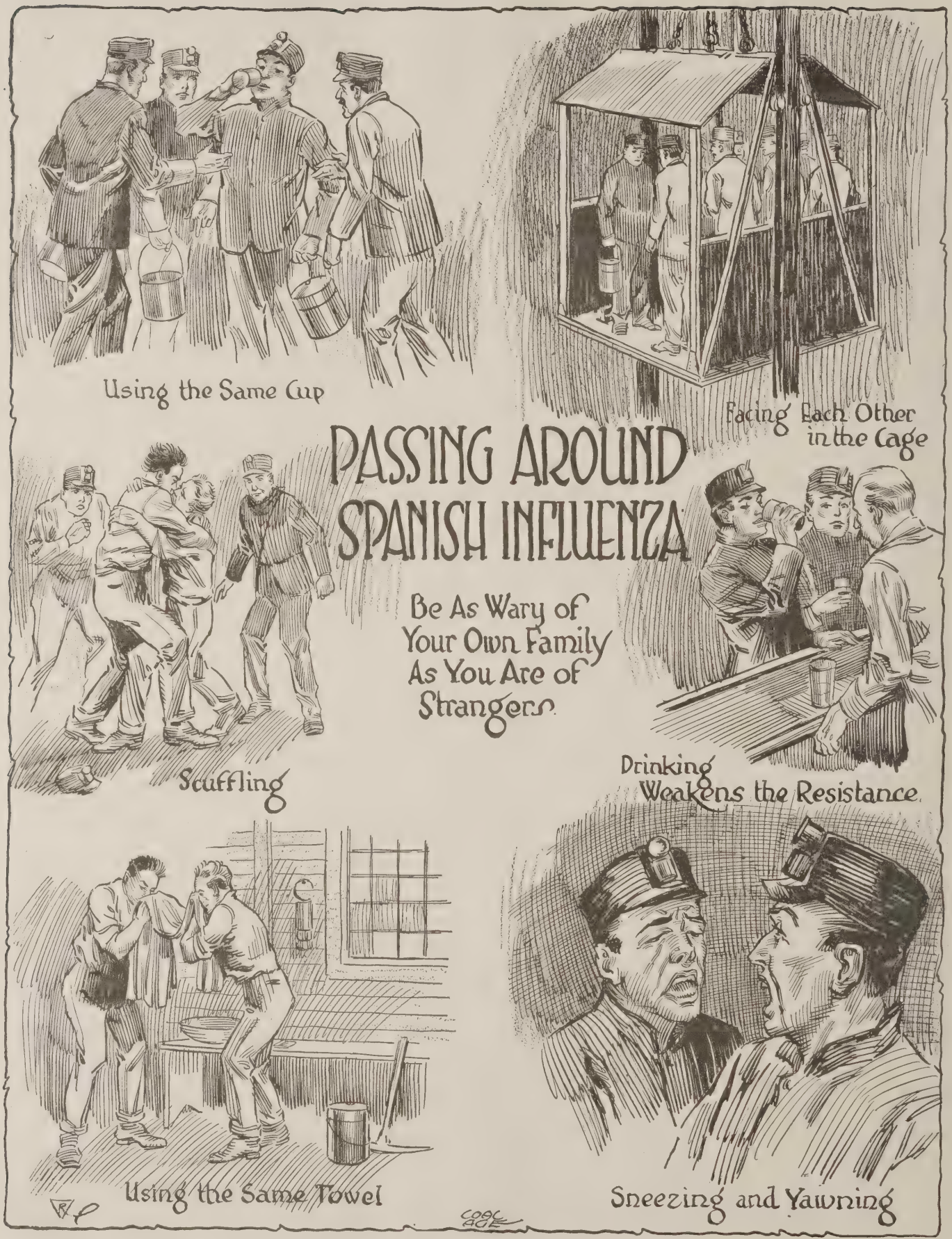
It does not seem orderly to use such a stand, but it is certainly better than to box a damp instrument or one that is dried out only exteriorly. In any event the boxing of a transit is at best a severely jolting operation and somewhat hard on the adjustments. Thus it is apt to affect them as badly as running with an instrument over the shoulder.

"Seeing the Boss" Wastes Time and Temper

WE HAVE long ago become accustomed to seeing idle miners in our trips around the mines. It seems quite natural on passing a room to find a disconsolate digger waiting for cars, or for the air to clear, or hunting the driver in the hope that he may get rails or props on the next trip. Some miners, there still are, who do not go home when the trip runs slow, but wait patiently for an opportunity to work.

In many mines the miner can see the boss only in the morning or in the evening, at both of which times that dignitary is little disposed to listen because he is too busy. For this reason, the miner often comes out during the working day to see if he can, by some means, get an interview and secure an understanding. But more often he comes out at that time because only on reaching the face is he confronted with the actual conditions of his work. The place has perhaps become flooded from a neighboring room. His tool box has been broken open and his carbide stolen. A big fall of rock has made it impossible to put cars at his working face. So he comes out to see the boss.

Where this trip is a mile or a couple of miles each way, it is a great waste of time, even should the boss be found without difficulty. Now, every superintendent knows how hard it is to secure a liaison with a foreman even when he is willing to be found, but it is far harder for a miner to find a foreman when that foreman is anxious to avoid an interview. This seeing the boss is a great waste of time and temper under the conditions too often obtaining.


PASSING AROUND SPANISH INFLUENZA
Be As Wary of Your Own Family As You Are of Strangers
Using the Same Cup
Facing Each Other in the Cage
Scuffling
Drinking Weakens the Resistance
Using the Same Towel
Sneezing and Yawning
COAL AGE

DISCUSSION BY READERS

Perplexities of Mine Foremen

Letter No. 2—With much interest I read the letter that appeared in *Coal Age,* Oct. 3, p. 656, dealing with a few of the perplexities of mine foremen. Surely, that official is sorely perplexed at times by little matters that it is beyond his power to control.

Taking advantage of the present situation in the coal field, many miners think that they are entitled to hold up the mine foreman for all that they can secure from him, and then some. Their patriotism does not prevent them from ceasing work for two or three days because of some trivial matter that calls for a little extra exertion or labor on their part. As a result, probably 30 or 40 tons of coal are lost to the daily output of the mine. They take this course, instead of working on, and allowing the matter to be adjusted in the proper manner.

The miner, today, is in a position to make more money than at any time in the history of the coal industry. It would seem, however, that the more some miners are paid for their work, the less willing they are to perform their share and keep things moving. The following incident that occurred recently at a mine in this district illustrates how a very small matter can interfere with the regular operation of a mine when a miner fails to put up with a little inconvenience on his part and do his share to keep the coal moving.

In the instance to which I refer, the machine runner had encountered a small roll when cutting the coal at the face of a room. Like the good cutter that he was, when starting to make another cut, he raised the cutterbar a few inches to avoid the roll. This left 4 or 5 in. of bottom coal that was not cut. When the miner entered his place the next morning, almost the first thing he saw was the thin layer of bottom coal that had not been cut. He at once started for the mine foreman and demanded that the cutter should return and cut out the coal so that he could lay his track, refusing to shoot down the coal if this was not done.

The foreman was at first surprised to see the condition of the place, but, on closer examination, discovered the roll and explained to the miner that the reason the cutter had not cut the bottom coal was to avoid running into the roll and breaking his machine. The foreman offered to pay the man for two hours' extra work for each cut if he would dig up the bottom coal enough to lay his track.

The miner seemed willing enough to do this for the pay offered by the foreman, but said that he would first have to see the committeeman who worked in the next place to him. Now, this particular committeeman had formerly run a machine, but had been taken off for indifferent work. The union, also, had elected him on the Production Committee for that mine, which gave him an idea of his own importance. He advised the loader not to touch the bottom, saying that he would see that it was taken up by the cutter. This, however, the foreman flatly refused to have done.

When the matter was referred to the Mine Committee, they decided that the loader was offered a fair price and should take up the bottom himself. Nevertheless, the committeeman previously mentioned induced the loader not to do this, and the matter was then brought to the notice of the Production Committee. At a meeting held in the mine office, the committee was informed that, owing to the difficulty, the mine was losing six cars a day. After hearing the case, the committee decided that the foreman was in the wrong, which was promptly denied by that official.

The superintendent, not wishing to delay longer in the matter, then took the loader aside, who, after a few minutes' talk, went back to his place. In one hour, the man had dug up the bottom and had his track laid ready to load his coal. For that work he was allowed four hours' pay.

Only recently, I attended a meeting of the Production Committee of the Indiana County mines, and listened to an address by Chas. O'Neill on production. In the course of his remarks, he stated that he wanted everybody to get a square deal. He insisted that the blame for non-production should be placed where it belonged, whether the fault was with the operator, the mine foreman, or the miner. He repeated that a mine foreman should get a square deal, when a voice in the audience rang out, "It can't be done." Few who are familiar with conditions existing in the mines today will deny the truth of this statement.

MINE FOREMAN.

Homer City, Penn.

Iron vs. Wood Mine Cars

Letter No. 1—Kindly permit me to give a little of my own experience in reply to the request for the opinions of readers in regard to the relative advantages of iron and wood mine cars. I have been connected with the mining of low coal for a number of years and can say, from actual experience, that the iron mine car is far superior to the wooden car, in every respect.

It must be admitted that the iron car is much more expensive in the beginning, but my belief is that it will always be found cheaper in the end. When an iron car is worn out, and is no longer of any use in the mine for hauling coal, it need not be thrown aside as having no value. The iron of the car body can often be used to advantage around a mine, or it can be sold as scrap iron for a fairly good price.

IRON CARS OPERATED IN LOW COAL

About eight years ago a company opened up a slope mine in a seam of low coal. They equipped this mine with 100 cars, among which were three made entirely of steel. The records show that during the eight years of continuous service not one of these three iron cars has ever been sent out of the mine for repairs and all of the three are still in use, doing good service. About

two years ago the same company placed an order for 100 more cars, and decided to make this order for iron cars only, the decision being based on the previous service of the three iron cars still in use.

Because of the way in which an iron car stands up under the severe service to which cars are subjected in the mines, less lost motion is developed and the haulage locomotive is able to handle a much larger number of cars than is the case when wooden cars are employed and these have been in use a short time. Moreover, iron cars are not derailed as often as wooden ones, because they are less liable to get out of line. The running gear of a wooden car that has been used but a short time is far less rigid than that of an iron car after the same service, and the car is more liable then to jump the tracks at a bad joint or on a sharp curve in the road. Again, it is necessary to inspect wooden cars more frequently and send them to the shop for repairs as quickly as any weakness develops, while an iron car will stand the same rough usage without showing any such weakness.

Iron Cars Possess the Important Advantage Of Being Dustproof

One advantage of iron cars over wooden cars is the fact that they are generally dustproof. If the oak used to make the wooden cars is not thoroughly seasoned it will shrink in use and the car will develop large cracks that permit the dust and fine coal to be scattered along the road. Another source of trouble, in the use of wooden cars, is the way in which the bumpers are often injured, making the car difficult to couple and causing much loss of time in making up trips.

Referring to the claim of some that iron cars when derailed are much harder to again place them on the tracks than are wooden cars, let me say that my experience with iron cars in low coal is that they can be replaced on the track more easily and quickly than wooden cars of the same capacity. The reason is that there is so much give in a wooden car that one must lift higher before the wheels can be brought over the rails, than when lifting an iron car back on the track.

Wood Cars Require Constant Repairs Owing to the Severe Conditions of Use

The use of an endless chain for hauling trips up a slope is very hard on wooden cars, as is also a direct steam dump when that forms part of the equipment on the tipple. Iron cars stand this hard service much better and are seldom injured, while wooden ones are frequently disabled. At our mine, when employing wooden cars, a man was kept busy all the time doing nothing else but repairing those cars, while the only thing that had to be done to an iron car was to occasionally straighten down a drawbar. An iron car of the same outside dimensions as a wooden one has a greater capacity. About the only wear on a steel car is that due to corrosion, and this is so small as to be negligible.

In closing, let me say that it is the opinion of most men with whom I have talked on this subject that steel cars are rapidly replacing wooden ones, in coal mining practice, and that they are far superior and more economical in the end.

John T. Cox,
Pensacola, Fla. United States Naval Air Station.

Man Power and Longwall Mining

Letter No. 2—It was with the deepest interest, but with some misgiving, that I read the letter of Joseph A. Greaves, *Coal Age*, Sept. 19, p. 564. The manner in which he describes some of the minor difficulties in connection with longwall mining is indeed amusing; but it occurs to me that he has omitted some of the far more weighty and important difficulties in connection with starting longwall work.

Like Mr. Greaves, my experience in longwall mining was obtained in mines in the North of England, where we had no troubles of the kind he has described as being due to the employment of miners of different nationalities. Let me stop long enough, here, to say that there must have been something radically wrong with the haulage arrangement, in the instance mentioned by my friend, when Tony and Mike would fall to fighting over a single empty where 20 carloads of coal were down ready for loading.

Now, I fully agree with Mr. Greaves in the belief that longwall mining has peculiar advantages where the conditions are favorable to its application, but there are a lot of things that must be first considered in order to insure the success of this method. As I have said, Mr. Greaves has seemingly overlooked these important features. However, it may be that the longwell mentioned in his letter was only in its infancy and had not reached a point where real trouble begins.

Success of Longwall Depends on a Right Start

Everything depends on the manner in which longwall work is started. One must be familiar with what is sure to happen if the work is not started right. Study well the conditions. Good judgment must be used in deciding whether it is better to take bottom or top for the packwalls. To make a mistake in this regard will give no end of trouble when the face has advanced a considerable distance and the weight of the overburden rests fairly on the packwalls. It is then that the roof will more than likely show a tendency to cut along the face. To overcome this difficulty, which would mean disaster, it is important to have large and well-built packwalls that will take the weight and throw it back on the solid coal.

My recollection goes back to the time when I was employed in a longwall mine where I gained the first ten years of my mining experience. In that mine, the seam was about 39 in. in thickness, and the packs would be squeezed down to 30 in. some distance back from the face. The packwalls were well built, bottom being lifted to supply the material for that purpose. The gateways were 36 ft. apart, center to center. Not a prop was permitted to stand in the gob, but the packs were built solid from one gateway to another.

The roof of the seam was a slate that could be readily taken down when this was required to make headroom on the roads. I never saw a wood chock set in any gateway, except at the corner of each gate, which is all that is necessary, I believe, provided the packwalls are well built. The work was all pickwork and no explosive was used except to shoot bottom. The work in this mine was entirely successful.

In contrast with the foregoing, I recall working in another mine where it was decided to start longwall,

in a single section of the mine. The conditions there seemed favorable and a pair of entries were driven far enough to start eight gateways. I think these were driven on about 70- or 80-ft. centers and the back entry was used to ventilate the longwall face. Men were set to work to slab both sides of the main heading its entire length. A wood chock was set at the corner of each proposed gateway, and the roof was shot down over the gateroad, the rock being used for packwalls.

This instance of longwall work would compare well, I believe, with that described by Mr. Greaves. "Coal getting" was the chief object for the first few weeks. Then the roof began to break along the face and settled hard on the packs, causing the cars to scrub both the sides and the top. The nightshift could not shoot down the top and build the packwalls fast enough, and it was no uncommon thing to see half the loaders digging bottom on the roads to get the cars into the face. Under these conditions, it will surprise no one to know that very much rock had to be loaded out. Altogether it was a miserable piece of work. I stayed there long enough to know that they had made a mistake in the start.

Let me repeat, then, in closing, start your longwall right and it will be sure to succeed if conditions are favorable. Do not expect to see the coal continue to pour out, as many do, in the first few weeks; but give attention to what is necessary to success in the future when the work is well under way.

McIntyre, Penn. THOMAS HOGARTH.

Hindrances to Coal Production

Letter No. 4—There may be a good deal of truth in the remarks of "Observer," made in his letter, *Coal Age*, Sept. 26, p. 612, where he speaks of men "passing the buck." The expression is seemingly intended to infer that men are prone to shift the responsibility from their own shoulders to those of others who are working under them.

Now, I believe I am in a position to know something of the inside workings of affairs, under conditions similar to those to which he has referred. As far as I am able to observe, the coal operator, today, is not leaving a thing undone that will help to increase the production of coal. Officials are ordered to "get out the coal," and reminded that it is up to coal producers to *win the war*. They are not sparing any reasonable expense, which is a secondary consideration at the present time.

During the past year I have attended meetings of all kinds, having for their object the speeding up of production. We all know that the expense sheet, in many cases has gone clean out of sight; but I have yet to hear a single official blamed on that account. The sole question asked is, "What are you doing to speed up production in your district?" If a machine is needed at the mine it seems only to be a matter of how soon it can be gotten. My observation is that operators, almost without exception, are anxious and willing to try out any system that seems feasible and promises to increase the output of the mine.

Speaking of miners and their loyalty to the cause in which we are all interested at present, only the other day the Pit Committee came to me with a small grievance. It was a trifling matter, and, after listening to their complaints and suggested remedy, I pointed out to them that what they asked would be a detriment to them and to all concerned. I urged them to give their thoughts to what would increase the production of the mine 10 tons a day. I told them that I would gladly act on any suggestion of theirs that had this for its object and would even be willing to pay them for it.

The interview ended with my urging them not to go to their meeting seeking to bring up some little matter that someone was prone to consider a grievance when other and more important matters should be coming before them. Above all, I asked them not to consider that the mine foreman and the superintendent were on one side of the fence and they on the other, but rather to regard all as on the same side and pulling in the same direction to accomplish the same purpose.

Patriotism of Miners Should Lead Them To Overlook Little Troubles

Let me suggest, here, if our miners all possessed the right feeling, there would be no need for the foreman or superintendent to wonder, the morning following a meeting held by the men, whether the miners were going to work or not. While I believe that the vast majority of miners are loyal to our common cause, things frequently occur that cause me to doubt whether many of them realize what true loyalty means, in respect to their attitude in relation to trivial and unimportant matters. I am led to think that ignorance of existing conditions is often the reason why miners allow these little matters to trouble them.

In reading the letter to which I have referred, it appears to me that the writer blames the management of the mine for a few of the miners producing but six, eight or ten tons a day, instead of 16, 18 or 20 tons, as shown by the weigh sheet. While I am not familiar with the mine to which he refers, or its management, I can tell him where 99 per cent. of the trouble lies.

Reflect, for a moment, on the fact that from 20 to 30 men often depend for the coal they can load the following day on what a single machine runner can cut the preceding night. If that man is idle, or meets with difficulties beyond his control, it is clear that the men will have little coal to load the next day. Or, when the machine is cutting the coal on the dayshift, it may happen that several places are cleaned up at the same time, and the men working in some of those places must then wait until the machine can reach them.

Difficulty Arises When Machine Men Lay Off

In a mine where there are 10 or 12 cutters, it is the foreman's biggest job to know if all of these men are in their places. Perhaps, two or three of them have failed to come to work and the foreman must hunt up men to run their machines. He may have to take men who know little how to run a machine and progress is slow.

It may be argued that every mine foreman should have two or three extra cutters available. Even when this is the case it will happen frequently that they are working in places where they can earn more money than by running a machine. Here, again, the foreman cannot be blamed because the men have not the coal to load.

Again, there may be two or three of the machines in need of repair, and the machine boss can only be in one

place at one time, so that here is another cause for delay and loaders must wait for their coal to be cut. In visiting many places where the coal is cut by machine, I have never yet found a mine where there is never any trouble and delay caused by the coal not being cut ready for the miners to load when they come to work. Trouble of this kind will cease when we have machines that do not get out of repair and machine runners that are not prone to lie idle when the notion takes them. We should not be hasty in blaming these troubles on the management, who are often helpless to avoid them.

McIntyre, Penn. THOMAS HOGARTH.

The Miner and His Pleasure

Letter No. 5—I read with much satisfaction and pleasure the letter of Thomas Hogarth, *Coal Age*, Aug. 15, p. 329, regarding the right of the miner to enjoy himself. Like him and others who have expressed the same sentiments, I feel that the miner should have all the pleasure possible, as long as he does not let it interfere with his work in the mine or keep him from doing his whole duty to his country.

Reference has been made to miners owning autos, and the suggestion was offered that this fact might lead many miners to neglect their work in the mine, for the purpose of taking long pleasure trips and visiting their friends in distant places. Let me say that I cannot think of any class of people who are more entitled to own and enjoy an automobile than the miner who works underground, shut out from the light of day, in order to furnish the coal needed in other industries and in the homes.

MINERS' NEED OF RECREATION

No industrial worker makes as great a sacrifice, in this respect, as the coal miner whose hours are spent, day after day, in the dark, damp and dangerous recesses of the mine. I have spent 13 years of my life in the mine, and I know that after a man has worked steadily for months in an atmosphere loaded with powder smoke and poisonous gases, he needs rest and sunshine. He must have recreation in the sunshine in order to build himself up and strengthen him for doing more and better work.

My observation is that miners who own automobiles are generally the very ones that are found most regularly in their working places. Almost without exception, the owner of an automobile is a man who, by hard and steady work, has saved enough money to buy his machine. He is not the man who will allow the pleasure derived from its use to keep him away from his work in the mine.

We all know that it has been a hard task to keep the miner in his place this summer. It is in the summer season that many miners are accustomed to take their hunting and fishing trips and be gone for a week or two at a time. But I have noticed that very little of this has been going on the past summer. A few would go off Saturday night and be gone all day Sunday, but Monday morning would find them back in the mines stronger and better fitted for their week's work.

I have frequently overheard miners remark that they would go fishing and stay a couple of weeks if it were not for the war and the fact that the boys who have gone from them need their help in the mine. Miners recognize that coal is needed to produce the shells and other war munitions required at the front and their conclusion is that, "If the boys can stand it in the trenches, we can stay at our places in the mine." Patriotism runs high among miners, the large majority of whom feel that they must sacrifice everything in order to be able to face the boys when they come home. This fact and the dread of being known as a slacker has worked miracles with the average miner.

Miners, as a class, are hard to understand, and often misjudged by those who are not acquainted with mining conditions. It is true that the miner is prone to be suspicious of everything that will take away his liberty, which he prizes highly. Because he is frequently seen on the street, before the hour for quitting work in the mines has arrived, the remark is often made that he should be at work in the mine, instead of loafing and wasting his time on top when the country is in such great need of coal. If the truth were known, however, the man referred to has completed his day's work and could do no more if he had stayed in his place in the mine. His work below being finished, he has come up to enjoy an hour or more of sunshine that will fit him for work the next day.

A GOOD MINER UNJUSTLY CRITICIZED

An instance of this kind occurred not long since when a traveling man pointed to a large stout young fellow, a miner, who was resting in the shade an hour or so before quitting time. The traveling man remarked, "That fellow should be in the mine loading coal instead of loitering there." On being told that the man had loaded a day's turn and a good one at that, and that he could not have loaded any more coal that day had he remained in his place in the mine, the traveling man showed his ignorance of coal mining by remarking further that he thought every coal miner was supposed to stay in the mine and work eight hours' full time.

Criticism of this kind and articles of a similar nature that appear in the daily press, from time to time, do the hard working miner a great injustice. He is accused of idleness when his day's work is done and he takes his much-needed recreation in the fresh air and sunshine above ground, which alone can fit him for steady work, day in and day out. He is denied a vacation and the right of many enjoyments in life, by an unfeeling public, who know only of the great need of coal and are unfamiliar with its getting. As in the incident I have just mentioned, many who are so willing to criticise the miner for taking a little pleasure might themselves be employed in a more useful business. Many of them might, with a little training, enter the mines themselves and help to get out the coal.

My word, in closing, is that the miner should not only be given all the rest and sunshine possible, but encouraged to take it, in order that he may remain healthy and able to give the country his best service, every day that cars are on the track and his coal is cut ready for him to load. More often it happens that no cars are set in his place or his coal is not cut.

Cleaton, Ky. OSTEL BULLOCK.

INQUIRIES OF GENERAL INTEREST

Locating the Coal Beyond a Fault

Kindly permit me to describe briefly an experience we had recently in one of our mines, hoping that it may lead to a discussion that will not only prove helpful to ourselves but be of interest to others.

In Fig. 1 is shown the general plan of the entries, together with numerous cross-sections taken at the several points indicated on the plan, while Fig. 2 represents roughly a profile or vertical section taken on the line of the main headings. The profile shows two seams opened by drifts. As indicated in the figure the drift in the upper or "X seam" has been driven 2000 ft. where it intersected a fault.

As shown in Fig. 2, the lower or "Y seam" underlies the X seam, from which it is separated by 55 ft. of rock strata. Although practically level, both of these seams have a grade of 4 per cent. in favor of the loaded cars. As indicated in the figure, the drift or main heading in the Y seam is driven less than half the distance reached in the upper seam.

As appears in the general plan, Fig. 1, the main-drift headings in the X seam, are driven three abreast. The middle one, being somewhat in advance of the other

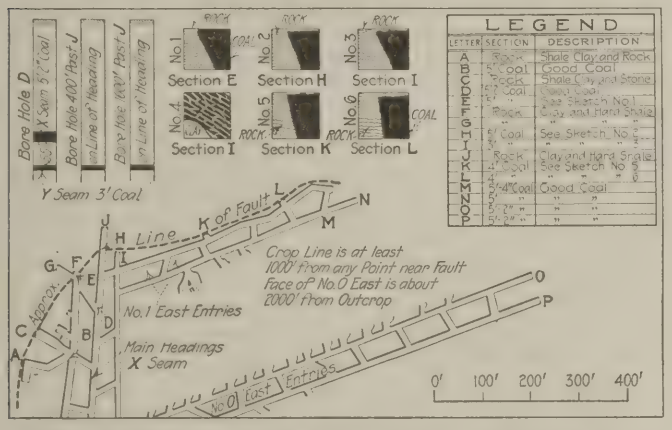


FIG. 1. PLAN OF MINE AND DETAIL OF FAULT AND BOREHOLES

two, was the first to encounter the fault, which was of such peculiar sharpness that work there was stopped until the other two headings reached the fault. It was thought that they would establish the approximate line of the break and show, by the character of the strata beyond, whether the fault was an upthrow or a downthrow and help to ascertain the approximate amount of the displacement. However, when the two side entries struck the fault, the results were so indefinite and unsatisfactory, that it was determined to drive No. 1 *E* heading along the line of fault, and prospect the district by driving holes *K* and *L* directly into the fault.

We were now enabled to obtain cross-sections at the face of each of the three main headings and the holes driven to the fault at *K* and *L*. These cross-sections are shown in detail in the sketches Nos. 1, 2, 3, 4, 5 and 6, Fig. 1. Each of these sections is shown looking toward the right rib and the line of slip between the rock and the coal is clearly indicated in each, except in sketch No. 4 where the section is taken looking directly at the face and shows only rock strata above and a clay vein at the lower left-hand corner close to the rib.

After studying these sections carefully for a time, and being unable to obtain from them the definite information desired, we attempted to locate the coal beyond the fault by driving short boreholes up and down, in the face of each of the main headings. But these holes failing to show the presence of the coal, we next put down two boreholes, one 400 ft. and the other 1600 ft. ahead of the face of the main headings, as indicated on the profile, in Fig. 2. As there shown, the first of

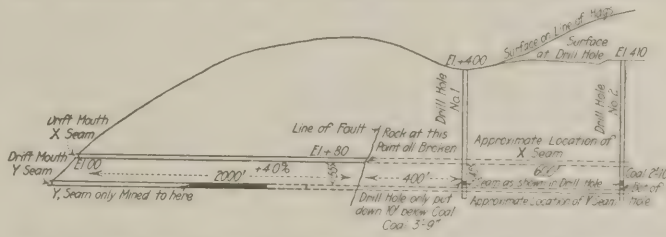


FIG. 2. APPROXIMATE PROFILE ON LINE OF HEADINGS

these boreholes struck coal, 3 ft. 9 in. in thickness, at a depth that was approximately 45 ft. below the level of the X seam. This hole was put down only 10 ft. below that coal and further drilling was stopped.

The second borehole, 1600 ft. ahead of the face of the main headings, struck 2 ft. 10 in. of coal, at approximately the same level as that shown in the first borehole. It was thought, at the time, that these two boreholes had failed to locate the X seam, and that the coal struck was probably the Y seam. The Y seam, however, rarely shows 3 ft. 9 in. of coal, the average thickness of that seam being from 2 ft. 9 in. to 3 ft., in this region. The appearance of the strata at the face of the main heading, in the fault, indicates that the strata had been subjected to a tremendous pressure, as the rock there is much broken.

We are particularly anxious to get from *Coal Age* and its readers their opinions in respect to this fault. If it is not possible to locate the continuation of the X seam, it will mean a large loss to our company.

Johnstown, Penn. SUPERINTENDENT.

From the information furnished by this correspondent, it is the opinion of *Coal Age* that the fault is a downthrow. Our belief is that the coal struck in the two boreholes sunk from the surface is the continuation of the upper or X seam. Had the borings been carried a few feet deeper they would probably have found the Y seam below. Assuming the elevations given to be correct and making due allowance for the 4 per cent. rise in the strata, the indication is that this fault is a downthrow of approximately 45 ft. We hope to receive the opinions of others.

EXAMINATION QUESTIONS

Miscellaneous Questions

(Answered by Request)

Ques.—An anemometer registers 30,000 cu.ft. velocity per hour, in an airway 8 x 5 ft. What is the volume of air passing per minute and how will you ascertain whether the anemometer is in good working order?

Ans.—The question probably intends to say that the anemometer registers a velocity of 30,000 ft. per hour, which would be 30,000 ÷ 60 = 500 ft. per minute. Then, assuming that this is an average velocity for the entire section of the airway, the sectional area being 8 × 5 = 40 sq.ft., the volume of air passing per minute is 40 × 500 = 20,000 cu.ft. per minute.

An anemometer, in constant use, should be returned to the factory once in every one or two years, for the purpose of testing its calibration and determining the accuracy of its readings. A rough method of checking the reading of an anemometer in a mine, however, is the following:

Select a straight piece of entry 100 yd. in length where a good current of air is passing. Starting from the point of observation where the reading of the anemometer is to be taken, measure off this distance in the direction the air is traveling and place a man at that point. Now, expose the anemometer to the air current in the center of the airway, holding the instrument at arm's length so that the flow of air through it will be unobstructed.

With a watch in one hand, let a small flash of powder be touched off at the instrument and note the exact time by the watch when this is done. The powder should be in a position such that its smoke will be borne on the air current in the center of the airway. The observer at the other end of the stretch, 100 yd. distant, signals when he first detects the smoke of the powder at that point, and the time interval is noted by the watch. For the purpose of a check, the second observer also notes the difference in time between the flash of the powder, which he observes, and the time when he first detects the smoke.

The anemometer is now held exposed for the full length of the minute and its reading taken. Assuming the reading shows a velocity of 500 ft. per minute, the interval of time between the flash of powder and the detection of the smoke 300 ft. distant should be $\frac{3}{5} \times 60 = 36$ seconds, which would indicate that the reading of the anemometer is approximately correct. It is needless to say that this observation for determining the correctness of the anemometer reading should be made at a time when the mine is idle and the circulation of the air normally regular.

Ques.—With a fan of 30 hp., from which you are obtaining only 50 per cent. useful effect, while the water gage stands at 2.3 in., what quantity of air per minute should you get?

Ans.—With 50 per cent. useful effect, the horsepower on the air is one-half that developed by the fan, or 15 hp. Ventilating under a 2.3-in. water gage, the quantity of air circulated by 15 hp. is

$$Q = \frac{33{,}000H}{5.2w.g.} = \frac{33.000 \times 15}{5.2 \times 2.3} = 41{,}390 \text{ cu.ft. per min.}$$

Ques.—(a) What is the general efficiency of a fan? (b) If the horsepower of an engine is 40 and the water gage 1.5 in., what quantity of air wil you expect to get?

Ans.—(a) The general efficiency of a mine ventilating fan, including that of the engine driving the same, may be stated as varying from 60 to 80 per cent., depending on numerous conditions.

(b) Assuming in this case the combined efficiency of the fan and engine as, say 60 per cent., the engine developing 40 i.h.p., the power on the air is 0.60 × 40 = 24 hp. The quantity of air circulated by this power against a water gage of 1.5 in. is calculated by the formula

$$Q = \frac{33{,}000H}{5.2w.g.} = \frac{33{,}000 \times 24}{5.2 \times 1.5} = 101.540 \text{ cu.ft. per min.}$$

Ques.—(a) What pressure and power would be required to produce and maintain an air volume of 150,000 cu.ft. per min., through an airway 8 x 10 ft. and 3000 ft. long? (b) What would be the total power exerted by the fan engine if 70 per cent. of the power was expended on the air?

Ans.—(a) First find the sectional area, rubbing surface and velocity of the air as follows:

Sectional area, $a = 8 \times 10 = 80$ sq.ft.;

Rubbing surface, $s = 2(8 + 10)3000 = 108{,}000$ sq.ft.;

Velocity, $v = 150{,}000 \div 80 = 1875$ ft. per min.

The pressure per square foot producing a circulation of 150,000 cu.ft. per min. in this airway is then

$$p = \frac{ksv^2}{a} = \frac{0.00000002 \times 108{,}000 \times 1875^2}{80}$$

$$= \text{say } 95 \text{ lb. per sq.ft.}$$

The power producing the circulation is found by multiplying this unit pressure by the quantity of air in circulation and dividing the product by 33,000; thus,

$$H = \frac{Qp}{33{,}000} = \frac{150{,}000 \times 95}{33{,}000} = 431+ \text{ hp.}$$

(b) Assuming that the power on the air, as just found, is 70 per cent. of the total power exerted by the engine driving the fan, the latter is 431 ÷ 0.70 = 615 + hp.

Ques.—What would be the current required for a motor of 25 hp., at a pressure of 500 volts?

Ans.—Since one horsepower is equivalent to 746 watts and the current (C). in amperes, is aqual to the voltage (W) divided by the pressure or electromotive force (E), in volts, the required current, in this case, is

$$C = \frac{W}{E} = \frac{746H}{E} = \frac{746 \times 25}{500} = 37.3 \text{ amp.}$$

It is assumed in this solution that the motor is developing its full rating of power.

COAL AND COKE NEWS

Harrisburg, Penn.

In an opinion handed down by presiding Judge Kunkel, on Oct. 16, the intimation is made that a treaty between the United States and Italy may invalidate the Workmen's Compensation Act of this state. There is a provision in the act that non-resident aliens cannot collect compensation under the state law, and the contention has been raised that under the treaty relations with Italy, Italian subjects have the same rights in the courts of this nation as American citizens. If this contention is correct, the Judge stated that the provision in the act cannot stand. By ruling that the Dauphin County court had no jurisdiction in the case, the judge was not required to decide the question of the validity of the act.

The facts in the case in which this interesting question arose are as follows: The parents of Giuseppi Liberator reside in Italy, and he was killed in this state. The parents brought suit for compensation through their representative in this country, and sought damages. No claim for compensation was made to the Compensation Board because of the provision in the act, and when it came before the Judge, he ruled that the court had lack of jurisdiction.

The time limit for presenting the claim to the Compensation Board has now expired, and it is too late to take action before it. If the case had been heard by it, and appealed to the court, the question of the validity of the act would have been decided.

Whether the State of Pennsylvania goes dry and remains so until the end of the war, as a war measure, is up to the wholesale liquor dealers of the state. Unless they cease to supply "speak-easies" in the coal regions, the United States Government will declare Pennsylvania a military zone and shut out all liquors, particularly in the soft-coal fields. None of the licensed wholesale and retail dealers now closed by order of the State Board of Health to prevent the spread of influenza will be permitted to reopen, and this state will join the list of permanently dry ones.

The decrease of production due to the influenza has become serious. In the Central Pennsylvania district it amounted to 250,000 tons the last two weeks. Coupled with this is the loss due to drunkenness. There are more than 1200 mines in this district. If only one man at each mine were idle it would mean 1200 tons daily and a loss in tonnage of 6000 tons a day. The average of idleness due to liquor is considerably greater than this. The loss of production in the anthracite region due to the influenza is estimated at about 25,000 to 35,000 tons daily.

Uniontown, Penn.

That liquor is a serious hindrance to the production of an increased tonnage of coal is conclusively proved in the weekly report of Manager of Production W. L. Byers for the week ended Oct. 12. During that period the imposition of health orders due to the Spanish influenza epidemic closed every saloon, distillery and brewery in the region and provided the first opportunity in history to put to the test the operators' contention that the unlimited distribution of liquor reacted against the man-power efficiency of the region.

Another new high record for the Connellsville region was established during the week, the output of 749,384 tons in terms of coal topping the previous high record for the week ended Sept. 18 by 4541 tons. The gain of 31,547 tons as compared with the production for the week ended Oct. 5 is credited almost entirely by fuel administration officials to the declaration of the "dry zone" by the state health order.

The battle between opposing financial interests for the control of the Thompson Connellsville Coke Co., one of the "war brides" of the Connellsville coke region, will be settled in open court under the supervision of Judge J. Q. Van Swearingen, presiding judge. Judge Van Swearingen on Saturday, Oct. 19 filed an opinion and order in which he directed that the annual meeting of the stockholders for the purpose of electing officers and directors be held in open court. The annual stockholders' meeting was originally scheduled for May 6 last but was restrained by an injunction when the present controversy developed.

Balance of voting power to control the election seems to rest in a block of 2500 shares of stock, involved in the J. V. Thompson tangle, which was placed as collateral to secure his indebtedness with a Pittsburgh banking institution. J. H. Hillman, Jr., a prominent Pittsburgh operator and coal broker, who has recently acquired extensive interests in the Fayette County region, purchased the block of stock a few days before the scheduled meeting of the stockholders but was denied the right of transferring it to his name for the reason that the stock transfer books had then been closed until after the election. Harvey R. Worthington and others then petitioned the Fayette County courts for an injunction, and at the hearing Mr. Hillman entered into the controversy as one of the plaintiffs.

In the decision just filed Judge Van Swearingen finds from the evidence offered that unless the court exercises its powers to supervise and control the corporate election for directors there is real danger that the meeting of the stockholders will be subject to confusion, disturbance and disorder, and that the election will not be fairly, impartially and legally conducted.

The trouble began when the majority of the present board of directors desired to make distribution of large sums of money as dividends to the stockholders, while the other directors insisted on first paying the company's indebtedness. The company has a capital stock of $3,000,000. It owns large coal properties in Fayette County and conducts extensive mining operations. John P. Brennen is president of the company and W. G. Rock is secretary and assistant treasurer. Other members of the present board of directors are John M. Reyburn, A. S. Livengood, J. V. Thompson, Edward R. Jenkins and Andrew A. Thompson. The court did not name a date for the stockholders' meeting.

Charleston, W. Va.

Operations in the Fairmont district are still wrestling with late placements and a very meager car supply. For instance, on Oct. 12 there were only 798 cars in the region and only 503 were placed by 7 o'clock. The day before, despite the fact that only 500 cars were placed by 7:00 a. m., 1095 cars were loaded. Car service in the Fairmont region has been about as poor as it could be for the last two months or more, and the production loss has consequently been very large through no fault of the operators or miners.

Decreases in production have followed in the wake of sickness in the Kanawha district, although the tonnage produced even under such a handicap is greater than it was at any time during September. As if a labor shortage were not enough, for the last three days of last week there was an acute car shortage, attributed by the Chesapeake & Ohio to the fact that so many engines were in shop. Tonnage figures for the week ended Oct. 12 show 171,096 tons of coal produced, this being a reduction in the output of 33,000 tons. It is easy to put one's finger on the trouble as the total number of hours worked was only 5228, hours lost from labor shortage being 556 and from car shortage 1155. Spanish influenza was on the rampage in certain parts of the district.

Through causes over which neither miners nor operators have any control it is doubtful if the mines of the Tug River and Pocahontas districts are able to reach the two-million ton production goal set for October, although a herculean effort is being made to achieve such a result. Up until the 12th shipments of coal had aggregated 14,129 cars. Taking into consideration the reduced man power in the district and the prevalence of Spanish influenza, the record so far is considered very good. There are 1800 cases of influenza in the two fields and 2600 cases among railroad employees. An increase under such conditions indicates how hard the men are working to reach the quota fixed by the Federal Fuel Administration.

With Spanish influenza spreading very rapidly in both the Tug River and Pocahontas districts, the output of 462,757 tons, for the week ended Oct. 12, even though a decrease of 6975 tons as compared with the previous week, is considered very good. The epidemic has not only affected the mining industry but also the railroads.

The total production in the New River and Winding Gulf fields the week ended Oct. 12 was 298,887 tons, which was an increase of 14,300 tons over the preceding week, the preceding week, however, having shown a decrease over the week previous. The increase was accomplished despite many obstacles. At least 1000 tons was lost at one mine through a wreck. Another wreck in the New River field curtailed production by at least 1500 tons. It is estimated that influenza in the mining districts is causing at least a 10 per cent. loss in production in the New River and Winding Gulf field. The same disease has also affected the railroads, the movements of trains being seriously interfered with.

Birmingham, Ala.

Mining operations in this district are not being affected to any appreciable degree by the wave of influenza which is sweeping the country, despite alarming reports to the contrary. This statement is borne out by the coal production figures for the week of Oct. 5, which have just been released by the Federal Fuel Administration bureau, showing a production of 409,022 tons of coal mined during the week. This is a substantial increase compared to the figures of the week previous, when an output of 383,067 tons was recorded. For the week ending Oct. 12 unofficial estimates show a further increase in output.

Beginning of a limited service by the Federal Railroad Administration of the Warrior River Barge line is affording opportunity for the movement of bunker coal from mines along the river which have no other means of getting their product to the markets. The Payne's Bend mines of the DeBardeleben Co. are now shipping upward of 200 tons of coal per day via barges, while the Franklin Coal Co., on the Locust Fork branch of the river, is shipping coal that was accumulated before the river transportation system was inaugurated. Full service on the river is to be started within another three weeks.

Transportation companies in the district are working hard to keep pace with the demand for service being made by consumers, and as a result car service in the coal section is somewhat improved, though there is still some room for complaint.

PENNSYLVANIA

Anthracite

Shenandoah — The main office of the Thomas Colliery Co., operated by the Madeira Hill Coal Co., of Philadelphia, was destroyed by fire on Oct. 9, together with records, important maps and valuable papers. The fire was caused by crossed electric wires. The breaker was saved by the heroic work of firemen.

Carbondale—Purchased at sale in bankruptcy on Aug. 22, 1917, for $40,000, the property of the West Mountain Coal Co., comprising in all 684 acres on the surface, and including large quantities of mine equipment, dwelling houses, barns, etc., and two large culm banks, holding thousands of tons of coal, has been sold to Max B. Smith and James V. Pinazzi, of Brooklyn, N. Y., for $93,000.

Minersville—The influenza epidemic situation here is appalling. Application was made to the state authorities for martial law, and it is expected the town will soon be under full control of the State Police. The local authorities say the situation is entirely beyond them. Corpses are being found which have been lying in houses for several days without attention, and sick and dead are being found together. It is expected to completely isolate the town. Graves cannot be dug fast enough on account of the scarcity of labor, and friends and members of families are being called upon to perform this work.

The Buck Run colliery, on which the town depends for support, has been compelled to close down.

Bituminous

Uniontown—As the result of a personal request from Fuel Administrator Garfield about 95 per cent. of the miners and the men employed at the coke plants worked on Liberty Day.

Greensboro—The Greensboro Coal Co. has received a permit to construct a coal tipple on the left bank of the Monongahela River at this place, about 2½ miles above lock No. 7.

Savan—The tipple at the new operation of Lowther & Davis, of Indiana, was put into commission this week. The mine is opened on the Hamilton tract in the Upper Freeport vein. The capacity is about 100 tons per day at the present time.

Blairsville—The Davis Coal Co. has opened a new mine on the Campbell farm near Smith Station to secure a block of coal which could not be reached from the old mine. The new mine has a production of about one car per day at the present time.

Pittsburgh—The tract of coal known as the Murray holdings and owned by Leander G. Edward, and Bertram G. Murray, comprising 155 acres in Frazier Township, has been sold to the Crucible Fuel Co. of Pittsburgh, a subsidiary of the Crucible Steel Company of America. The consideration was not mentioned.

Greensburg—Believing that a long "dry spell" is to be established, Italians and Austrians, particularly, are purchasing grapes in carloads in the mining sections in this county for conversion into wine. Reports from the "moonshine" sections in the Laurel Hill Mountains indicate a revival in the "mountain dew" business.

Brookville—Application will be made for a charter for a coal company to be known as the Sunday Hollow Coal Co., by Ira J. Campbell, Joseph B. Henderson and John E. Geist. Several hundred acres of coal have been purchased near Putneyville, in Armstrong County. The vein has been tested by drilling and the coal is said to be of a good thickness and fine quality. A switch will be put in, tipple erected, and the mine made modern in every respect. It is doubtful if the mine will be ready to produce coal this year.

Altoona—The Russett Coal Co., which supplies a large portion of the commercial and domestic coal used in Altoona, has started to electrify its mine and is installing electric shortwall machines. A new drift has been started and a tramroad proposed from this drift to the Buckhorn road. This will place the operation about four miles from the city on a downgrade haul. It will relieve the fuel shortage in Altoona, as the new operation will have a capacity of 500 tons daily. No railroad shipments will be made from this mine, all being hauled to the city in trucks.

WEST VIRGINIA

Dana—The shipment of coal from the plant of the Dana Coal Co., on Campbell's Creek, was begun last week. The plant was only recently completed. H. A. Jepson of Marting, will act as general manager.

Acme—In order to protect its Acme mine against any damage from floods, the Cabin Creek Consolidated Coal Co. of which Josiah Keely is general manager, is having a mile of rip rap work put in.

Charleston—A lease from Queen Land Co. conveying a tract of 1004 acres of Big Sandy district coal land to Kanely Coal Co., has been filed for record in the county clerk's office. The lease runs 20 years at a royalty of 10c. a ton.

Charleston—By Jan. 1 the Burch Fork Coal Co. expects to have its plant on Marsh Fork, in the Kanawha district, in operation. Construction work is being pushed under the direction of L. C. Lilly, the general manager of the company.

Ohley—A number of improvements have been made at the plant of the Coal Fork Coal Co. at Ohley on Cabin Creek, including the installation of a new motor and mining machine, the company also having put up a substation. The superintendent at this plant is S. W. Smith.

Clendenin—After several months' construction work, the new plant of the McBower Coal Co. at Clendenin, on the Coal & Coke, is almost ready for operation and it is probable that the shipment of coal will be begun in a few days. The general manager of the company is Max Goldman of Clendenin.

Laing—New equipment being added to the Berlin plant of the Wyatt Coal Co. at Laing, on Cabin Creek, includes an electric hoist, the company being engaged in making such improvements as may be necessary, under the supervision of James Martin, superintendent, to increase the company's output.

Fairmont—An agreement has been entered into between the United States Government and the Domestic Coal Corporation, recently chartered under the laws of Delaware, under the terms of which the Government will build the plant, now in course of construction at the old Fair Grounds here, but the corporation will operate the plant.

Fairmont—Spanish influenza has cut into the coal production considerably. The disease is prevalent everywhere in West Virginia and no coal fields have escaped. The Fairmont fields lost 20 per cent. in production the first two weeks of October, owing not so much to the disease in the mines, though the disease has since obtained a foothold, but to the interference with railroading. The Norfolk & Western fields, where the car supply has not been a source of worry, could not escape the epidemic and many mines are practically closed. The Chesapeake & Ohio field, which has had a good car supply recently, is crippled both as to railroad men and miners. The Big Sandy and Elkhorn districts of Kentucky, which adjoin one corner of West Virginia, suffers to such an extent that the output has been reduced 50 per cent. There are 1917 cases at Jenkins, Ky., where the Consolidated Coal Co. has one of the largest operations in the Big Sandy field.

Moundsville—An ineffectual effort was made the night of Oct. 11 to burn the tipple of the Panama Coal Co., near here, waste saturated with oil being found at the base of the tipple by members of the night crew who were leaving the mine when Night Watchman Hendricks gave the alarm.

INDIANA

Sullivan—Clyde Philips, a miner at Glendora, fell from the top of the mine tipple to the bottom of the sump, a distance of 125 feet, and escaped with only a fractured knee and a broken collar bone. He was doing repair work in the tipple when the bucket was drawn up from the shaft, knocking him from his position.

Oglesby—Members of Oglesby local union No. 929 have drafted resolutions asking for the opening of the mine of the Oglesby Coal Co., which was closed by a permanent injunction brought about by litigation of the Marquette Cement Manufacturing Co. The mine workers represented that many of them owned their homes in Oglesby and that they wished to remain there. It was also pointed out that the operation of the mine at this time would help the country.

ILLINOIS

Orient—The Orient No. 1 mine of the Chicago, Wilmington and Franklin Coal Co. hoisted, prepared and loaded for shipment during the week ended Oct. 12 a total of 32,514 tons of coal. The average output—5419 tons—was larger than any single day's output of any other mine in the southern Illinois field. On Oct. 10, with 738 men reporting for work, the mine hoisted 6008 tons, which is believed to be the largest single day's output ever reported.

Duquoin—Duquoin is to have a $200,000 hospital as the gift of Mrs. Lillie F. Browning who died recently while on a visit to Oklahoma City, Okla. In her will, which has been filed, she makes a bequest for that purpose and further directs that a trust fund of $40,000 is to ultimately go to the hospital. The institution will be named the Marshall Browning Hospital, in memory of her husband, who was president of the St. Louis & O'Fallon Coal Co., the St. Louis & O'Fallon Railroad Co. and the Western Anthracite Coal and Coke Co. He died in 1908.

Bethalto—The Bethalto Coal and Mining Co. has been organized to take over the right to the Spencer mine on the Munsull place near here, the shaft of which has been filled with water for twenty years. When the shaft was sunk by John Spencer so much water was found that under the conditions then prevailing the mine could not be profitably operated. But it is different now. The new company, headed by George Prescott, has pumped out the shaft, made repairs and put the mine in operation. There is a 6-ft. vein under a rock top at a depth of 70 ft. The rights cover 175 acres.

Staunton—Five robbers held up the office force of the Mt. Olive and Staunton Coal Co., near here, Tuesday afternoon, Oct. 15, and escaped with $13,300 payroll money. The robbers drove up to the office in an automobile and while one stayed in the machine and another acted as lookout, the other three entered and with drawn revolvers drove three clerks, Otto Awe, Robert Barr and Frank Ballwek, into a vault. H. O. Panhorst, auditor and cashier of the company, was then bound to a chair with baling wire and two other men in the office, Charles Miller and Peter Schultz, were lined up against the wall. The robbers gathered the money from Panhorst's desk and drove away in the direction of St. Louis. When an attempt was made to use the telephone to give the alarm the wires were found to have been cut. The company has offered a reward of $500 for the capture of the robbers.

KENTUCKY

Drakesboro—The Black Diamond Mining Co. is installing a ten-ton ice plant for the use of its camp in taking care of foods, and furnishing ice.

Lebanon—Falling slate in the mine of the Willisburg Coal Co., near Harlan, Ky., resulted in the death of Charles Mills, a miner, while 15 men had narrow escapes. The level was choked with a mass of slate.

Mannington, Ky.—The Memphis Coal Mining Co. is arranging to commence work at an early date on the development of extensive additional property, to increase its present capacity. It is said that plans are being prepared for the construction of two new tipples, to be electrically operated, and ground has been broken for the erection of a new power plant for operation.

Henderson—The small but excellent mining property of the Zion Mining Co. has passed from the hands of Herman Mitchell and Chiel Moss to Murray Hughes, Oscar Abbott and Charles Hare. Hale and Hughes for several years have been with the Audubon Mining Co., Hale being mine foreman and Hughes an office man. Abbott is a prominent young farmer and head of the automobile firm of Abbott & Gerard.

TENNESSEE

Kingston—The Emory Gap Coal Mining Co., which recently filed articles of incorporation with a capital of $50,000, is planning for the immediate development of about 600 acres of coal properties in the Harriman section, to have a capacity of 100 tons daily. The company has arranged for the purchase of the necessary mining equipment, and will commence the installation at once. John W. Staples is president.

OKLAHOMA

Ada—Oklahoma is falling behind in its quota of increased coal production. About 94,000 tons more each month are being mined than last year, but the Federal Fuel Administration want 100,000 tons more each month.

COLORADO

Boulder—The Black Diamond Coal Mining Co., which is owned by Boulder capital is planning the erection of a new tipple and the installation of additional mining equipment with the view of increasing its daily capacity to 200 tons. Twenty men are employed at the mine under the management of George Williams. The coal is being hauled from the mine direct to the bins of the consumers by means of motor trucks with capacities ranging from 2 to 5 tons. Analysis of the coal indicates a fuel value of 12,000 B.t.u. W. E. Binder is president of the company.

MONTANA

Great Falls—Arrangements for the development of a new coal mine in the Belt district have been made by a company in which State Senator J. M. Burlingame and other local and Belt men are interested.

ALASKA

Cordova—It is reported that the mine of the Alaska Petroleum and Coal Co. in the Bering field is ready to ship coal for sale, as the Alaska Anthracite Ry. has completed the railway from the mine to Goose City, on Bering River. At Goose Bay the coal will be loaded on scows and taken to the steamship for shipment to Seattle. At the mine 50 men are working three shifts, and already a large quantity of coal has been sacked ready for immediate transportation. The coal is an anthracite and is said to be of superior quality.

Foreign News

The Hague, Netherlands—Announcement was made at the American Legation on Oct. 18 that the United States had offered to place at the immediate disposal of the Dutch Government 100,000 tons of coal monthly for the next twelve months or until the end of the war, on condition that Holland stop sending food to Germany. The coal is to be shipped in vessels sent from Holland.

Lens, France—It will be from 18 months to two years before it will become possible to take out any coal from the mines in the Lens region, which the Germans damaged to the best of their ability before they retired from the city. It is estimated that it will take five years to restore the normal production of the pits. At Courrieres, northeast of Lens, the Germans had blown up the mines before retiring.

Sydney, N. S.—The first battery of the new coke ovens of the Dominion Steel Corporation, comprising 30 ovens, has been completed and put in operation. The second battery of 30 ovens will be ready by the end of the year. When in full operation the output will exceed 1300 tons and the corporation will benefit materially through the saving of operating costs, as the new ovens can be operated by 200 fewer men than the old ones.

Amsterdam, Holland—The immense coal and iron and smelting works owned by Baron de Wendel in Lorraine have been sold to a German syndicate for the normal equivalent of $65,000,000 on the ground they were chiefly owned by French citizens. The process by which this great property was transferred from French to German ownership is called "compulsory liquidation." These fields have long excited the cupidity of German capitalists. The potential ore supply in this field alone has been estimated at $1,900,000,000.

The Hague, Netherlands—The "Neue Freie Presse" reports that the coal problem in Austria-Hungary has become serious on account of the great reduction in output of the mines. It is stated that conditions may not be expected to improve very much and that every possible saving must be effected in order to avoid a coal famine. It is urged that various industrial concerns should combine their operations so that they would consume less coal. During the first quarter of 1918 Austria's coal production was 275,000 tons less than in the corresponding quarter of 1917.

Personals

Baird Haberstadt, well known mining engineer and geologist of Pottsville, Penn., was married on Oct. 15 to Ida Ray Smith. *Coal Age* extends its congratulations.

Robert D. Reeder, superintendent of the Kennon Coal and Mining Co., Flushing, Ohio, has accepted the position of superintendent of the Stotesbury mine of the E. E. White Coal Co., to take effect Nov. 1.

H. C. Owen, of Fairmont, W. Va., has been elected secretary of the Coal Jobbers' Association of the Pittsburgh district, with headquarters in Pittsburgh. The association starts with a membership of about 50 jobbers.

Samuel J. Wilton, of Rockville, Ind., has been appointed assistant mining inspector to succeed **Thomas McNair**, of Clinton, Ind. The duties of the assistant are in the mine fields and include inspection of mines and machinery.

E. J. Best, former chief engineer of the Tennessee Coal, Iron and Railroad Co., and later associated with the Angema Steel Co., of Sault Ste. Marie, has accepted a similar position with the Woodward Iron Co., Woodward, Ala.

Harry Urban, formerly superintendent of the Fairfield byproduct plant of the Tennessee Coal, Iron and Railroad Company, Birmingham, Ala., has been appointed general manager of the Woodward Iron Co., Woodward, Ala.

John T. Darrah, a prominent designing and contracting engineer, connected with the McCrossin Engineering Co., died Oct. 13 at his residence in Birmingham, Ala., after a short illness from Spanish influenza. Mr. Darrah was 39 years of age.

John M. Roan, commissioner of the Ohio Compensation and Statistical Bureau, and recently named inspector for the Federal Fuel Administration for the entire United States, is recovering slowly from a serious automobile accident which occurred recently. While riding along near Wellston, Ohio, he went over an 80-ft. embankment and was rendered unconscious. He was found about three hours later by school children. Several ribs were broken.

Erskine Ramsay, for the past several years first vice-president and chief engineer of the Pratt Consolidated Coal Co. of Birmingham, Ala., has been appointed chief of conservation of the state by the Federal Fuel Administration. Mr. Ramsay has been identified with the mining interests of the Birmingham district for almost 30 years, and many of the improved methods of mining and handling coal are due to his skill and initiative. Mr. Ramsay has established his office at 848 Brown-Marx Building. Associated with Mr. Ramsay is **H. M. Gassman**, who from 1908 to 1916 was chief electrical engineer for the Tennessee Coal, Iron and Railroad Company.

Obituary

Walter S. Wells, president of half a dozen large coal mining companies of Eastern Kentucky, died on Oct. 16 at his home near Prestonburg, Ky., death being due to influenza.

Stewart Buck, paymaster for the Coal Run Mining Co. at Indiana, Penn., died on Oct. 11 after an illness of about one week. He contracted the Spanish influenza while paying the miners at Coal Run and this, together with pneumonia complications, caused his death. He is survived by his widow and one child.

Trade Catalogs

Maintaining Morale. Armstrong Cork Co., Pittsburgh, Penn. Folder. Points out the value of a proper drinking water installation if the workers are to be kept in good health. Without good health high morale and maximum production are impossible.

C-H Standard Attaching Devices. The Cutler-Hammer Mfg. Co., Milwaukee, Wis. Folder. Illustrates 21 of the various attaching devices manufactured by this company. Emphasis is placed on the fact that the C-H "Standard" attaching cap fits all C-H "Standard" plugs and receptacles,, as well as those made by five other leading manufacturers.

Jeffrey Belt Conveyors. Jeffrey Manufacturing Co., Columbus, Ohio. Catalog No. 175. Pp. 80, 6 x 9 in., illustrated. This new catalog of the Jeffrey company can rightfully lay claim to being a complete textbook upon the belt conveyor. Although compiled essentially for the purpose of promoting the use of the Jeffrey Conveyor, the purchaser's requirements for information have been covered in detail.

Industrial News

Chicago, Ill.—The Chicago Pneumatic Tool Co. announces the election of H. D. Megary to the office of secretary, vice W. B. Seelig, resigned.

Charleston, W. Va.—The Snuffer Coal Co., of which John Laing is president, at a recent meeting of its stockholders decided to discontinue business and surrender its charter.

Charleston, W. Va.—The Cabin Creek Consolidated Coal Company has announced the appointment of the following superintendents: Jno. Richard, at the Red Warrier mines: L. G. McCarty, for its United Mines at Wevaco; James Cole at Decota; J. M. Echols at the Quarrier mine.

Cincinnati, Ohio—A fleet of barges containing approximately 45,000 tons of coal arrived in this city recently from the Kanawha field. This is probably the last fleet to arrive in the city as a result of artificial floods caused by operating the various Government dams in the Ohio River. Approximately 250,000 tons of coal has reached Cincinnati as the result of artificial waves.

Duluth, Minn.—Receipts of coal at Duluth and Superior docks during September aggregated 222,015 tons of anthracite and 1,717,588 tons of bituminous, comparing with 315,126 tons of the former and 1,795,640 tons of the latter in the similar month last year. The falling off in receipts for the month is attributed to light stocks at the Lake Erie docks and congestion in railroad lines at that end.

New Albany, Ind.—The Ohio and Indiana Collieries Co., and Edward J. Hackett, of New Albany, were made defendants in two suits for damages of $10,000 each. The Central Indiana Lighting Co., at Columbus, Ind., in bringing the suit claims failure of the companies to supply coal on a contract made on July 25, 1916. Failure to supply plants at Fowler, Bedford and Salem is claimed by the Inter-State Public Service Co. in the other suit.

Columbus, Ohio—The Southern Ohio Coal Exchange announces production figures for the four weeks ending Sept. 28, showing that the output in the southern Ohio field was extra large. The figures do not include railroad fuel used by the lines on which the mines are located. The reports show that during the week ending Sept. 7, the production was 238,531 tons; week ending Sept. 14, 311,925 tons; week ending Sept. 21, 325,737 tons, and for the week ending Sept. 28, 298,358 tons, making a total of 1,174,551 tons for the four weeks.

Toledo, Ohio—The movement of coal from the Toledo docks to the Northwest is continuing satisfactorily, as is shown by the report of the loadings at the docks of the various railroads for the week ending Oct. 12. During the week the Hocking Valley docks handled 206,508 tons as compared with 188,467 tons the previous week, making a total of 4,082,653 tons for the season. During the same week the Toledo & Ohio Central Docks handled 91,000 tons as compared with 92,000 tons the previous week, making a total of 1,790,000 tons since the opening of navigation.

Washington, D. C.—The Draeger Oxygen Apparatus Co. of Wilkinsburg, Penn., has applied to the Federal Trade Commission for license to use eight patents for respiratory, resuscitating and breathing apparatus devices and the trade mark "Pulmotor," which they claim are enemy-owned or controlled. The patents were issued originally to Johann Heinrich Dräger, of Lubeck, Germany, and to the other assigners to the firm of Drägerwerk Heinr. and Bernh. Dräger, of Lubeck, Germany. The commission is considering the merits of the application.

New York, N. Y.—The Anthracite Committee has stopped the practice of certain producers of forcing steam sizes upon the domestic market by issuing the following order: "The committee is informed that certain producers and distributors are forcing steam sizes of coal upon buyers who are entitled to domestic sizes only. This practice the committee cannot under any circumstances permit, and all producers and distributors will be held responsible by the Federal Fuel Administration for either beginning or continuing these methods of moving steam sizes."

New York, N. Y.—Delos W. Cooke, state fuel administrator has announced the appointment of Wilson S. Kinnear as personal representative of the Fuel Administration in coöperation with the Anthracite Committee. Mr. Kinnear is head of the consulting engineer firm of W. S. Kinnear & Co., and was formerly president of the United States Realty Improvement Co. Previous to coming to New York, Mr. Kinnear was president of the Kansas City Terminal Co., and while chief engineer of the Michigan Central Railroad Co. he had charge of the construction of the railroad tunnel under the Detroit River.

Bowerstown, Ohio—Among the mines recently equipped with automatic cages made by the Mining Safety and Device Co., of Bowerstown, Ohio, are Old Ben Coal Corporation's No. 15, Carlinville, Ill.; Republic Collieries Co., Clinton, Ind.; Standard Oil Co.'s No. 4, Carlinville, Ill.; Republic Collieries Co., Russellton, Penn.; Delaware, Lackawanna & Western Railroad Co.'s Pettebone mine, Luzerne, Penn.; Bell & Zoller Mining Co.'s No. 2, Zeigler, Ill.; Lehigh Valley Coal Co.'s Blackwood Colliery, Blackwood, Penn.; Prairie Coal Co., East St. Louis, Ill.; Taylor Mining Co.'s No. 5, Herrin, Ill., and the Lehigh Valley Coal Co.'s Drifton Colliery, Drifton, Penn.

St. Louis, Mo.—Under a ruling of the Fuel Administration, the M. W. Warren Coke Co. will have to refund about $20,000 to purchasers of coal since July 8. Prior to that the basic price for coke was set by the Fuel Administration at $6 to $6.50 per ton, the retail price to be fixed by adding the lowest freight rate from the coke ovens nearest to St. Louis. The ovens at Connellsville, Penn., were then thought to be nearest. The freight rate was $3.60. But attention has been called to the fact that there are ovens at Earlington, Ky., with a freight rate of $1.70. The refund which the company is required to make is the difference between the two freight rates.

Cincinnati, Ohio—In the Federal antitrust suit against the so-called "soft-coal trust," which has been pending in the United States Courts here for several years, a petition has been filed by the Central Union Trust Co. of New York as trustee of $2,294,000 of bonds of the Kanawha & Hocking Coal and Coke Co. asking the court for further instructions in connection with these bonds. The mortgage securing the bonds, it is alleged, provides that certain interest payments may be made after notice of default, and the company desires to know whether the mortgage shall be foreclosed, in spite of the fact that some of the defaulted interest has been paid, or whether efforts shall be made from time to time to collect interest coupons as they fall due. Hearing on this petition before the circuit judges will be set for a later date.

MARKET DEPARTMENT

Weekly Review

Peace Talk and Influenza Have Demoralizing Effect on Coal Production—Situation Not So Gloomy as Last Year—Soft Coal Output Keeps Up Well, Though Anthracite Continues to Present a Problem—Some Rumors of Contracts Being Offered

AND now peace talk and influenza have come to trouble the coal-mining industry. Premature reports of the surrender of Germany, printed by misguided and overzealous newspapers, led mine workers in many sections of the country to throw down their tools and enter into an orgy of celebration, with a consequent reduction in the coal output. More serious, however, is the havoc being wrought by the influenza epidemic. In the anthracite region production is being curtailed by the disease, and colliery after colliery has been forced to suspend due to lack of man-power. In the bituminous regions, particularly in central Pennsylvania, the epidemic has begun to make itself felt, and it is feared coal production will be completely demoralized unless success attends the endeavors of health officials and mine operators to eradicate the disease.

Having presented the dark side of the coal situation, justice demands the enumeration of more favorable factors. First and foremost is the belief that there will be no serious shortage of bituminous coal this winter. The needs of essential industries are being supplied as they become evident, and even nonessential industries are permitted to accumulate reserve stocks under a new order issued by the Fuel Administration. New England, which last winter was on the ragged edge of supply, furnishes no cause for anxiety this year, as all the New England ports, those on Long Island Sound as well as east of Cape Cod, have ample stocks of soft coal on hand.

Then, again, the production of soft coal keeps well ahead of last year. For the week ended Oct. 12, the output of bituminous coal is estimated at 12,321,000 net tons, a decrease of 273,000 net tons compared with the week preceding, but 1,317,000 net tons greater than the output of the corresponding wee in 1917. Soft coal production for the first nine months of the calendar year of 1918 is estimated at 447,905,672 net tons, an increase over the same period of last year of 36,179,783 net tons.

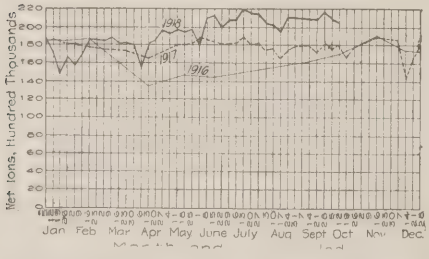
Anthracite coal still continues to present a problem, though the authorities are hopeful that all consumers entitled to this grade of coal will receive a supply before long. Though domestic demand continues heavy, the prevalence of warm weather has kept consumption down, and it is believed that household bins are unprecedentedly well stocked with coal. Production of hard coal, unfortunately, continues to decline. For the week ended Oct. 12, the output is estimated at 1,955,000 net tons, a decrease of 97,000 net tons compared with the week of Oct. 5. The total production of anthracite for the coal year to date amounts to 55,658,000 net tons, compared with 54,683,000 tons for 1917.

As for trade conditions, the stove and chestnut sizes of anthracite continue to be in the greatest demand, while the smaller steam sizes drag. Whatever rice and culm moves does so slowly, there being no active call for these two grades. A sign that the bituminous market is easy is evidenced by the fact that contracts are already being offered for next year, but on a twelve-month basis from Oct. 1. With rumors of the war coming to a speedy end, however, buyers are reluctant to commit themselves for a whole year to a contract based on Government prices.

WEEKLY COAL PRODUCTION

The production of bituminous coal during the week ended Oct. 12 is estimated at 12,321,000 net tons, a decrease compared with the week preceding of 273,000 net tons or 2.2 per cent., but an increase over the corresponding week of last year of 1,317,000 net tons or 12 per cent. The average production per working day during the current week is estimated at 2,053,000 net tons as compared with 2,099,000 net tons during the week of Oct. 5, and 1,834,000 net tons during the week of Oct. 12, 1917.

Bituminous coal production during the month of September, 1918, is estimated at



51,687,031 net tons, and exceeds production during the same month of 1917 by 6,579,073 net tons or 14.6 per cent. September production, limited, first by loss of time on Labor Day, second loss of time on Registration Day, and third, by the short month, was approximately 4,000,000 net tons less than production during either July or August and fell slightly below the production of June but exceeded all records prior to June, 1918.

For the first six months of the coal year 1918, production of bituminous coal is estimated at 312,282,414 net tons as against 274,537,172 net tons during the same period of 1917, an increase of 37,745,242 net tons or 13.7 per cent. The requirements during these first six months of coal year 1918, however, exceeded the production during these months of last year by 49,448,828 net tons, so that even with the large increase, production during the first half year fell 11,703,586 net tons or 3.7 per cent. behind the estimated requirements.

Production for the first nine months of the calendar year of 1918 is estimated at 447,905,672 net tons, an increase over the same nine months of last year of 36,179,783 net tons or 8.7 per cent. This tremendous increase over last year was really brought about during the months of July, August and September, the increase during this period amounting to 24,234,681 net tons or 17.4 per cent., and more than doubled the improvement that occurred during the first six months of the calendar year, the increase during this period over last year amounting to but 11,945,102 net tons, or 4.4 per cent.

For the week ended Oct. 12, 1918, production of anthracite is estimated at 1,955,000 net tons, a decrease of 4.7 per cent. compared with the week of Oct. 5. The daily average during the current week of 326,000 net tons was lower than the daily average for the coal year to date during either 1918 or 1917. Total production for the coal year to date now amounts to 55,658,000 net tons compared with 54,683,000 net tons for 1917, an increase of 1.8 per cent.

Bituminous coal dumped at lake ports, (including bunker), during the week ended Oct. 12 exceeded the large tonnage dumped during the week preceding by 3.7 per cent. and is estimated at 1,240,848 net tons. Compared with the weekly average during the period July 1 to date, the current week's tonnage was 147,907 net tons or 13.5 per cent. in excess. The total dumping for the year to date now amounts to 23,940,060 net tons.

Shipments of bituminous coal to New England during the week ended Saturday morning, Oct. 12, are estimated at 465,350 net tons, a decrease compared with the week preceding of 20.9 per cent. Rail receipts during the week are estimated at 165,216 net tons, a decrease of 8.6 per cent. compared with the week preceding, and tidewater shipments which are estimated at 300,134 net tons, decreased 26.4 per cent. Shipments from New York and Philadelphia amounting to 81,774 net tons, decreased 32.6 per cent., from Baltimore, amounting to 42,727 net tons, decreased 35.3 per cent., and from Hampton Roads, amounting to 175,633 net tons, decreased 15.8 per cent. Shipments from Philadelphia during the week were extremely light, the tonnage reported above practically covering shipments from New York alone. The performance during the week ended Oct. 12 by both rail and water also fell considerably behind the weekly average for the coal year to date. Bituminous coal to New England for the coal year to date is estimated at 15,539,368 net tons, of which total receipts by rail are estimated at 5,932,754 net tons and tidewater shipments at 9,606,614 net tons.

Shipments from all tidewater harbors during the week ended Saturday morning, Oct. 12, amounting to 804,657 net tons, or 15.5 per cent. behind performance of the week preceding. All harbors report a falling off in tonnage loaded, Baltimore dropping behind 33.5 per cent. compared with the week preceding, New York and Philadelphia, 18.8 per cent. and Hampton Roads, 6.3 per cent. Current week's shipments from each harbor also fell behind the weekly average for the coal year to date. Estimates place the total shipments of bituminous coal from all harbors from Apr 1 to date at 25,238,928 net tons.

The production of beehive coke in the United States during the week ended Oct. 12 is estimated at 597,000 net tons, an increase over the week preceding of 23,000

net tons or approximately 4 per cent. The average production per working day during the current week is estimated at 99,000 net tons as against 96,000 net tons during the week preceding. The operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania report production of beehive coke at 371,563 net tons, and the operation of their plants at 77 per cent. of their full time as against 75.5 per cent. during the week of Oct. 5. A slight improvement was reported in labor conditions during the week.

Operating conditions in the byproduct industry during the week ended Oct. 12 were approximately the same as reported by the operators for the week preceding. For the country as a whole the byproduct plants were operated for 91.9 per cent. of their full time and at a total loss of 8.1 per cent. The operators attributed a loss of 1.1 per cent. to shortage of byproduct coal, 0.6 per cent. to labor shortage, 5.3 per cent. to repairs to plants and 1.1 per cent. to other causes. Material improvement occurred during the week in Minnesota and New Jersey. In the former state the improvement is attributed to other causes while in New Jersey a better supply of byproduct coal and repairs to plants brought about increased production. Maryland was the lone state reporting falling off in production and is attributed by the operators to labor shortage.

BUSINESS OPINIONS

Marshall Field & Co.—Current wholesale distribution of dry goods is running slightly ahead of shipments for the same week in 1917. Road sales for at once delivery were about the same, while for those for future delivery were well in excess, especially for spring. Merchants have been in the market in slightly smaller numbers. Collections continue good.

Bradstreet's—The Government's win-the-war programme shows no let-up, and, indeed, increased efforts are being made to get out production, while at the same time orders have been issued to cut outputs in an additional number of lines that are deemed non-essential at this juncture, this policy being accepted as counter propaganda to the talk of an early peace. All advices continue to indicate marked paucity of labor or of crude materials, and where odd offerings of staple merchandise are made, ready absorption occurs.

The Iron Age—What would come to the steel industry from a sudden ending of the war has been a large factor in the trade comment of the week, yet not a disturbing one. Generally the view is taken that apart from shell steel, in which an early peace would cause some cancellations, the materials now most in demand would show no great falling off. Government shipbuilding would go on and rail and railroad equipment contracts would keep many mills busy for months. There is no abatement of the Government demand for shipments to France. A new order calls for 12,000 to 15,000 tons of portable track for France, or double the amount taken in the previous week for the same purpose.

American Wool and Cotton Reporter—The most important development of recent weeks in the wool situation occurred when H. E. Peabody, of the Textile Division of the War Industries Board, announced to the National Association of Spinners that it will be an absolute impossibility to apportion any amount of raw material to producers. It was stated that this condition will continue to Jan. 1, until a new tabulation is made of the raw material available, and that there was great uncertainty as to the possibility of release of raw material after Jan. 1. Thus the hopes of the manufacturers are dashed to the ground, at least for those manufacturers who had held to the opinion that wool in sufficient quantity was accumulating so that some allotment could be made. The cotton situation is decidedly uncertain.

Atlantic Seaboard

BOSTON

Receipts all-rail continue to sag. Embargoes still being placed against consumers who have been able recently to accumulate stocks. Water borne shipments fall off. Number of modern colliers now definitely withdrawn from coastwise service, but substitute craft not all arranged for as yet. Hampton Roads situation shows improved dispatch but fewer bottoms loading for New England. Tidewater ports at this end well stocked for the present. Contracts being offered for twelve-month periods. Movement of anthracite all-rail increases slightly over early October, but receipts by water show notable shrinkage. Influenza epidemic seriously affects shipments.

Bituminous—Commercial bituminous continues to show week by week a further reduction in movement all-rail to this territory, particularly from Central Pennsylvania. For the first seven days in October the average receipts at the five New England gateways were 407 cars daily, while for the next nine days the movement dropped to an average of 352. During the same period the receipts of railroad fuel have slightly increased, so that the total number of cars passing daily, railroad fuel and commercial bituminous combined, averages now but little over 550. This is a drop of 200 cars per day from the August average.

A large number of special requisitions placed through Fuel Administration channels have now been cancelled or suspended, but with the operators either these have been replaced by requisitions in favor of Government or special use at Tidewater piers, or shipments have been permitted to go forward on contract. In many cases shippers now free to start deliveries on contract find their consignees embargoed and are obliged either to seek orders from industries that are not embargoed or solicit railroad contracts. There are queries in the trade as to just what extent the fuel authorities will continue to shut off current requirements.

There is also a disposition to take into account the stocks of anthracite screenings now on hand at individual plants. There is a fallacy in this, for while there is hardly a plant that cannot run on bituminous alone there are extremely few cases where anthracite screenings can be used without a proportion of bituminous. In other words, to discontinue shipments of bituminous merely because a plant has an ample stock of barley would be rather a shortsighted procedure.

Receipts by water have also shown a marked decrease. This was only to be expected when heavy tonnages of Pocahontas were turned away from Tidewater and ordered to byproduct plants and for western requirements. And, again, there were indications when quite a number of the most serviceable modern colliers in the New England trade were provisionally requisitioned for overseas transport. These bottoms have now been definitely withdrawn from the coastwise trade, but boats to replace them have not yet been supplied to the extent needed.

At Hampton Roads the loading dispatch is tolerably good, except in rare instances. A large proportion of the coal available, however, is being taken for Government use, either naval or otherwise, and the number of bottoms loading for New England seems to be constantly growing less. There is no real alarm over this situation for the reason that stocks here are so favorable, especially on the part of those plants that depend more largely on water deliveries.

All the New England ports, on Long Island Sound as well as east of Cape Cod, are well stocked with bituminous and there is no present anxiety here over conditions at the loading ports. In fact, the discharging piers and all concerned with them are enjoying a welcome respite from unloading coal under pressure.

One of the unfailing signs of an easy market is now putting in its appearance. Contracts are already being offered for next year, but on a twelve months basis, from Oct. 1. There would probably be a mild sort of buying, were the delivery offered only to Apr. 1, but there is so much talk of the war drawing to an end that buyers hesitate to commit themselves to "Government price," for a period after Government price-fixing may have ceased.

Anthracite—Receipts of domestic sizes at the five gateways show a somewhat increased movement as compared with the first week of the month. The first seven days show an average of 406 cars, while the next ten days the average was something over 450 cars per day. The increase is probably caused in large part by the congestion at the New York piers.

Water-borne anthracite is coming forward more slowly and in less volume than at any previous time this year. Some of the congestion at the New York loading ports is due to other causes, but the big factor the past three weeks has been the influenza epidemic. To one of the companies this has continued to mean a loss of something like 10,000 tons each day. Not only is the coal not mined, because of sickness among the operatives, but train crews and pier men are also away from their places to such extent that coal is not brought to the piers except in dribbling quantities and even then there are vexatious delays in dumping. Barges are daily being taken away from some of the ports to load at other ports. The epidemic is past its high point in this vicinity, although it is still causing a serious loss in industrial output.

NEW YORK

Influenza reduces production and interrupts shipments. Dealers complain of lack of supplies while public calls for fuel. Cool weather and illness increase consumption. Buckwheat sizes in good supply. Bituminous market easier. Commercial coals in better supply. Storage regulations modified.

Anthracite—The ravages of influenza in the mining regions is being reflected in production and shipments with the result that less coal is being mined. Every town in the anthracite region is affected and many collieries are hard hit. All the producing companies are suffering from the lack of men and many of the mines have suspended operations at various times. Conditions have become so serious that physicians have been sent from this city into the coal fields to assist the local physicians in combating the disease.

The docks from which this market secures its fuel are also seriously affected. One instance of this is at South Amboy, where on Saturday last instead of a force of about 200 men being at work there were only between 35 and 40, the other men being at their homes victims of the epidemic.

Though the figures showing the number of cars dumped at the local docks during the week ending Oct. 18 indicate an increase over the previous week, the receipts by the local trade do not indicate that they are receiving anything like their requirements. For the seven-day period the cars dumped here aggregated 6050 cars, an increase of 896 cars over the previous week, the low record of the previous week having been caused by the explosion at Morgan, N. J., on Oct. 5, and which resulted in some of the docks being idle two days.

Most dealers complain of the lack of domestic coals. They have plenty of buckwheat and some pea, but the former is of no use for household purposes. They point out that consumers obeyed the mandate of the Fuel Administration last Spring and placed their orders for this winter's fuel. In many instances no deliveries have been made on these orders, although most of them were placed the early part of April, and consequently these customers are now without fuel enough to start their fires. In the meantime the public is being assured that everybody will be supplied with fuel sufficient to keep them warm, and the dealers are wondering where it is going to come from.

Egg, stove and chestnut are very short. Shippers say the demand for these sizes is far ahead of the supply, and the prospects for larger shipments are not encouraging now. These three sizes have been running in fairly good shape all summer, and while the dealers have many unfilled orders on their books, they have had an unusually busy summer and have put away in bins more coal than probably ever before during the summer months.

Pea coal is easy and much of this size is being substituted for the larger sizes where the customer permits.

Buckwheat and the smaller coals are plentiful. Considerable Buckwheat No. 1 is being stored for future use, while rice and barley are drugs on the market, certain individuals paring prices in order to move stocks. Most retail yards have more or less of these coal on hand.

Retail dealers are being seriously handicapped in their deliveries by the lack of help and the attitude of those who are employed. The latter in many instances refuse to put the coal into the customers bins although the order calls for it. Frequently the coal is dumped on the sidewalk and the customer is left alone to put it away as best he can.

Current quotations, per gross ton, f.o.b. tidewater, at the lower ports are as follows:

	Circular	Individual		Circular	Individua
Broken	$6.75	$7.50	Buck	$5.10	$5.90
Egg	6.65	7.40	Rice	4.65	5.10
Stove	6.90	7.65	Barley	4.15	4.30
Chestnut	7.00	7.75	Boiler	4.60	
Pea	5.50	6.25			

Bituminous—There has been a decided improvement in the local bituminous situation. More coal is available and spot buyers have been able to pick up stray cargoes occasionally. This latter condition is not expected to continue indefinitely now that the Fuel Administration has amended the storage regulations and cool weather is approaching.

The revised regulations permit all classes of consumers, except those in Class 1 as defined by the War Industries Board, to increase their reserve stocks, and those heretofore not on the preference list are

authorized to lay in additional reserve supplies.

Dumpings have improved during the week ending Oct. 18, reports showing 6448 cars dumped as compared with 5507 cars the previous week, an increase of 941 cars. Reports from the mine fields show a pronounced reduction in production as a result of the influenza epidemic, the figures from Central Pennsylvania indicating a decrease of 70,000 tons.

Shipments into New England and along the Long Island Sound have suffered much owing to the lack of labor at the loading docks, and it was estimated that 75 vessels were idle because of the failure to get coal for those points.

The surplus of commercial coal here resulted in a much easier market. There were no hurry calls for shipments and many shippers have plenty of coal. There were reports that some shippers were shading prices in order to save demurrage charges, but these were hard to locate.

The bunker situation is on the ragged edge. If the weather should suddenly become cold the situation would be serious with the coals now available for this purpose. As it is no ships have as yet been held up because of the lack of fuel, but there is no surplus in case of emergency.

Current quotations, based on Government prices at the mines, net ton, f.o.b., tidewater, at the lower ports, are as follows:

	Mine Gross	F.o.b. N. Y. Gross
Central Pennsylvania:		
Mine-Run, prepared or slack	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of Mine	3.08	5.23
Prepared	3.36	5.51
Slack	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite production seriously cut by influenza. Retailers also handicapped. Stove and nut in great demand. Public fails to take mixed egg and pea. City has 50 per cent. supply in cellars. Peddlers licensed. Price increase expected. Steam sizes drag, except buckwheat. Bituminous grows more plentiful. Non-war plants stocking up. Car supply equal to labor. Brokers to be investigated.

Anthracite—It has been a trying week for the entire trade. The production has been seriously cut, particularly in the Schuylkill region, and it is estimated that the loss at the present rate for a month will be close to one million tons. Reports show that each day more men are idle due to the prevailing epidemic of influenza, and the outlook for the immediate future is not bright. Some operators, such as the individuals, are especially hard hit, many of them suffering a loss of more than 50 per cent. of their tonnage. We know of a few instances of local dealers almost entirely dependent on such sources of supply, and they were almost out of business this week.

The dealers are all working shorthanded, and it has been noticed that many are hiring mere boys to tide over the emergency. The retail trade has been unable to properly care for the numerous hurry calls from homes where there is illness and no coal. They have done all in their power and have been put to considerable expense by delivering fractions of tons.

As for many weeks, stove and chestnut are in the most active demand and in the half-hearted coöperation of the public with the suggestion of the Fuel Administration to substitute a mixture of 60 per cent. egg and 40 per cent. pea for stove and nut. In fact, there are numerous dealers who have not sufficient stock of these two sizes to make any impression on their orders.

This week notice was issued to all peddlers and grocery stores handling coal by the bucket that they must procure a fuel administration license. The response was not very heavy at first, as many small dealers had such trouble in procuring supplies last winter that they are not liable to engage in the trade this year, and in addition many of them thought they were to be charged a license fee in addition to the regular city commercial license. The authorities have adopted a standard quarter-bushel bucket, with which all such dealers must provide themselves. The maximum price for nut has been fixed at 16c., with pea at 14c. Various other restrictions are placed about the business to assure fair treatment for the humble class of trade dependent upon this source for their fuel supply.

As to the steam sizes, we find that with heavy movement to the West and Canada buckwheat is well covered with orders. The smaller sizes drag and we have heard of rice price being cut. Culm moves very slowly. The situation on the latter two sizes is not relieved by the embargo on the sizes below buckwheat now effective on shipments to Port Reading. The explosion causing the closing of the piers at South Amboy also added to the difficulties of the small sizes.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.25	Buckwheat	$3.40	$4.45
Egg	4.80	6.15	Rice	2.90	3.80
Stove	5.05	6.40	Boiler	2.70	3.70
Nut	5.15	6.50	Barley	2.40	3.30
Pea	3.75	5.00	Culm	1.25	2.15

Bituminous.—The past week has been one of the best periods for the receipt of coal experienced for many months. To make a plain statement, there has been plenty of soft coal. Of course, one reason for this has been that the labor shortage caused by the epidemic has in some respects made this condition somewhat imaginary instead of real, because of transfers necessitated by the inability of some concerns to unload promptly. Following the ruling of the National Administration the non-war industries took advantage of the situation and at this time are getting pretty fair stocks of fuel. The distribution committee, however, is holding strictly to its rules of not allowing those concerns with a maximum supply on hand to increase it. The operators report a car supply equal to the labor supply. So far the bituminous region has not been greatly affected by the epidemic, but there are numerous cases, and fears are expressed that they will experience the same difficulty as the mines in the east.

It is rumored that the fuel authorities are contemplating weeding out concerns doing a brokerage business, many of whom they claim are not legitimate. It is understood that a questionnaire will be sent to all concerns selling coal on a commission, and in this way it is hoped to discover those who are doing a bona fide business.

BALTIMORE

Influenza makes big inroads on coal production and coal handling. Bituminous situation becoming tight again. Mild weather prevents more serious conditions for moment in regard to anthracite, but trouble is predicted.

Bituminous—Mines, railroads and coal-handling agencies in this section have suffered greatly from the epidemic of influenza and la grippe, which from the Baltimore city population alone has been counting from 500 to 2000 new victims daily, with a death list running from 100 to 250 per day. Every coal office force and yard force has been depleted by the ravages of the disease. Every mining district sending coal here reports a lessened production due to hundreds of miners being ill. Some days the past week the Baltimore & Ohio R. R. had as many as 40 per cent. of its operating men off active duty, and the shipment of coal over the lines dropped from a normal of around 2400 cars a day to about 1000. The result has been a distinct tightening of the soft-coal business. From an easy state where most industries here were able to keep their allowed reserve of from 15 to 30 days untouched, a number have seen their small reserves nearly wiped out and are appealing for shipments. The tighter market has stopped the tendency to reject box-car coal and wait for open-top shipments, which have been scarce both on line and harbor shipment. At present there is practically no open-top car coal either at tide for ordinary business or on line delivery, and the fuel administration is having no trouble now in disposing of the box-car coal coming through to its account. In the matter of distribution through purchasing agents of this coal, the national fuel administration has modified a former order of June 15, which allowed the Maryland administrator to select the agent to bill for the coals distributed by his office to consumers, irrespective of the former connection of the consumer with a coal supplying agency. The new order directs that the consumer be allowed to designate the purchasing agent or agency to bill for the coal supplied through the fuel administration, which designated agency shall receive the 15c. a ton commission allowed by the Government.

Anthracite—Only continued warm weather has prevented a bad situation here in regard to hard coal supplies. Not only are there thousands of homes without coal, the state administrator estimating that there are still about 175,000 tons of undelivered orders on the books, in addition to a large tonnage order demand which is being refused by dealers, but many homes in which persons are desperately ill with pneumonia have no coal. The dealers here have for the time being dropped all thought of the two-thirds delivery plan, which even the fuel administration officials now admit was faulty and over-optimistic, and are giving coal in one- and two-ton lots. The chairman of the city coal committee of the fuel administration believes that all homes can be supplied with a ton or two before real winter arrives; coal dealers do not believe it possible to do this in view of the light arrivals. There was a little spurt in receipts for a few days last week, but the deliveries are again in the old rut and far below requirements. Nut and stove coal are particularly scarce here.

Lake Markets

PITTSBURGH

Lake shipments decreasing but will continue to Nov. 15. Spanish influenza curtailing production. Byproduct plants supplied only with difficulty.

The diversion of larger tonnages of coal to retail dealers, upon the recent request of the local fuel administrator, has been decreasing the tonnage of Pittsburgh district coal shipped in the lake trade. In the week ended Sept. 28 the district's lake shipments were 351,000 tons, the shipments decreasing to 326,000 tons the following week, while there have been further decreases since. Hopes are entertained that the shipments can be kept at fully 300,000 tons a week for the remainder of the season, and the present prospect is that lake shipments will continue until about Nov. 15, or approximately to the end of the season of navigation.

Spanish influenza did not affect coal production of the Pittsburgh district until about the middle of last week, when reports began to come in from various quarters of very material reductions in the working forces and fears are entertained that before the epidemic is over there will have been a considerable curtailment in production. Previous to the middle of last week production was at substantially the best rate the district has ever seen.

The Pittsburgh district is furnishing practically a full supply of coal to the byproduct coke plants that depend on the region, but is barely able to maintain the supply and there has been no surplus for some time past for stocking purposes. With lake shipments extended to the middle of November there will be little chance of stocking thereafter, as local consumption will be heavier on account of the season. The district has been furnishing to the Clairton byproduct plant the amount originally asked for, 900 tons a day, remainder of the Clairton coal coming from the Lower Connellsville region. With seven batteries of 64 ovens each in operation the plant is consuming altogether about 7000 tons of coal daily.

There is practically no free coal in the market, substantially all the coal produced going out on lake shipments or against contracts and allocations.

TORONTO

Movement of coal light owing to heavy shipments to Upper Lake. Conferences of coal dealers for relief of householders without fuel. Conservation measures urged. Situation well in hand.

The movement of coal toward this city is light, owing to the heavy shipments which are being made to the Upper Lakes prior to the close of navigation, after which a marked improvement in the supply is anticipated. The list of householders who have stated that they have absolutely no fuel numbers 12,000. A conference was recently held between the local fuel dealers, the Board of Control and the city Fuel Commissioner at which the dealers agreed to supply ton lots to those without fuel within two weeks, the orders being apportioned among the dealers. The deliveries are being made on specified days when the filling of regular orders is suspended. From now on and throughout the winter dealers will only make deliveries to supply ordinary demands and no one will be permitted to have a large supply on hand. Instructions on coal conservation will be issued to householders, and it is hoped that if the public follow the advice given to substitute soft-coal, coke and wood for anthracite as far as possible the winter will pass without hardship due to lack of fuel.

BUFFALO

Sickness in the mines reduces output. Bituminous is fairly plenty. Jobbers not gaining more business. Anthracite coming in slowly, going up the lakes at fair rate.

Bituminous—The output of coal at the mines is sure to be cut down seriously by the prevalence of influenza, but it is not possible to say now how serious the reduction is going to be. Every effort is being made to keep the men at work, but they cannot of course do the impossible. But for that the work would have gone on well and the output made to show an increase.

The work of the jobbers is still as hard and unpromising as ever. They see no future to their part of the trade till conditions change. In fact they say that the tendency is to turn over more and more of the business to the zone managers. Consumers so often find that they must appeal to the fuel authorities that they often go there at the outset, and in that case the jobbers seldom get into the trade at all.

The general report is of a fair supply of bituminous all over the country. It is believed that a steady increase has taken place for some time and that there is now considerably more in consumers' hands than there was a year ago. Unless production is now seriously cut down the winter will be entered in better shape than for some years. The trade is tranquil. Government prices are rarely, if ever varied, though the jobber has never been reconciled to his small share of the profits.

Anthracite—The local retailer and consumer are engaged in complaining that they are discriminated against and that the city is bound to suffer next winter if the amount brought here for consumption is not increased materially before long. They declare that large numbers of consumers, some of whom have had their orders in since spring, are without coal and that there is none for them yet. From that side of it the situation is serious.

The wholesale and Government side tells a radically different story. It is declared that Buffalo has more coal in cellars than ever before at this time of the year and that if the distribution has not been fairly made it is because some one has managed to get more than he should. The fuel administrator's office reports that it has been able to fill every emergency order coming from families where illness from influenza has occurred. It is supposed that the lake trade is now getting first attention and that when that is ended for the season a liberal amount will be left in Buffalo.

CLEVELAND

Peace talk and influenza have been the governing factors in the Cleveland coal markets for the past week, the former bringing to the forefront speculations on after-war trade and period of readjustment, and the latter cutting sharply into production at Ohio mines. Lake coal is coming forward at the fastest gait of the season. The domestic trade also is faring considerably better—for the moment.

Bituminous—Production at Ohio mines is being reduced from 10 to 50 per cent. by the epidemic of Spanish influenza, according to operators. Lack of adequate medical attendance is being felt, and in instances entire mines have been down two and three days at a stretch. At present, conditions are certain to grow much worse before they become better, it is believed.

Optimism that has marked the views of operators here recently shows no diminution. Industrial stock piles, on the whole, are the largest in several years. The retail trade now is getting close to 50 per cent. of its requirements, and at least 75 per cent. of the homes in northern Ohio now have half or more of the soft coal they will need this winter. All told, there is more bituminous in northern Ohio today than for some time past, operators generally declare, and short of a disastrously bad winter no severe fuel shortage is possible. One operator goes so far as to predict that there will be a short market after Great Lakes navigation closes—about the middle of December—though he does not expect to see prices shaded much, if at all.

Anthracite—A thousand cars of anthracite in both November and December will see Cleveland's allotment for this year all in hand. Total shipments are estimated to be about 50,000 tons to date, but the city's proportion is only 40 per cent. of its normal requirements. Considerable No. 1 buckwheat has been coming in lately, but this grade is not very much sought. Receipts have been quite spotted, some dealers complaining they have not received over a half dozen cars in the past six months, while others have received a very fair percentage of their needs.

Lake Trade—Bituminous offerings at lower lake ports have been liberal the past week, but the tonnage loaded by the docks in the week ended Oct. 19 falls behind that of the week ended Oct. 12, which final official figures will show a record one for the season. Last week the docks were handling an average of 4000 cars or better a day, and the week's total hovers around the 1,200,000-ton mark. This week it has fallen to about the 1,000,000-ton mark. The first half of October has seen more than 2,000,000 tons loaded for the Northwest, while the entire month is calling for only 3,500,000 tons, according to schedule. Forest fires back of Duluth have lengthened the turn around at the head of the lakes, and the fleet will be found ultimately to have lost four or five days' time. Where a month ago operators were desparing of giving the Northwest its desired 28,000,000 tons, they now are being warned they must hold back some bituminous in order to provide ballast for the carriers that are going to make December trips.

DETROIT

Demand for steam coal appears easier, though supply is not excessive. Weather favors domestic consumers. Lake movement holds good volume.

Bituminous—Detroit consumers of steam coal are manifesting less active interest in the market than heretofore. Their easier attitude is attributed by jobbers to the fact that a number of the larger buyers have been successful in accumulating reserves of some size, while smaller concerns also have been able to get supplies in excess of current requirements. As the movement of coal from West Virginia and Ohio, available for use of steam plant, is now limited to slack and not very much of this is coming from West Virginia, the supply nearly offsets buying. Mines in Illinois are sending forward lump and prepared sizes more liberally. While the coal is not the state's best product, it is finding a market both with steam plants and with retailers.

But for the continuance of moderate temperatures many domestic consumers would be experiencing the hardship of fuelless homes. The domestic supply has been augmented by adding mine-run to the stock which mines in West Virginia and Ohio are permitted to ship to retail dealers serving household consumers. This compensates only in part for the continued scarcity of good domestic lump and prepared sizes, which are moving to the lakes under priority orders. There is still an urgent inquiry from domestic buyers, which suggests that many homes are yet without winter coal supply.

Anthracite—Representatives of the state fuel administration says a slight improvement is noted in receipts of anthracite the first two weeks of October compared with the similar period of September. The supply is still light, however. Of the 53,000 baseburner users whose applications for anthracite were received by the state fuel administration during the first ten days of September, approximately 23,000 have received delivery of sufficient anthracite to start the winter. The remaining orders, it is reported, are being filled at the rate of about 2000 daily. Should anthracite shipments continue at the present rate it is believed the baseburner users will be provided for within a month or six weeks.

Lake Trade—Shipments over lake routes are being facilitated by the plan under which dispatch of carriers is improved by assigning them to head of the lakes docks having speedy unloading plants. Cargo loading for the week ending Oct. 12 is reported to have been the heaviest of this season for a similar period. Shipments are likely to continue until Dec. 1 or later.

COLUMBUS

The Spanish influenza which is prevalent in many parts of Ohio is cutting production in all of the coal fields, but the reduction is not as great as might be expected. Miners are showing more patriotism and as a result the output is still good.

Production is being curtailed because of a great deal of sickness, due primarily to the epidemic of influenza. But miners are showing a good spirit because of the patriotic campaign which has been waged by James H. Pritchard, production manager for Southern Ohio, and are producing a good tonnage. The car supply is generally better. Production has been averaging about 75 to 80 per cent. of capacity in many of the producing fields of the state. Eastern Ohio is having a better car supply and as a result the output is better. Labor shortage is still having a bad effect on tonnage.

Domestic trade is still active and dealers are now accumulating surplus stocks in order to be in a position to take care of the rush when the mercury suddenly falls. There are fairly large stock of mine-run in the retail yards, and dealers are refusing to take that grade. Lump is being moved in limited quantities. The retail situation is generally good and little trouble is expected during the coming winter. Retail prices are firm at Government levels. Pocahontas is now out of the market and there is little anthracite to be had. Consumers in central Ohio are depending largely upon coal from the Hocking Valley and Pomeroy Bend fields.

The steam business is still a little soft because of the large production of screenings and mine-run which are not permitted to be shipped into the entire state of Michigan, the natural market; but modifications of the recent embargo have relieved the situation to a certain extent. It is reported that some producers are cutting prices of screenings, but these cases are isolated and will not affect the trade to any extent.

CINCINNATI

Domestic consumers are well supplied, and although influenza is hampering mining and transportation, other demand is also well taken care of. There is a fair car supply.

The coldest weather of the season has prevailed during the past week in this section, necessitating continued consumption of coal for heating purposes by householders, hotels, apartments, office buildings and the like. The extent to which summer storage, so often commented upon in these columns during the past few months, has taken care of this expected situation is indicated by the fact that there is no great rush to buy coal, but rather an actual let-up in demand, as compared with recent weeks. The average domestic consumer, in particular, is well taken care of, houses with basement furnaces being as a rule provided with very nearly their winter's supply of fuel, furnishing a decidedly good and unusual situation.

On the other hand, the industrial market has become a trifle soft in this vicinity, perhaps for the first time in several months, on account of the successful efforts of the mines to forward domestic coal and a correspondingly large production of screenings. As the zone system limits coal from a given section to a given zone, a slight over-supply may, and at this time does, exist in this vicinity, although of course this does not mean that there is an oversupply of any variety of fuel, taking the country as a whole. The general prevalence of the so-called Spanish influenza has to some extent affected production at the mines, as well as the operation of trains, as many men have been seized with the disease; but so far this is not a serious factor in the situation, and it is hoped, with the vigorous preventive measures that have been taken, that it will not become so.

LOUISVILLE

Car supply fine, but influenza epidemic is holding back production. Mild weather creating some surplus of Western Kentucky domestic. Steam generally draggy.

Reports from all sections of Kentucky show that the car supply is adequate. While reports show that last week proved a big one in production for the country as a whole, in this district output was smaller due to illness in the camps. The influenza epidemic and diphtheria have caused a shortage of labor in some of the eastern Kentucky districts.

Mild weather has curtailed retail business materially, and for the first time in many months the retailers are beginning to advertise in the newspapers for business. The small concerns and newer organizations have been advertising steadily to build up business, but even the large established organizations are now going to printers' ink as surplus stocks are being unloaded in the yards. However, the western Kentucky mines are meeting with such a good demand for coal at the powder plant at Nashville, Tenn., that they are shipping mine-run to that point instead of overloading the market, as there is little demand for any grade of western Kentucky just now.

Eastern Kentucky lump is in demand, but none of this grade is coming on the Louisville market. Some screenings and mine-run are to be had, but no lump.

Practically no West Virginia coal has come to Louisville by the river since the first few days of the month. Low stages have made it impossible to bring coal down, there having been very few rains, and no artificial tides created. River coal companies at present are depending on western Kentucky rail shipments.

Steam coal of all grades appear to be a bit draggy on the Louisville market just now. The eastern Kentucky producers are

meeting with a fair demand for good gas and byproduct coal, but even with regulations modified on stocking are not securing enough business on screenings to enable them to produce much lump. Coal from the Elkhorn district is moving principally to byproducts plant. Harland and southeastern Kentucky coal is moving to the lakes and also to Georgia and the Carolinas for domestic, industrial and general use. This coal is only moving to Michigan for gas and byproduct consumption.

BIRMINGHAM

Coal production showing some improvement. Car supply satisfactory in most instances. Steam demand very easy. Domestic market brisk.

Reports from this field indicate that a gradual improvement may be expected from now on in the output of coal. For the week ending Oct. 5, 409,022 net tons were mined, according to official tabulations of District Representative Holmes, which was an increase of about 26,000 tons over the week of Sept. 28. Car service during the past week was good, and only in a few cases was any delay occasioned at mines on account of lack of equipment for loading. Production at some mines is being affected by the presence of influenza in the camps, but this disease has not assumed an epidemic stage to such an extent as to cripple operations seriously.

Small industries are apparently fairly well supplied with fuel and are not clamoring vigorously for shipments above quotas specified in orders. All priority orders of railroads were cancelled by the Fuel Administrator, effective Oct. 14, shippers being instructed to continue deliveries on the basis of priority stipulations in effect for the week ending Oct. 12. Though the market is easy there is no surplus coal for the spot trade.

Domestic sizes are in great demand and there is a deficit in the supply to meet present requirements. Official reports show that approximately 21,000 net tons was purchased and stored during September. Yards are still without stocks and unprepared for the cooler weather which will soon set in.

Coke

CONNELLSVILLE

Slight decrease in coke production, with prepondering increase in raw coal shipments. Coke quality improving somewhat. Market quiet.

Coke production in the region has shown a further though slight decrease, but this is possibly equalized by increased shipments of coal, as the major portion of the coal shipments are to byproduct coking plants. Spanish influenza is beginning to curtail working forces and more serious effects are expected from the epidemic before it is over.

Reports from blasts furnaces as to quality of coke received from beehive ovens continue of a favorable character, but there is still much improvement to be sought. Some furnaces, receiving coke from several different operations, report distinct improvement in coke from some plants and none whatever in coke from other plants. Nearly all blast furnacemen agree that the quality of much of the beehive coke received is far below former standards. There is complaint of high ash in the case of many cokes, of high sulphur in a few cases, and of coke being of too small size from many if not the majority of machine drawing plants. The number of plants using mechanical drawers has increased since labor became so scarce. There is practically no complaint as to quality of byproduct coke.

Practically all the blast furnaces seem to be sufficiently supplied with coke, in point of tonnage, but there is little if any opportunity to accumulate reserves. It is very rarely that furnace coke is offered on the market, and there are few fresh allocations, as deliveries continue to be made on old allocations. Foundry coke is offered in a limited way, some of it through brokers, who are generally able to collect a commission of 25c. from the sellers. Coke screenings from old dumps continue to be offered, but in smaller volume than before the Government price limit was reduced.

The "Courier" reports coke production in the Connellsville and Lower Connellsville region in the week ended Oct. 12 at 322,920 tons, a decrease of 7240 tons, and raw coal shipments from the two regions at 266,533 tons, an increase of 42,867 tons.

Middle Western

GENERAL REVIEW

Middle West mines producing record tonnages. Railroads not storing any coal, and result is a weak market. Central and northern Illinois mines in need of more business. Domestic trade shows improvement.

The entire Mid-Western coal-producing territory has apparently set out to please the Fuel Administration, as the tonnage produced from this district in the last week is going to equal, if not exceed, previous records. It is quite true that many favorable factors have helped the operators. For instance, plenty of cars, mild weather, and a fairly good labor situation. To counterbalance these things, the market continues weak, and at times erratic, and some operators are fearing a general epidemic of Spanish influenza in the mining districts.

To get back to present market conditions, the concensus of opinion is that there will probably be a break. With the enormous tonnage produced, and the present restricted zones, it is easily seen that something will have to happen, if the market is to remain firm. The railroads are not buying coal in any great quantities; in fact, it is said that only a few of the Northern railroads are in the market at all. The fact that the railroads are not purchasing coal, nor have they any in storage, accounts for in the opinion of many operators, the present weak market:

The southern Illinois field, considered as a unit, is well supplied with orders; in fact, the miners in this district have been behind on their shipments for over a year. Last week southern Illinois coal was easier than it had been for some time, but this condition has changed, owing to purchases made by a large public utility organization, and one or two railroads who have been temporarily in the market. Domestic sizes from Franklin, Williamson and Saline County are almost impossible to get, in spite of the fact that the average retailer has apparently as much coal as is needed for the present.

Central and northern Illinois producing districts are in need of more business. Even 6-in. lump and other domestic sizes can be freely purchased at Government price, while mine-run and screenings can be purchased considerably below that figure. The situation in Indiana is practically the same, with the exception, of course, of the Clinton No. 4 district, and one or two other fields producing very high grade fuels.

There is some little improvement in the domestic trade, as a number of retail dealers in the Northwest have come into the market with substantial orders. As the season progresses, and the hope of obtaining hard coal and high-grade eastern coals grows less, the retail trade will have to limit their purchases more and more to mines in Illinois and Indiana, rather than to the dock companies at the head of lakes, and the eastern producers.

CHICAGO

Almost impossible to sell steam coal. Domestic situation in bituminous is dull. Anthracite situation getting worse.

Chicago is proving a poor place these days in which to sell coal. It is almost impossible to place steam coal here, except at a discount from the Government price. Some of the biggest buyers are entirely out of the market, except when offered a decided bargain, and nine times out of ten are only interested on that basis, on the grounds of a personal favor. In short, if an operator has coal that must be sold, Chicago is a poor place in which to sell it.

The domestic situation is dull, so far as bituminous coal is concerned. All reports indicate that operators are receiving instructions to hold up shipments. The retailers claim that the spell of mild weather the city has been enjoying for the past few weeks has put a temporary stop to all buying. The anthracite situation is getting worse, rather than improving. It appears that all shipments of anthracite are being handled by the State Fuel Administration, and the way this organization is managing the job is causing a lot of adverse criticism. There is no indication either of any prompt relief of this hard coal situation.

MILWAUKEE

Mild weather dispels uneasiness in coal circles. Liberal receipts of anthracite by rail. Half of Wisconsin's supply in the hands of dealers.

The prevalance of mild weather, together with liberal receipts of anthracite by rail, tends to dispel uneasiness in coal circles. It is estimated that each day of the present weather saves about 6000 tons of fuel in Milwaukee. Between 300 and 400 tons of hard coal have been coming in daily by rail of late. No attempt is being made to store this coal, but it is passed right out to small dealers, who are thus enabled to make satisfactory inroads on delayed orders. About six weeks of lake navigation remain. During that period the receipts of anthracite will have to be above the normal if orders now on the books are to be supplied.

According to figures compiled at the office of the state fuel administrator, 50 per cent. of the coal ordered in Wisconsin for the winter of 1918-19 has already been delivered to dealers for distribution.

A statistical plan whereby it will be possible to prevent congestion of coal cars at any point and which will enable fuel administrators to tell at a glance where coal is needed most, has been perfected by Paul J. Weirich, of Monroe, Wis., fuel administrator for Green County. By the adoption of this system every county will receive equal distribution, and there will be no hardship because of improper consignment of fuel by administrators. No order will be filled unless the charts are consulted. The plans have received special commendation from the Federal Fuel Administration office at Washington.

Appleton, Wis., a prominent manufacturing center of the Fox River Valley, is undergoing a coal panic, which only the reception of fuel supplies will abate. Many families are closing their homes and seeking apartments and hotels. There is no reason why this condition cannot be corrected, however.

Coal receipts by lake thus far in October aggregate 53,111 tons of anthracite and 200,072 tons of bituminous, making the season's receipts of the former thus far 514,539 tons, and of the latter 2,967,749 tons.

ST. LOUIS

Overproduction of all kinds of coal in the southern Illinois field, and St. Louis is glutted. No domestic business at all from city or country, and steam business extremely light. Unbilled coal worries operators. Plenty of equipment and transportation improved.

Contrary to general expectations, and at a time in the year when everybody is worried about securing enough coal, the condition here is just the reverse. If there is any worry it is about where coal is going to be placed and how the mines are going to be kept running. The retail coal business in St. Louis is absolutely at a standstill. Many of the larger dealers have from one-eighth to one-fourth of their equipment working and the rest idle.

General conditions throughout the country sections are much the same. Orders are not coming in and inquiries develop the fact that the yards have put in the bulk of the coal required for the next couple of months. This pertains to practically all kinds of coal—Standard, Mt. Olive and high grade—whereas a few weeks ago there was a shortage on all kinds.

Steam business is slow. There is no storing to speak of, and the big buyer, figuring on lower prices, is holding off buying as much as possible.

The operators in the Standard field are facing a critical period, and the only thing that is going to keep their organizations intact will be the railroad business. At the present time this is coming through in fairly good volume, and every effort is being put forth to secure nearly all of the tonnage from the Standard district.

In the Carterville district and also the Duquoin district the operators are slowly but surely catching up with their orders, and there has been some free coal offered from this field in the St. Louis market this week. Some of the larger dealers here have shut off their shipments, and for the first time since last February, when there was a slight lull in the market, Carterville coal is being offered by the shippers on the open market for prompt shipment. This condition was not anticipated by anybody a few months ago and was not expected to happen until sometime next spring.

Fuel Administrator for Missouri, Wallace Crossley, has asked the United States Fuel Administration at Washington to lift the restrictions on industrial plants in Missouri storing coal so that the tonnage for Missouri may be absorbed and business kept going. There are no eastern coals coming in and an extremely light tonnage of Arkansas.

The prices are the same as previously, excepting that Standard screenings are from $1.50 to $1.60 and 2-in. lump has broken to $2.30 and $2.40.

On some of the coals from the Williamson and Franklin County field a 10c. special preparation charge is in effect. Very little of this coal moves into this territory.

COAL AGE

Volume 14 New York, October 31, 1918 Number 18

The Enlistment of Shorty McGee

By Gilbert Fletcher



I WANTED to jine with the army,
Or the navy, said Shorty McGee,
But the guys what was doin' recruitin'
Didn't seem to be crazy fer me.
They kicked 'cause I wasn't a scholar,
They said I was way under size,
And they hung out the crape on my cravings,
When they found I was weak in the eyes.

SO I pulled my freight back to the pit mouth,
To the gloom and a rank smellin' hole,
With a cuss at my eyes and my inches,
And an oath at the tools and the coal.
And wrath, plain wrath fer the thick heads
That headed a runt fer the mine,
And gave him a pick and a shovel
When he asked fer a gun in the line.

IT was coal that they wanted to win it,
So I'm gettin' it out on the run,
And it's keeping things warm fer the Allies
And it's making them hot fer the Hun.

Yea boy, it's a line I'm a-holdin',
Jest bet yer best boots I will stick,
Fer if I can't shoot I can shovel,
I can blast and can handle the pick.

I'M wading coal out by the carload,
Too busy to stop or to strike,
I'm doing my bit fer the Allies
A-workin' the way I would fight.
Each lump that I throw in the coal car
Is a missile slam-bang to its mark,
It ain't any haphazard business
Like chucking grenades in the dark.

IF I am a bit short fer a soldier,
And my eyes seem to be on the bum,
I can delve into coal with a shovel,
With the zeal I would carry a gun.
So it's stick to the diggin's fer us boys,
And sure we'll be doin' two bits,
In keeping things right fer the Allies
By coaling up Hades fer Fritz.

IDEAS AND SUGGESTIONS

FIG. 1 AND 3 Key-pulling Devices
FIG. 2 " 4 Driving Bushings home with Chain and Jack
FIG. 5 Cutting long Oilgroove by Hand
FIG. 6 AND 7 Placing a Bushing: Wrong Way-Driving. Right Way-Pulling
FIG. 8 AND 9 Extracting Bushings in Close Quarters

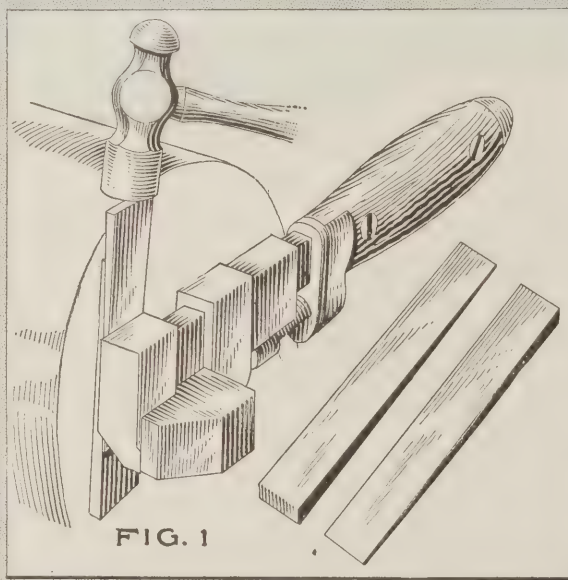


FIG. 1

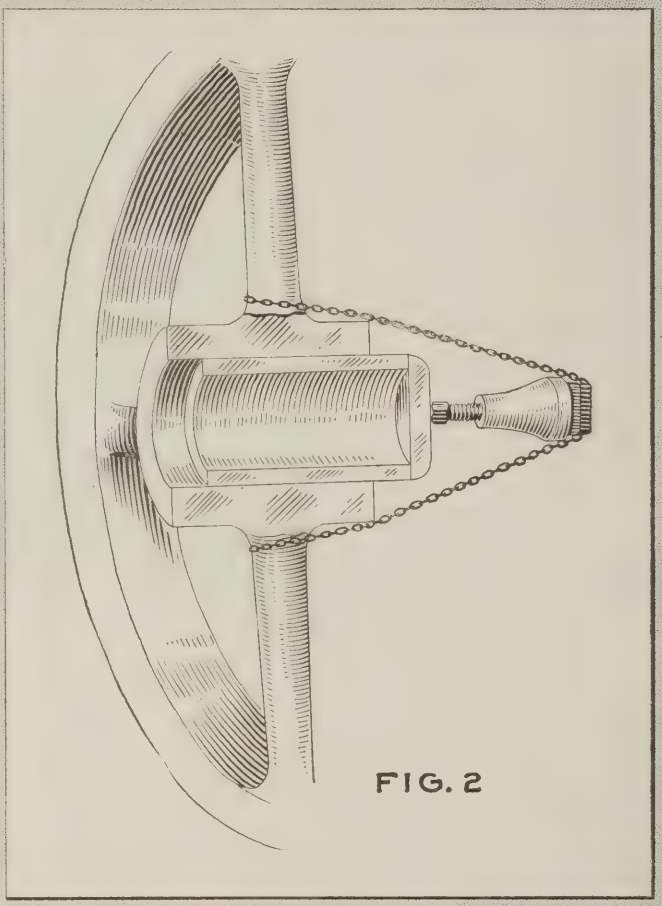


FIG. 2

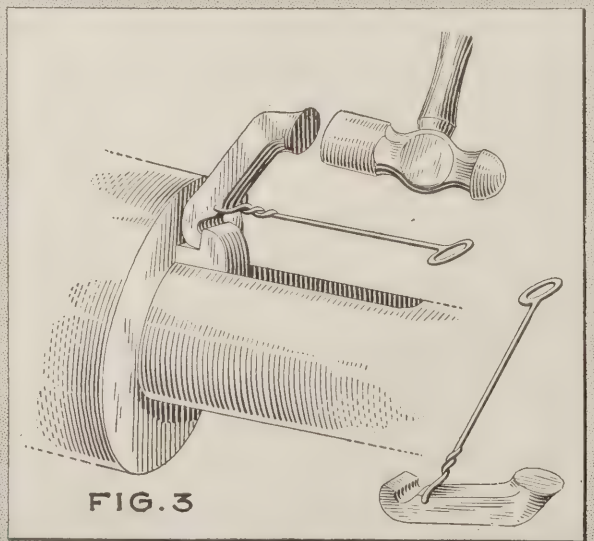


FIG. 3

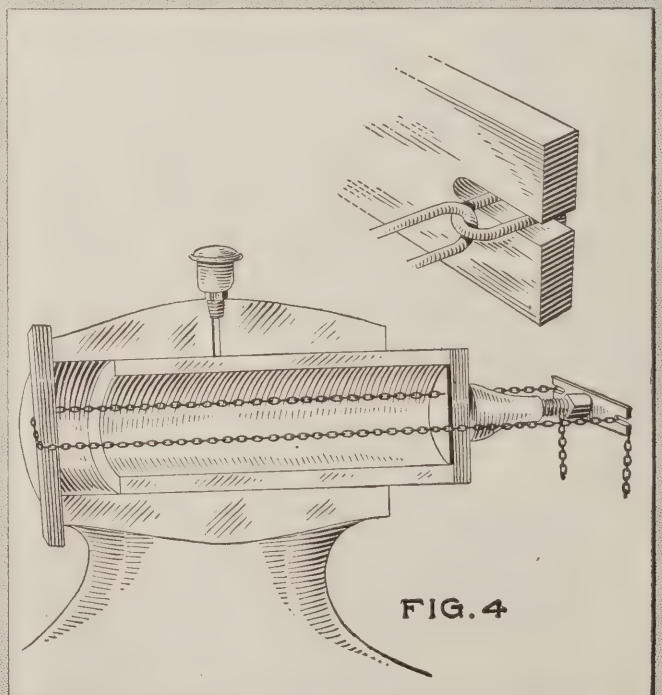


FIG. 4

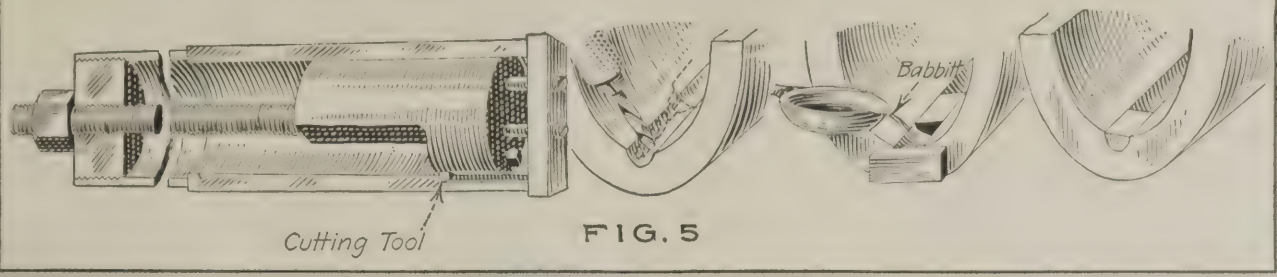


FIG. 5

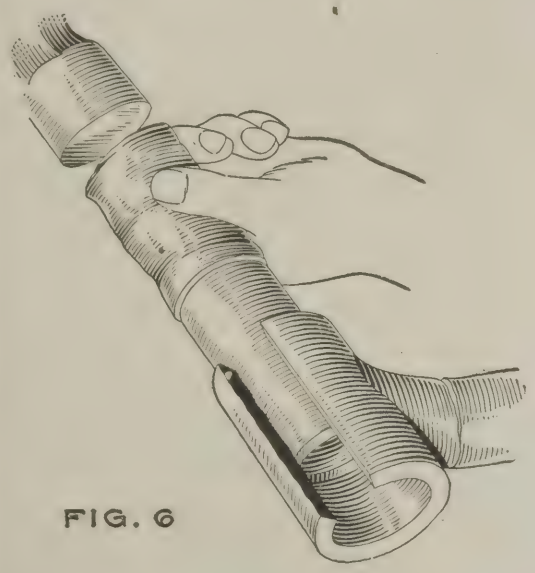


FIG. 6

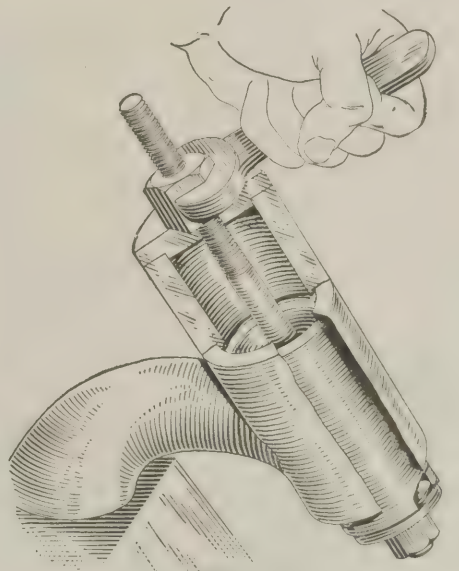


FIG. 7

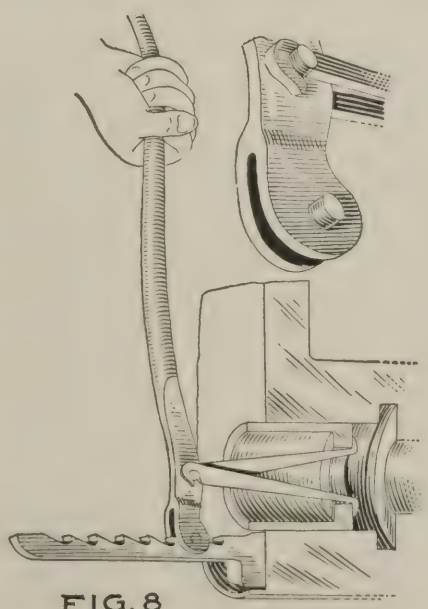


FIG. 8

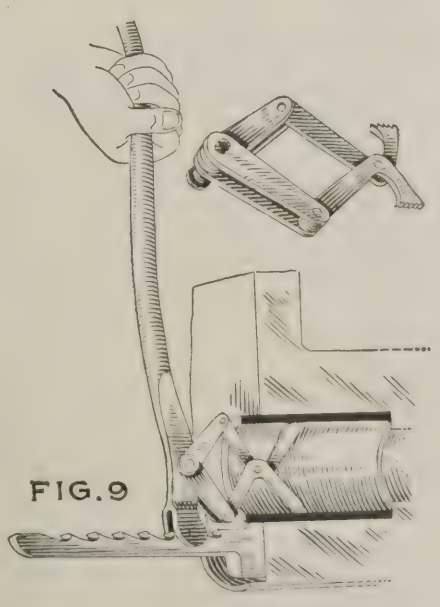


FIG. 9

Peabody Coal Development in Central Illinois

By GEORGE W. HARRIS
Editorial Staff, "Coal Age"



FIG. 1. TIPPLE AT MINE NO. 7 OF THE PEABODY COAL CO., KINCAID, ILLINOIS

BIG coal producers do not spring up overnight like mushrooms. Neither do they continue in the first class unless the management provides for systematic development along uptodate lines in which full advantage is taken of every opportunity to secure tonnage. It is interesting to note how the leaders do things. In a coal state of the importance and potentiality of Illinois, there are a number of large coal interests which have under way some big plants in different stages of development. Among these mining companies is the Peabody Coal Co., one of the leading miners and shippers of the state as regards modern equipment and aggregate tonnage; its eleven mines shipped 4,310,000 tons for the year ended Dec. 31, 1917.

PROMINENT among the mines of the Peabody Coal Co., of Chicago, Ill., is a group of plants on the Chicago & Illinois Midland R.R., within 20 miles of Springfield, Ill. This short line of road does not attract much attention on the Chicago or New York exchanges, but it is of far more interest to the Peabody company than some of the big railroads which are prominent at these stock exchange centers. The Chicago & Illinois Midland R.R. interchanges with the Baltimore & Ohio and the Wabash R.R. at Taylorville to the east, with the Illinois Central at Pawnee Junction, with the Chicago & Alton at Auburn, and the Chicago & Northwestern at Compro, to the west of the plants in question. This belt line of about 26 miles in length furnishes traffic connection for the Peabody mines along the line of the road with the trunk railroads noted. Seven miles west of Taylorville on the Central & Illinois Midland R.R. is the mining town of Kincaid; to the east of this town is the No. 7 mine of the Peabody Coal Co., to the west is No. 8, and about halfway between Kincaid and Taylorville is No. 9—the latter in embryo.

Standardization of machine parts has been practiced in this country for some time, but the same policy seems somewhat novel when applied to coal plants. Nevertheless this principle seems to have been adopted in the case of the three plants just noted. No. 7 main shaft was sunk in the fall of 1911 and is 349 ft. deep to the No. 6 seam; shaft No. 8 was sunk the following year, reaching coal at a depth of 358 ft.; No. 9 has only recently struck coal at 417 ft. below the surface. The No. 7 and No. 8 shafts and equipment are in duplicate practically in every particular, and No. 9 is laid out on the same lines. It would hardly be practicable to carry out a plan of this kind in some mining sections. But in the prairie state of Illinois the surface topography permits of plant location almost

at will, and the regular seams readily adapt themselves to a standard plan of development.

The No. 7 and No. 8 mines of the Peabody Coal Co. are in Christian County. These two plants and a third mine at Stonington (Peabody No. 21), eight miles northeast of Taylorville, produced 1,747,292 tons of coal for the year ended June 30, 1917. This tonnage was all machine-mined. By contrast the remaining six commercial shipping mines in this county produced only 1,074,875 tons during the same period; and of this amount only half the product of one mine (34,382 tons) was machine-mined coal—practically the whole output was mined by hand. In view of the fact that Peabody No. 7 and No. 8 mines

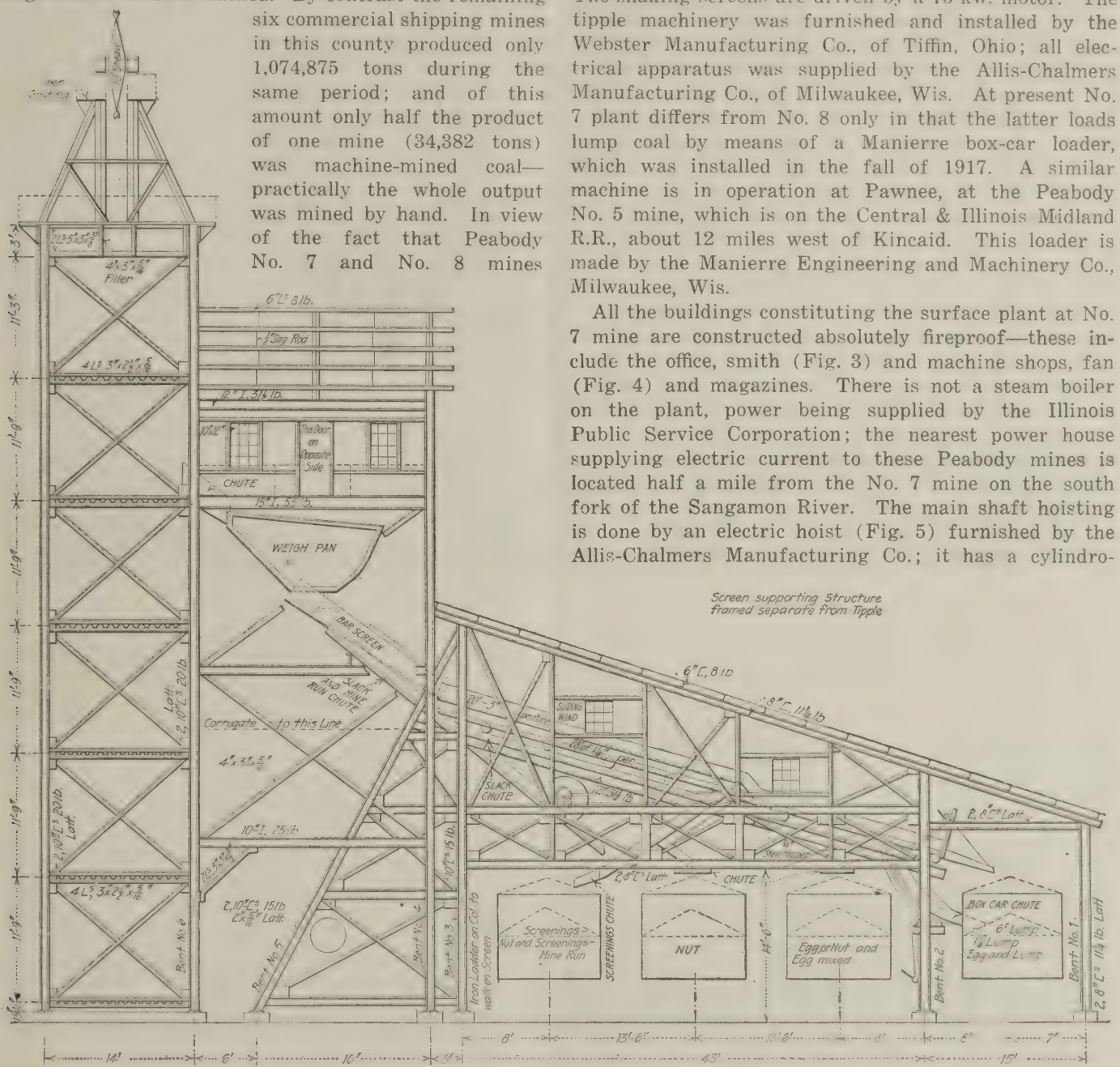


FIG. 2. LONGITUDINAL SECTION OF HEAD FRAME AND TIPPLE, SHOWING LOCATION OF CHUTES AT MINE NO. 7, PEABODY COAL COMPANY

are duplicates of each other, only the No. 7 plant is illustrated and described in this article. The capacity of No. 7 mine is 4000 tons of coal in eight hours. The tipple at this mine is shown in perspective in Figs. 1 and 3, and in section in Fig. 2. The tipple is steel throughout and most of the main members are of built-up construction. The main posts and beams are latticed channels; other members are built up with angles and lacing, and some I-beams are used as struts The main tipple is covered with corrugated-iron siding, as shown in the illustrations. From the surface to the center of the sheave wheel at the shaft is a distance of 90 ft. The tipple was built by the Decatur Bridge Co., of Decatur, Illinois.

The arrangement of the screens and the sizes and grades of coal loaded at this four-track tipple are shown on the section, Fig. 2. The screen-supporting structure is framed separate from the rest of the tipple. The shaking screens are driven by a 75-kw. motor. The tipple machinery was furnished and installed by the Webster Manufacturing Co., of Tiffin, Ohio; all electrical apparatus was supplied by the Allis-Chalmers Manufacturing Co., of Milwaukee, Wis. At present No. 7 plant differs from No. 8 only in that the latter loads lump coal by means of a Manierre box-car loader, which was installed in the fall of 1917. A similar machine is in operation at Pawnee, at the Peabody No. 5 mine, which is on the Central & Illinois Midland R.R., about 12 miles west of Kincaid. This loader is made by the Manierre Engineering and Machinery Co., Milwaukee, Wis.

All the buildings constituting the surface plant at No. 7 mine are constructed absolutely fireproof—these include the office, smith (Fig. 3) and machine shops, fan (Fig. 4) and magazines. There is not a steam boiler on the plant, power being supplied by the Illinois Public Service Corporation; the nearest power house supplying electric current to these Peabody mines is located half a mile from the No. 7 mine on the south fork of the Sangamon River. The main shaft hoisting is done by an electric hoist (Fig. 5) furnished by the Allis-Chalmers Manufacturing Co.; it has a cylindro-conical drum and is equipped with modern safety devices.

On descending the shaft the same modern construction evident about the rest of the plant can be noted—in the concrete lining, the steel I-beam buntons and the 70-lb. T-rail guides. The main shaft is 17 ft. 8 in. by 10 ft. in dimension; the air shaft measures 16 x 10 ft. inside—there is a 10 x 10-ft. air compartment and a 6 x 10-ft. stairway partitioned off by a 6-in. concrete curtain wall. The air shaft is concrete throughout. The 12-ft. Jeffrey steel-cased fan at this shaft

runs at high speed and supplies 250,000 cu.ft. of air per minute to the mine workings.

A strategic point about a high production plant is the shaft bottom. Through this lower end of the bottle's neck passes the tonnage of the mine, and any congestion here limits the production of the plant. The capacity of the shaft is greatly increased by attention to details of hoisting, haulage and the facilities at and around the bottom itself.

All these factors so vitally affecting the shipment of coal are interdependent. In Fig. 6 is shown the bottom at No. 7 mine viewed from the empty side. The diamond cross-over is prominent in the foreground. On

Four-ton end-gate cars are used. In order to get the proper grades at the loaded and empty tracks, bottom rock was blown up on either side of the shaft; side retaining walls of concrete were then built, on top of which were set 12 x 12-in. posts to support the 12-in. I-beams holding up the limestone roof. All these features are brought out in Fig. 6. This illustration shows that the local underground artist has improved his opportunity to decorate the concrete side retaining walls with frescoes—someone also had a literary turn of mind.

The No. 6 seam at this group of Peabody mines has an average thickness of 7 ft. 6 in. and a good top.



FIG. 3. BLACKSMITH SHOP AND TIPPLE AT MINE NO. 7 OF PEABODY COAL COMPANY—ALL FIREPROOF

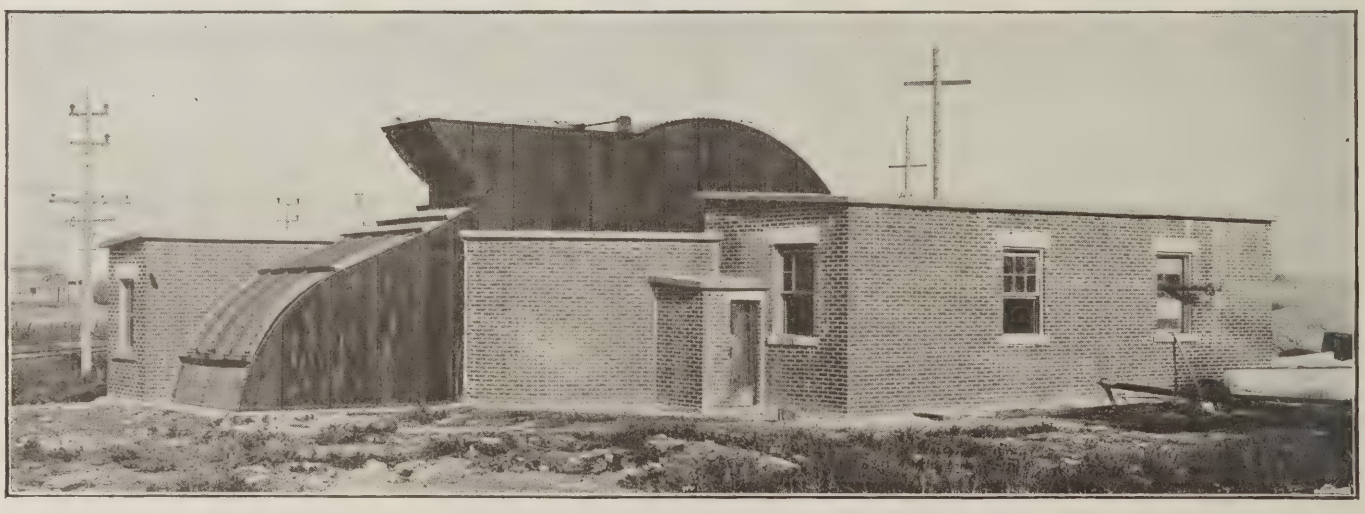


FIG. 4. FAN AT MINE NO. 7 OF PEABODY COAL COMPANY

the opposite side of the shaft automatic safety mine-car cagers are installed, made by the Mining Safety Device Co., of Bowerston, Ohio.

Both loaded and empty cars are handled by gravity, the former being delivered on the Oleson self-dumping cages (made by the Eagle Iron Works, Des Moines, Iowa) by the automatic cager, a device contributing greatly to safety and speed of operation. The empty pit cars, pushed off the cage by the loaded ones, run onto the empty tracks and around to each side of the shaft by gravity; here they are made up into trips which are picked up by motors.

The mines here are worked on the room-and-pillar panel method of mining. The east and west main entries are driven on the three-entry system—a haulage way in the middle and an airway on either side. Double entries branch out from the main entries. A 100-ft. barrier pillar is left between the first room in a panel and the nearest entry. Rooms in one panel do not hole through at the face to the rooms of an opposite panel ahead. Rooms are driven on 55-ft. centers with 30-ft. room width and 25-ft. pillars; entries are 12 ft. wide.

All operations are conducted electrically at Mine

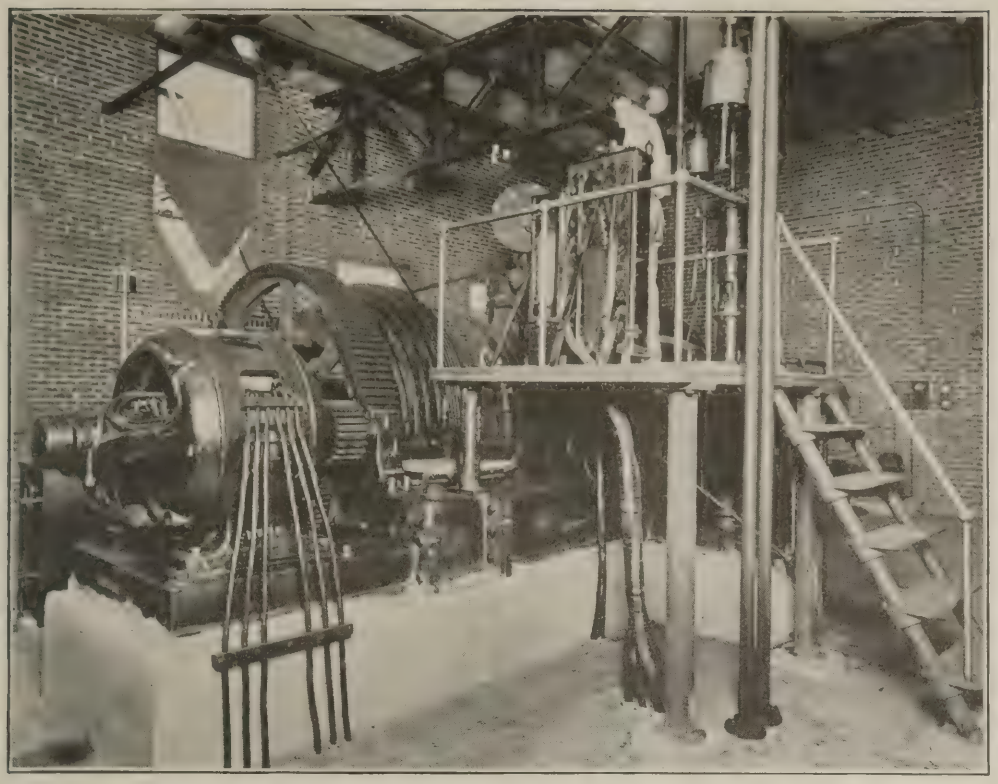


FIG. 5. MAIN HOIST AT MINE NO. 7, KINCAID, ILLINOIS

No. 7. On the surface this power is used as noted. Underground the haulage is done by General Electric motors—13-ton locomotives for main-line work and six-ton motors for gathering cars from rooms and delivering to partings. All coal is cut by electrical mining machines, distributed as follows: Twenty Sullivan shortwall machines are used on territory work and entries are driven by 12 Morgan-Gardner machines.

No pillars are drawn in this field, which is rather unfortunate. Everything being equal it costs no more to drive an entry looking to 90 per cent. recovery of coal in the territory opened up than for 50 per cent. The expense of narrow work charged up against 9000 tons of coal mined is considerably less per ton than when only 5000 tons are recovered. Many operators consider that coal of the thickness of that worked in Mine No. 7 is almost ideal as regards profitable mining. However, it is difficult to take full advantage of these favorable conditions at times. The same trouble is experienced here as in most other sections of Illinois, where a comparatively low percentage of coal recovery has been maintained.

According to the 1910 census reports, the average value of surface in Christian County, Illinois, is $123.63 per acre. This is among the best land in the state, and when subsidence of surface occurs as a result of mining which brings down the top then heavy damages are claimed by the owners of surface thus disturbed.

A natural consequence is to leave sufficient coal in the ground in the form of pillars which will prevent a break in or settlement of the top rock. This subject has been touched on in *Coal Age* before, but the importance of the matter is such that a further discussion of similar cases is warranted. A most interesting bulletin on the "Percentage of Extraction of Bituminous Coal with Special Reference to Illinois Conditions," by C. M. Young, of the University of Illinois, reports on the results of investigations which have been going on recently. This bulletin notes that in the district, of which Christian County is a part, the Peabody Coal Co. reports extractions at its mines of 65, 62, 60 and 70 per cent. respectively.

Every year the housing problem at mines receives more and more attention. The majority of the miners at No. 7 and No. 8 Peabody mines own their own homes, which were purchased from the company. The mining town of Kincaid is on the other side of the track from No. 7 shaft, and No. 8 is only 1½ miles distant; it has a population of about 2000. Building

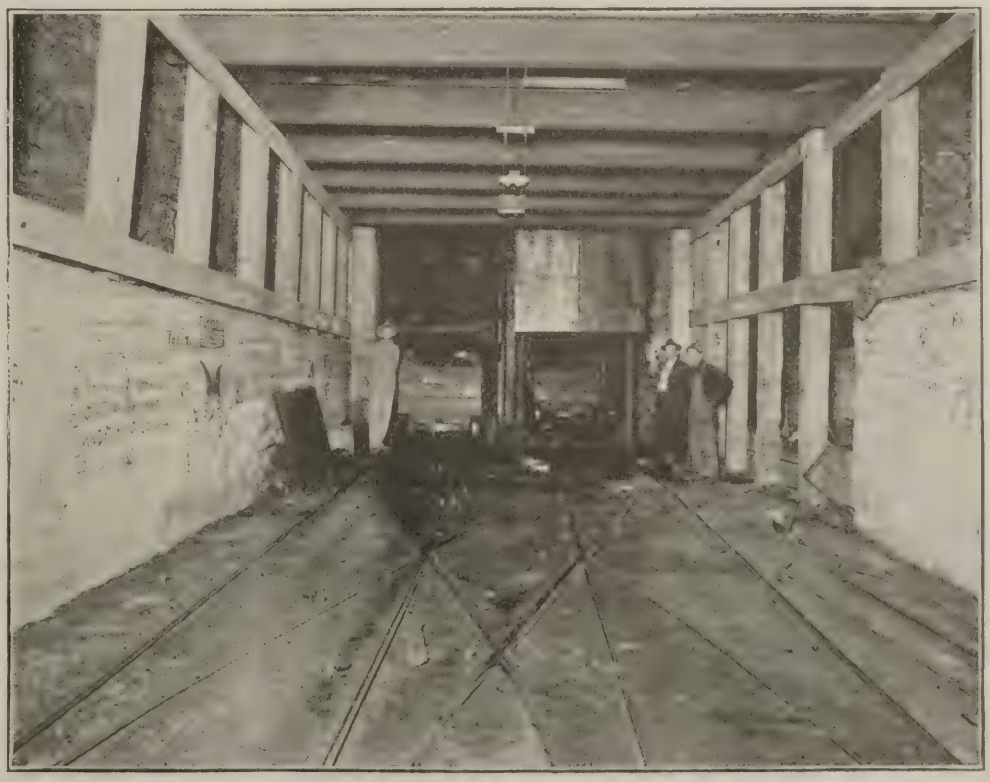


FIG. 6. SHAFT BOTTOM, EMPTY SIDE OF MINE NO. 7, PEABODY COAL COMPANY

restrictions are attached to transfers of land and vary according to the value and location of the lot. The restrictions include the erection of brick business buildings, the exclusion of saloons, gambling houses and so on. The miners can build their houses of wood. A hotel and a large foundry and machine shop have been built in the town; the latter is about to double its capacity.

Often of equal importance to an operator with the technical side of mining are commercial problems—markets and car supply. At present the market for a given coal is determined by the zoning system, and operators and men are struggling to the limit to supply coal. Dr. F. C. Honnold, Production Manager for Illinois, has stated that if the domestic consumer would accept all grades of coal it would greatly help production—that screenings on hand retard production. It is due to the discrimination of the private consumer of coal in Illinois as to the kind preferred which has led to the preparation of the "57 varieties" which have been placed on the market. One solution of the abnormal demand for domestic coal in Illinois, in Dr. Honnold's estimation, would be the acceptance of mine run by the private consumer—its use has been urged.

Now that production is receiving so much attention, all the factors entering into the tonnage problem are given most careful consideration. Prominent among these are labor and transportation, and they are much more closely related than might appear on the surface. It is now the policy of the Peabody company to provide an opportunity at each of its mines to ship over several roads. Miners tend to go to those mines where they can get the most steady work. The mines on the Central & Illinois Midland R.R. have had a particularly good car supply, operating at best from 75 to 80 per cent. of the time. It is difficult to hold men and keep up an efficient organization where the car supply is unsteady; when a mine works only two or three days a week it is not at all satisfactory to the miners, who leave and go to a mine where steady work is obtainable.

The Peabody company stated last spring that it had lost 20 to 30 per cent. of possible production on account of labor shortage due to insufficient car supply. The consumption of coal has increased enormously during the last two years; new mines have been opened up and existing plants have improved their facilities for increasing output. On the other hand, available labor of mining caliber has decreased, and the car renewals on the railroads have hardly more than replaced worn-out rolling stock. In view of the present tax on the facilities of the transportation lines in other directions, improved service will have to compensate for deficiencies in cars and locomotives if the operators are to ship the quantity of coal necessary to meet this year's requirements.

For the facts forming the basis of this article and the illustrations accompanying it, the writer is indebted to various officials of the Peabody Coal Co., who courteously furnished the information.

Soft Coal Loadings at Lake Erie Docks

To Oct. 1 the Great Lakes fleet had taken on exactly 20,756,057.04 net tons of bituminous coal for the Northwest, according to the official statement of the Coal and Ore Exchange, Cleveland. Since the Federal Fuel Administration's schedule calls for a total movement of 28,000,000 net tons of bituminous this season, and October is down for 3,500,000 tons and November for 2,400,000 tons, the Northwest is behind 1,343,942.96 tons. December, however, was left open by the Federal Fuel Administration, and since operators are figuring on moving at least as much coal as in last December—when the movement was about 660,000 tons—the lake trade is about 700,000 tons behind schedule.

In addition to the 20,756,057.04 tons of cargo coal loaded at Lake Erie ports for the season to Oct. 1 the total of vessel fuel loaded is 928,778.90 tons, making a grand total of 21,684,835.94 net tons of bituminous handled at the docks from the opening of navigation to the first of October.

Cargo coal loaded in September amounted to 4,666,545.10 tons and vessel fuel, 184,652.80 tons, making a total of 4,851,197.90 net tons for the month. The schedule called for 4,900,000 tons of cargo coal. Toledo again led, with a total of 1,754,641.15 tons at the three docks; Lorain was second with 608,186.80 tons; Ashtabula was third with 622,990.30 tons, and Cleveland fourth with 552,087.55 tons.

The accompanying table, the official compilation of the Coal and Ore Exchange, which is handling the Great Lakes vessel pool, gives the statistics in detail:

BITUMINOUS COAL LOADED AT LAKE ERIE DOCKS

Port	Dock	During September			Season to Sept. 30		
		Cargo	Vessel Fuel	Total	Cargo	Vessel Fuel	Total
Toledo	B. & O.	578,751.55	14,793.50	593,545.05	2,137,271.20	45,523.80	2,180,795.00
Toledo	H. V.	798,782.80	22,160.40	820,943.20	3,600,207.60	104,176.05	3,704,383.65
Toledo	T. & O. C.	332,116.90	8,037.00	340,153.90	1,598,690.00	43,616.15	1,642,306.15
Sandusky	Penna.	420,811.30	10,294.95	431,106.25	1,764,408.20	44,241.10	1,808,649.30
Huron	W. & L. E.	313,773.30	9,957.40	323,730.70	1,605,074.85	57,561.70	1,662,636.55
Lorain	B. & O.	592,724.55	15,462.25	608,186.80	2,373,539.30	67,955.25	2,441,494.55
Cleveland	Erie	98,843.00	3,355.45	102,198.45	487,350.95	16,128.15	503,479.10
Cleveland	Penna.	411,253.65	38,635.45	449,889.10	1,900,575.54	224,241.90	2,124,817.44
Fairport	B. & O.	44,152.40	6,367.50	50,519.90	149,324.65	34,126.20	183,450.85
Ashtabula	N. Y. C.	330,992.05	30,157.30	361,149.35	1,535,289.55	164,163.15	1,699,452.70
Ashtabula	Penna.	249,436.20	12,404.75	261,840.95	1,027,956.55	62,929.55	1,090,886.10
Conneaut	B. & L. E.	329,104.90	4,145.80	333,250.70	1,730,437.40	25,455.70	1,755,893.10
Erie	East.	84,953.65	4,055.35	89,009.00	512,942.45	30,651.20	543,593.65
Erie	Pa. West	80,848.85	4,825.70	85,674.55	332,988.80	10,009.00	342,997.80
Total		4,666,545.10	184,652.80	4,851,197.90	20,756,057.04	928,778.90	21,684,835.94

The bituminous coal movement by months, according to the Coal and Ore Exchange, has been as follows: April, 868,852.64 tons; May, 3,194,198.10; June, 3,539,-352.30; July, 4,234,305.05; August, 4.996,929.95, and September, 4,851,197.90. Vessel fuel is included in these figures.

If the 34,000,000 tons of coke made in beehive ovens in 1917 had been made in the byproduct type, some 750 million cubic feet of gas would have been saved, according to estimate, every 24 hours. From this gas about 65 million gallons of benzol might have been recovered.

Low-Temperature Distillation of Illinois and Indiana Coals

By G. W. TRAER

SYNOPSIS—*This article is an abstract of a paper presented at the October, 1918, meeting of the American Institute of Mining Engineers at Milwaukee. It gives an account of some remarkable results. A semi-coke averaging 18 per cent. volatile matter was made in cast-iron containers that were pushed consecutively through the ovens. By this process it is estimated that nearly 20 gal. of gasoline as well as other valuable byproducts can be made from one ton of Illinois coal.*

THE distillation of bituminous coals at what is commonly termed low temperature, and the quantities, nature and adaptabilities of the products evolved have been the subject of considerable experimentation during recent years. Fortunately, the earlier work in this country was done by men whose scientific training qualified them properly to record and interpret the results of their experiments. The work of Professor Parr, of the University of Illinois, is especially notable in this respect.

Professor Parr's work, added to that of English experimenters, demonstrated certain things to a degree which is generally regarded as convincing. They have proved that a caking bituminous coal, when subjected to a temperature of not more than 1000 deg. F. (preferably somewhat less) will yield light tar having low specific gravity (about 1.06) and high commercial value; also, that this yield, with a given coal, will depend upon the percentage of hydrocarbons in the coal, the maximum temperature used, and the promptness with which the distillate gases are removed. It is assumed that air is excluded from the retort, and that the coal is subjected to heat for a sufficient time to drive off all of the tarry hydrocarbons. It is the purpose in this paper to describe other work of a practical nature, directed toward the commercial adaptation of these principles, which was begun nearly two years ago; this investigation was assisted by A. J. Sayers, of the Link-Belt Co., and Carl Scholz.

The first step was to draft tentative designs for the handling of the coal and coke so as to produce a coke having a suitable structure for sizing, storage, shipment and handling, without the necessity of briquetting. Professor Parr's results had indicated that the rather open-pored volatile coke produced by him had a low ignition point, which would contribute toward easy control of the fire in stoves, house furnaces, fireboxes and boilers. It is recognized by those experienced in the marketing of fuels that the hard non-volatile coke from the high-temperature process falls far short of being an ideal domestic fuel. The high ignition point of hard non-volatile coke makes it difficult to burn satisfactorily in a small or thin fire. With a strong fire the drafts have to be watched closely because of the tendency to over-intensity of combustion. In spite of its high heat value and cleanliness in handling, it has therefore fallen short of being a popular domestic fuel.

Another important factor is that, while it has proved quite impracticable to use non-volatile hard coke in locomotives previously using high-volatile bituminous coals, without radical changes in the fireboxes, the indications were that high-volatile coke could be employed for this purpose without material firebox change.

C. M. Garland was retained to revise the designs and supervise the construction and operation of an experimental plant, which was installed at Chicago in 1917. The operation of the plant began early in October and, with some stoppages for corrections indicated by its use, was operated until Dec. 24. Altogether about 140 tons of coal were passed through the plant, about 100 tons of which was Franklin County mine-run crushed to pass through a 2-in. round-hole shaker screen. The other coals tested, in lots ranging from 4 to 12 tons, comprised those from Harrisburg and Eldorado in Saline County, Illinois; Indiana Fourth Vein from the J. K. Dering mine, Clinton, Ind.; Indiana No. 5 from Grant mine No. 4; and Indiana No. 5 from Knox County.

The plant comprised one oven or retort, together with the usual condensing and scrubbing apparatus for the distilled gas, and other necessary machinery and appliances. The oven was horizontal and rectangular, about 60 ft. long, 4 ft. high and 20 in. wide. At each end was a double-door lock, one serving for the admission and the other for the withdrawal of the containers carrying the coal, without admitting any substantial amount of air. These locks were of suitable length to hold one container; they were not heated, nor was a space of the same length as the lock immediately inside of it. The remainder of the retort was supplied with down-draft flues, each of which led to a large off-take flue in the base of the oven, and thence to the stack. The flues were about 1 ft. square in the clear and were laid with ordinary rectangular silica brick. As the volume of clean gas yielded by the low-temperature process is insufficient for heating the oven, provision was made to supply city gas for the additional heat necessary; a commercial plant producer gas would be supplied for this purpose.

A track was laid through the oven with 16-lb. steel rail, 11-in. gage, to carry the containers. These were introduced at intervals into the charging end, each successive container pushing forward those which had preceded it; when the retort was filled, a finished container would be discharged whenever a fresh one was inserted. The train of containers was pushed by a hydraulic ram. They were charged with coal and the coke was discharged from them manually. In a commercial plant the pushing would be done by an electric ram, and the charging and discharging would be mechanical. The container design was the central feature of the process. Those used in this experimental plant

were about 4 ft. long, 4 ft. high and 12 in. wide. Partitions, 12 in. apart, divided each box into four sections, each 12 in. square. Each box was placed on a cast-iron truck mounted on four cast-iron wheels. When the truck and box were removed from the oven, the box was lifted off, the coke discharged, the box replaced on the truck, and returned to the other end of the oven for recharging.

One of the principal purposes of this form of container was to afford means by which the heat could be quickly conveyed through the mass of coal. Experience with the high-temperature byproduct oven has shown that when heat is applied only to the side of the charge, the progress of coking is slow, only ½ in. per hour.

It is impracticable to make a semi-coke of substantially uniform volatile content, unless special means are employed for conveying the heat to the center of the charge more quickly than is possible by means of a heated side-wall only, because if the side-wall temperature is not raised above 1000 deg. F. the progress of the coking toward the center will be prohibitively slow. If the heat is raised above 100 deg. by the time the tarry volatiles are all driven off at the center of the charge, the volatile contents of the coke on the outer

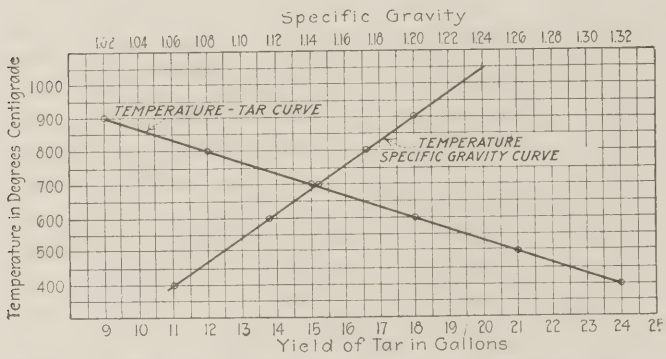


FIG. 1. RELATION BETWEEN COKING TEMPERATURE AND TAR PRODUCED
Coal contains 30 per cent. volatile matter

side will be greatly reduced, thus giving a coke of widely varying character. Furthermore, the higher temperature will cause a proportionate decrease in the valuable light oils and a corresponding increase in pitch; the percentage of coke also will be decreased. There will be an increase in gas, but it will fall far short of compensating for the losses mentioned.

The first container boxes were made of sheet steel, and were divided into four compartments each 12 in. square. It quickly developed that this column was too large for short-time coking, with a reasonably uniform volatile content. Additional compartments were then put in some of the boxes; while, in others, pipes of varying diameters were placed in the centers of the large compartments. Both of these expedients produced usable coke.

A cast-iron box also was used; the shell and partitions were ¾ in. thick, and the compartments varied from 4 to 8 in. in width. This cast-iron box showed great superiority over all other forms, and proved eminently satisfactory for the purpose. The compartments were tapered slightly, so that by the time the boxes reached the open air the temperature had been reduced enough to cause a slight shrinkage and the coke slipped out of the compartments without difficulty. It showed no tendency whatever to cling to the metal.

The semi-coke thus produced proved a most satisfactory fuel for all general purposes. Although the retort had only side-wall heat, a coke was produced that was practically homogeneous in structure and volatile content. By keeping the charge in the heat long enough, a hard coke with practically no volatile contents could be made; or by withdrawing the charge as soon as it was fused to the center, the coal could be changed into the form of coke while but little of the original volatile contents had been removed.

Experience indicates that the ideal fuel for general use is obtained by leaving about 18 per cent. of the volatile matter in the coke; this gives a satisfactory yield of coke, while, at the same time, practically all the volatile-producing oil or tar has been removed and the coke thereby rendered smokeless. Using compartments of suitable width, the coke is uniform in structure and has sufficient strength to permit sizing and handling. The specific gravity is somewhat less than that of hard coke, but not enough to be a practical objection. The breeze and fines burn satisfactorily, either by themselves or with the coarse sizes; in fact, the behavior in the firebox, in that respect, is quite similar to that of bituminous coal. It ignites readily, the fire is easily controlled and successfully banked for 8 to 10 hours in house furnaces during severe winter weather. It burns with a short, bright, clear blaze, and is clean to handle and fire.

An 8-hour test of the semi-coke made from three different kinds of coal was made on a switch engine in one of the large railroad yards in Chicago. The coals were Franklin County, Illinois, Indiana Vein No. 5 from north of Terre Haute, and Indiana Vein No. 5 from Knox County. In clearing up the pile from which the tender load was taken, all the fine stuff was gathered up with the coarse, so that there was a large percentage of it in the tender load, which, in the proportion of coarse to fine, resembled mine-run coal.

There was a light coal fire in the locomotive and on this the semi-coke was started. This fuel steamed rapidly from the start and made no smoke throughout the test. The amount of cinders thrown from the stack with a heavy exhaust was but a small proportion of the amount coming when using bituminous coal. The semi-coke steamed fast enough to make it unnecessary to use the steam blower when the exhaust was off, as is done to lessen the smoke when bituminous coal is used; this effects a substantial saving of fuel. The engine did its regular yard work for about 4 hours, the crew being changed at the third hour. By this time a thin clinker had formed which, however, was readily removed during the noon hour. Another thin clinker was formed and removed during the afternoon, but some coal, of which there was a small amount at the bottom of the tender, had been fired on top of the semi-coke before this happened.

The engineer of tests of the railroad stated that this clinkering probably resulted from the mixing of semi-coke made from three different kinds of coal, and from the excessive amount of fine stuff. Carl Scholz, who was on the engine during a considerable part of the test, was of the same opinion; and they agreed that the semi-coke had satisfactorily shown its adaptability for locomotive use without material change in the firebox. The semi-coke was entirely new to both firemen.

In regular practice, a semi-coke made from one kind of coal will clinker less than the coal from which it is made. This is because the semi-coke burns without permitting the lumps to break down or melt; there is, therefore, a better circulation of air through the fire bed than with coal. Ordinarily, also, there would be a great deal less fine stuff than was in this tender load. In a plant equipped entirely with casting-boxes, the plant run of semi-coke would contain only a small percentage of fine stuff; from his observation in our experimental plant, Mr. Garland estimates this at less than 10 per cent.

Volatile Products of Distillation

In the operation of the experimental oven it was demonstrated that it would not be possible to use a brick wall between the side flues and the containers, and at the same time make a practically complete recovery of the oil and gas in the coal. This was partly due to the small amount of gas—½ to 1 cu.ft. per pound of coal—obtained in the low-temperature process, as compared with 5 to 6 cu.ft. in the high-temperature process. A small air leakage, such as exists in the high-temperature ovens, would therefore produce disastrous results. In the experimental oven the use of plain brick instead of special interlocking brick increased the leakage materially, although special precaution was taken in laying up the brick and in coating the interior of the oven with special low-temperature cement.

The quantitative determination of gas and tar was therefore impossible with this oven. These factors, however, have been demonstrated repeatedly, not only by Professor Parr, for practically every coal mined in the State of Illinois, but also by numerous others. The curves of Fig. 1 show the relation between the coking temperature and the tar produced, in gallons per ton, for a coal containing approximately 30 per cent. of volatile matter. These curves are based on experiments made by Lewes, and correspond with the results obtained by Professor Parr. The Illinois and Indiana coals have 35 per cent. or more of volatile hydrocarbons and will therefore produce correspondingly more tar than the 30 per cent. coal illustrated in Fig. 1.

For a commercial oven, a cast-iron retort will be used, which will be lined on the flue side with silica brick. This retort is ribbed to prevent warping, and is fixed only at the center, leaving the ends free to expand. Since the temperature within the oven does not exceed 1000 deg. F., this will not only insure a gas-tight construction, but the retort will be considerably more permanent than a brick structure, and will cost less for maintenance than brick retorts of this form.

The light tar produced by the low-temperature process is a liquid having the consistency of heavy cylinder oil. Its significant characteristics, as disclosed by Professor Parr's work, are: First, the large percentage of the light fraction cut at 210 deg. C. (about 12 per cent.); second, the large percentage of the middle fraction (about 52 per cent.) and the high temperature of the tar acids therein; third, the low proportion of pitch (about 30 per cent. as compared with 56 per cent. or more in the heavy high-temperature tar), the low melting point of this pitch, and its low percentage of free carbon.

Taking Franklin County, Illinois, coal as a basis, the results of operation at the experimental plant indicated that the products of low-temperature distillation will be about 77½ per cent. of semi-coke having 18 per cent. volatile combustible matter, and about 25 gal. of light tar and oil per ton of coal. There will also be a small amount of ammonia, but since the nitrogen in the coal, which is the source of the ammonia, does not leave the coal freely until the temperature is considerably above 1000 deg. F., the greater part of the nitrogen remains in the semi-coke; if this product is then made into producer gas in a byproduct plant, a large recovery of the ammonia may be made. Treated in this way, the recovery from Franklin County coal would be about 100 lb. of sulphate of ammonia per ton of coal.

This assertion is based upon data furnished by C. W. Tozer, of London, England, regarding his experiments with a coal closely resembling that of Franklin County. In the high-temperature non-volatile coke plants, the nitrogen is all driven from the coal but only the lesser part of it is recoverable as ammonia, because the temperature of the oven is so high that the greater part of the nitrogen does not combine with hydrogen, or, if such a combination is made at first, it is later broken up before it can be recovered.

Based upon experience at the experimental plant, the heating period required with the casting containers will not exceed 8 hours, and it is probable that this may be reduced. The length of time required depends upon the greatest distance which it is necessary for the heat to travel through the coal. A shorter period could be attained by reducing this distance, but if it is too greatly shortened, the result might not be compensatory, by reason of structural and other considerations.

High- vs. Low-Temperature Distillation

Ample data were secured from the operation of this plant, upon which to base enlarged and perfected designs for a commercial plant, and to furnish a sound basis for estimating the cost of installing and operating it. This has been carefully worked out by Mr. Garland and myself, and the results are attractive as to earning power. Such a plant will cost considerably less than a high-temperature plant of the same capacity, and the products will yield a larger return per ton of coal. Franklin County coal, which has a natural moisture content of about 8½ per cent., will yield 12 to 15 per cent. more semi-coke by the low-temperature process than can be derived from it as hard coke by the high-temperature proces. There will be at least double the amount of tar and oil, and commercial investigations indicate that the value of these products per gallon will be several times as great. The high-temperature process will yield several times as much gas as the low-temperature process, but the surplus gas is always sold at a low price. The high-temperature process also has some advantage in the greater amount of ammonia produced, but this is more than offset by other considerations. The opportunities for commercial development of the low-temperature process seem to be great; it is not visionary to predict the substitution of semi-coke, in the central and western states, for a large part of the anthracite and so-called smokeless coals which now come into this territory, by rail or lake.

Many are doubtless well informed as to the large

number of valuable sub-products which may be derived from light tar and oil, and the rapidity with which this chemical industry is now developing in the United States. Dr. David T. Day is authority for the statement that the cracking process for deriving motor fuel from mineral oils has reached a stage of development indicating that it is possible, in this way, to secure nearly 20 gal. of gasoline, or motor fuel of the same value, per ton of Franklin County or similar coal.

Who's Who In Coal Mining

Clarence W. Watson

Two talents possessed by Clarence W. Watson, of Fairmont, W. Va., Chairman of the Board of Directors of the Consolidation Coal Co., which have contributed materially toward making him a successful coal operator and which have been potent factors in helping him to achieve his position in the business world are his genius for organization and his constructive ability, combined with sound judgment and broad vision.

A man of strong mentality, "C. W.," as he is familiarly known by his associates, has surrounded himself in his



LIEUT.-COL. CLARENCE W. WATSON

various undertakings with men upon whose ability he could rely; and, being an excellent judge of human nature, he has rarely made mistakes in his selections. But the chief factor in the success of this well known builder of industries is his integrity. "His word is as good as his bond." That is the way he is regarded not only throughout West Virginia, but in the financial centers of New York, Baltimore and Richmond; and it is this reputation for integrity and reliability which has enabled him to play such an important part in the development of West Virginia's coal and other resources.

The Government was not slow to recognize how useful a man of Mr. Watson's ability would be in connection with many of the large projects undertaken by the War Department, and his tender of his services was promptly accepted. Commissioned as a Lieutenant Colonel in the Procurement Division of the Ordnance Department, many important tasks were assigned to the West Virginia coal man, among them the Neville Island project of the Government. A few weeks ago Colonel Watson was assigned to service over seas, where his ability as an organizer and executive will be much in demand.

In the short span of fifty-four years, Clarence Watson has with the magic wand of organization transformed many sections of the State of West Virginia from sparsely settled hamlets into thriving, prosperous communities; has linked up cities with a network of interurban railways and has given thousands of men employment in the coal mines he has established in four states.

The youngest of three brothers—all of whom are successful business men—C. E. Watson was educated in the public schools of Fairmont and in the Fairmont Normal School. Of modest demeanor, almost to the point of diffidence, Watson is a man of action rather than of words, a thinker rather than a speaker, traits by which he comes naturally since his father, the late James Otis Watson, was a man of few words. The elder Watson was a sturdy pioneer in the state's development, and that his sons have succeeded in carrying on the development work inaugurated by him is attested to by the Consolidation Coal Co., one of the largest concerns of its kind.

The Consolidation company, as it is well known, is only the outgrowth of the Fairmont Coal Co., which was organized by C. W. Watson, Jere H. Wheelwright and others. Aiding in the formation of the Consolidation company, which acquired mines in four states—West Virginia, Maryland, Kentucky and Pennsylvania—Watson became the head of that great concern and remained as such until his election as a member of the United States Senate in 1911, when he retired as president of the company but was made chairman of the board. Upon his retirement from the Senate in 1913 he devoted much attention to the organization of the Elkhorn Fuel Corporation and other companies for the development of the Kentucky coal fields in conjunction with the late John C. Mayo.

Of late years, outside of his business hours, Clarence Watson has devoted much attention to the raising of fine live stock and finds in that his recreation. It might be said, however, that he derives more unalloyed enjoyment from a good game of baseball than anything else.

At the outbreak of the war in 1914 Mr. Watson was touring Germany with members of his family in an automobile, and the party had many trying experiences. Now in France directing the production of materials and in massing them for the use of the United States and its Allies, it would be strange indeed if through the victory of American arms Colonel Watson were able to again visit Germany, as part of a victorious army.

Largely because of Clarence Watson's ability as a business man and because of a feeling that a man of his caliber was needed in the councils of the nation, not only to aid in dealing with present war problems but with the many questions which will arise in the period of readjustment after the war, the Democrats of the state nominated him as their candidate for United States Senator, although both before and since his nomination he has given his entire time to the Government.

Would Replace Coal by Peat Fuel

In an address made before the American Peat Society at its annual meeting held in New York City recently, Prof. C. C. Osbon, of the United States Geological Survey, declared that, because of the shortage of coal, the public might be ready to consider seriously the use of peat in the hope that it would prevent a recurrence, in some localities, of the suffering caused by inadequate fuel supplies. He said that the shortage of coal in many European countries since the beginning of the war is being supplied in part by the increased use of this material, and there is no reason why the United States should not utilize its vast deposits of this fuel.

Dr. Osbon spoke on "Peat Possibilities from the Government Viewpoint," confining himself to the uses of peat as fertilizer and fuel. The total quantity of peat marketed in the United States in 1917, the record year in the peat industry, was 97,363 short tons, and the total amount produced since peat was first utilized has been 466,020 tons. In Europe between 15,000,000 and 20,000,000 tons of peat are produced and consumed annually in generating heat and power. In the United States coal, in normal times, is so abundant and, at all times, is so efficient, readily prepared and transported that only small quantities of peat fuel have been produced and the interest shown in the development of the industry has largely been scientific and experimental. However, in recent years the increasing cost of producing coal and the failure of the output to keep pace with the ever-expanding demand have led to a general advance in price.

Use of Peat Would Release Railroad Cars

Professor Osbon declared that the preparation and storage of peat fuel would not only increase the local fuel supply and in many communities prevent a recurrence of the suffering caused by a coal shortage, but it would release railroad cars that are vitally needed for other purposes during the war. It may be used locally in some states during economic and industrial crises, and in some sections, notably New England, it is believed that peat could successfully compete with other fuels for both domestic and industrial use after the war.

He said that the failure in past years in this country to produce peat fuel on a commercial scale was not due to a lack of market, but to the lack of sufficient capital, to the inexperience of operators, to the failure to recognize that peat fuel is inferior to coal, and to preventable engineering errors. Many extravagant claims concerning the fuel value of peat have been made, Professor Osbon declared, but the sooner its inferiority to coal is recognized the better for the peat fuel industry. Over a million dollars have been spent in this country in trying to produce some form of peat fuel equal to coal in heating value, and careful consideration leads him to believe that there are only two forms in which peat fuel can be marketed commercially in the United States. These are as air-dried machine peat blocks and powdered peat.

Air-dried machine peat is suitable for both domestic and industrial purposes. In calorific value a ton of machine peat is equal to about 1.3 tons of wood, 0.5 ton of good bituminous coal and 0.6 ton of anthracite. It is clean to handle and burns freely, yielding an intense heat and producing no soot or other objectionable deposit. For open grates this fuel is nearly ideal. However, the best results for household use could probably be obtained by burning it in a stove with relatively small grate openings and a restricted draft.

For commercial use powdered peat, Professor Osbon said, has many advantages over machine peat as it can be more cheaply prepared and more readily handled. The consumption of peat in a gas producer is perhaps the most effective way of utilizing peat fuel in the generation of heat and power, for peat that is to be used in this way does not need to be so carefully prepared nor so thoroughly dried as peat that is to be consumed for domestic purposes or under steam boilers.

Analyses of the peats of the United States, Professor Osbon said, show that they are rich in available nitrogen, as much as 70 to 85 per cent. of the whole nitrogen content being of that character. The fixed nitrogen in some peats amounts to more than 2 per cent. of their dry weight, and gas-producing byproduct plants operated with peat could recover this nitrogen in the form of ammonium sulphate. The crushed peat is fed into the furnace of a gas producer in which combustion is regulated by steam and hot air. The peat burns at the bottom of the feed shaft, and, reacting upon the steam, forms water gas and ammonia. These gases are next cleansed of tar by means of a scrubber and are subjected to a fine shower of sulphuric acid, which converts the ammonia into ammonium sulphate and purifies the water gas. After being cooled the water gas may be used under steam boilers, in internal-combustion engines, and for other purposes. It is said that in Italy peat containing 2.5 per cent. of combined nitrogen, when treated by this process, yielded 170 lb. of ammonium sulphate per ton.

Shortage of Coal in New Zealand

There has been a shortage in the coal supply in New Zealand for the past year for two reasons—a decrease in the production of the local mines and also in imports from Australia, according to a recent *Consular Report.* During 1917 the mines produced but 2,068,419 tons as against 2,257,135 tons for 1916, and the imports for 1917 amounted to 597 tons as compared with 293,291,-556 tons during 1916, and 518,000 tons during 1914.

The loss in production was largely due to the decreased output of the miners, since in 1916 they produced on an average of 750 tons per miner, while in 1917 they produced but 715 tons per miner. During the first six months of 1918 the combined importations and coal mined in this country amounted to 1,084,719 tons as compared with 1,083,461 tons for the same period in 1917, while stocks on hand on April 30, 1918, amounted to 151,866 tons as compared with 216,987 tons on July 31, 1917. This shortage of coal has had a tendency to slow down some of the industries in the country, and is threatening the railways, street car, and electric-light plants.

Exports from the United States to Latin America in 1918 were ten times as much as in 1898, and three times as much as in 1910, while coffee, cocoa, rubber, hides, copper, wool, nitrates and bananas, the principal articles imported from Latin America, show marked increase in quantities and increased prices since 1914.

Increasing Coal Mine Efficiency—III

By CHARLES E. STUART
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SYNOPSIS—*A lack of power capacity is often blamed for low voltage at the point of power application. This is seldom the root of the difficulty. Increased voltage may often be secured by connecting together various existing branches of the power line. The mechanical equipment is often in extremely bad condition, and a supposed shortage of power may be rectified by putting engines, boilers and piping in good shape. Electrified mines usually show marked superiority over unelectrified ones.*

VI—Analysis of Mine Power Conditions in Relationship to Production

FIG. 20 is the resultant of a number of tests at different mines and illustrates in excellent manner the possibility of improving the voltage of the average mine by other means than through the purchase and installation of additional large quantities of copper. The improvement as indicated between curve

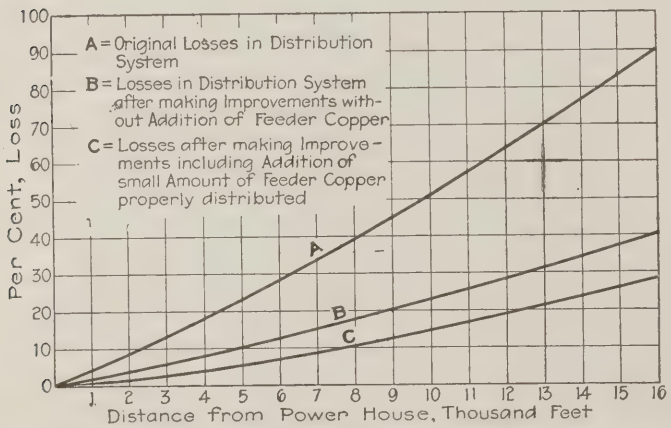


FIG. 20. THE POSSIBILITIES OF IMPROVING THE VOLTAGE WITHOUT EXCESSIVE ADDITIONS OF COPPER

A and curve *B* has been brought about not only by taking full advantage of all copper already placed, but in addition by improving connections of all kinds. The track bonding was perfected. In a word, conditions as represented by curve *B* were as nearly perfect as practicable without additional copper.

Between curve *B* and curve *C* there is represented an improvement resulting from the installation of feeder copper. A comparatively small amount of copper was necessary to obtain this improvement. That which was applied, however, was so placed as to balance the system and to place good voltage at points where conditions were most severe, rather than carry the copper transmission to those places that are seldom used.

Fig. 21 represents voltage and amperage readings on trips going in and out. The condition of the circuit is well indicated. The test deriving this information is simple and can be readily run by a capable mine electrician with the equipment of instruments which it is criminal negligence for any mine to be without.

The proper application and distribution of copper, while not difficult, is a matter for careful consideration, analysis and test. Fig. 22 indicates the location and capacity of trolley line and feeder copper as well as electrical equipment. Analysis of this layout develops the following simple measures, of such nature as to operate the copper and rail to maximum advantage under the conditions existing.

Referring to this sketch, it would be recommended that both 4-0 wires which connect the substation with point *V* should be carefully connected to both trolleys going into the mine entrance—that is, both the trolley on the empty side and on the loaded side. Points *J* and *H* should be connected with a 4-0 line; *S* and *U* should be connected with a 4-0 line; *D* and *T* should be connected. .The following connections should also be made: *P* should be connected with *Q*, *M* with *N*, and *K* with *L*.

In some of the foregoing instances the workings will have to progress a little farther than they are at present, but the advantage of making such connections will be readily seen; and it will be apparent that by means of these connections the utility of the copper now in use throughout the mine will be greatly increased.

As a general proposition a mine does not take full advantage of either its copper or its rail. As a result, copper that is unnecessary is frequently purchased. Conversely, the motors often operate on a lower voltage than is necessary with the copper and rail already installed.

A usual source of power and voltage loss in the average mine is at the bonds. Fig. 23 shows a group of readings taken at random. The record is a good one. The average of a well-bonded track will show a bond resistance of 8 ft. of equivalent rail, and 5 ft. is regarded as an excellent showing. Higher readings may be due to various causes, such as loose terminals and the like. Thus, in the placing of bonds the greatest care should be exercised in order to see that there is no grease or dirt either in the hole or on the bond at the time of insertion. Care should be taken that the fit be tight.

Frequently I have found only one side of the track bonded. More often there is insufficient cross-bonding and almost invariably there are loose terminals. Every fifth rail should be cross-bonded. A loose bond closely approximates a broken connection. Every mine should be equipped with a bond-testing device.

Remember always that the effects of a loose connection, a badly burned switch contact or a grounded wire cannot be overcome by increasing the generating capacity or the installation of additional feeder copper. The parallel of a bad connection is the insertion of a section of ½-in. pipe in a 2-in. line. Do not simply twist a wire connection, but wrap at least 20 turns with No. 10 wire and then solder well. Keep all contacts

of disconnecting switches clean. A corroded or burnt switch, or a contact that is imperfect in any way, is the equivalent of a loose connection.

Extreme low voltage is not necessarily an indication that there is insufficient copper. Such low voltage may occur in entries where the demand is of infrequent occurrence and of short duration. In such cases it would readily become a direct waste of money to attempt to build up the voltage. On the other hand, at those points where the demand is steady, as in the main entries, or where there is a steady pumping, fan or cutting machine load, the voltage should not be allowed to drop below the rated minimum for which the machines were purchased and which minimum is standard with respect to all makes of motors.

It is the rule where there is frequent armature burnout, or in fact where any class of repairs appears to be too frequently necessary, to blame or disqualify the equipment. As a matter of fact, in 99 cases out of each 100 the fault does not lie here. Frequent burnout or excessive repair costs of any kind, which should stand out in a properly developed cost sheet, are an indication of neglect of equipment or of equipment operated under unfavorable conditions. If a locomotive is specified as to weight and motors for the load which it is to handle, if the power conditions are approximately those under which the locomotive is purchased to operate, and if the track conditions are reasonably good, the repair cost will rarely attract attention.

But let it be borne in mind that the actual cost of repairs represents only a small portion of the total cost. The interruptions to service, the loss of time while the repair is being made and the demoralization incident to the interruptions are the real considerations.

Bad power conditions mean the following: First, an actual loss of power and corresponding wastage of fuel in a greater proportion than the actual voltage drop. Second, in a mine where, for instance, there is a 25 per cent. voltage drop, and where the station appears fully loaded, that this station is actually loaded up, not as a result of the work being done, but because, practically speaking, all over 65 per cent. of the demand represents a direct wastage of energy and a corresponding reduction of capacity. Third, bad power conditions, as stated above, mean frequent burnouts and corresponding repair cost. Fourth, there is further entailed interruption to service with corresponding reduction in output. Fifth, finally, and most important of all, is the reduction in the speed and power of the entire equipment of the mine. This may mean that four pumps are doing the work that three should do, or that four cutting machines are doing the work that should be performed by three, or that four locomotives are doing the work of three; in fact, there has often followed an even greater reduction than this in operating efficiency.

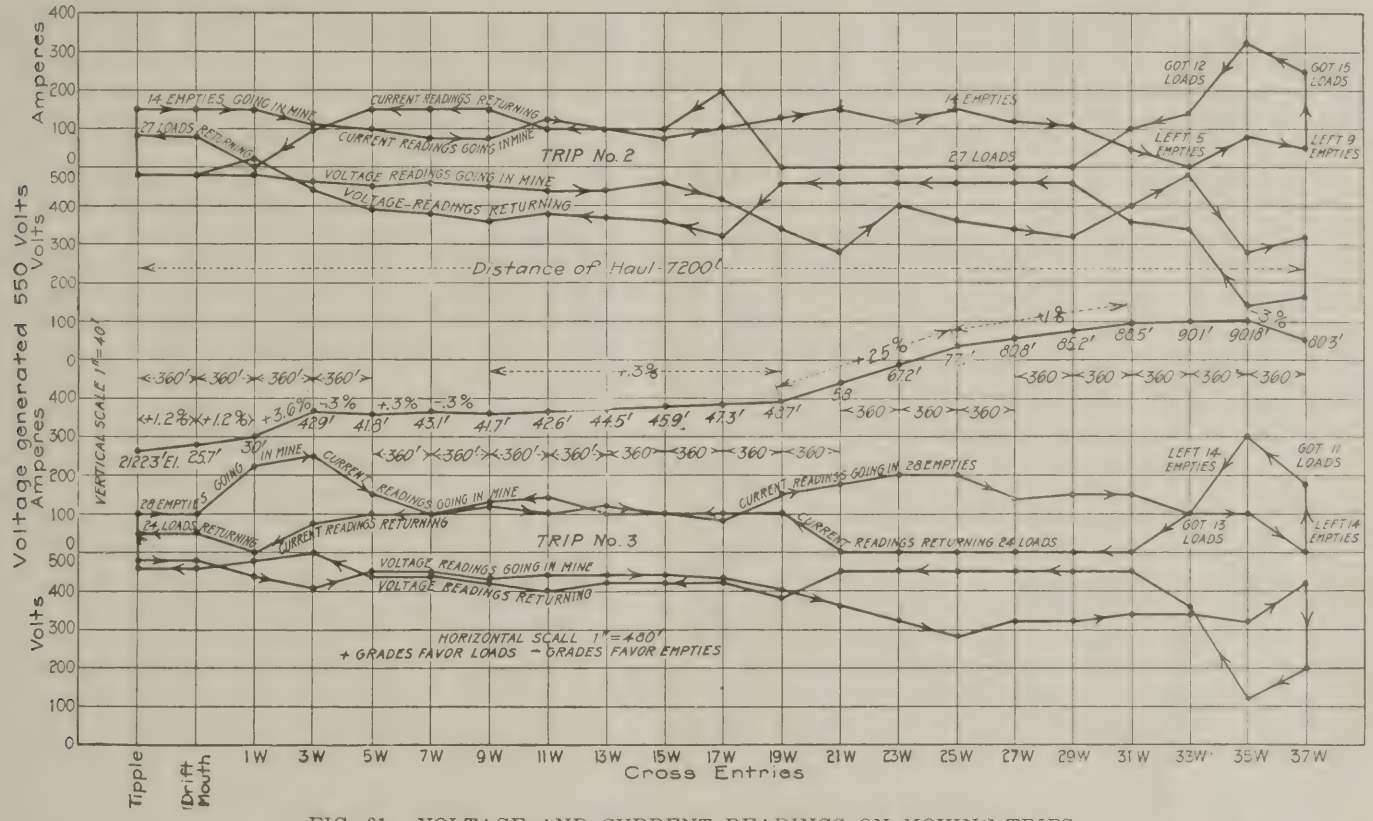


FIG. 21. VOLTAGE AND CURRENT READINGS ON MOVING TRIPS

VII—Track Conditions in Relationship to Production

The trackage of a mine and the operating equipment in general may be readily compared with that of a railroad. In fact a parallel may be drawn at nearly every point. It is possible to operate the main haulage system on a rough schedule. The method of picking up cars is identical. The wrecks and interruptions to service arising from badly maintained equipment and other mismanagement that have rendered many railroads unprofitable have likewise thrown many mines into the hands of receivers and prevented other mines from making money.

The excessive grades, which in the case of a railroad cut down train length and necessitate an increase of locomotive power beyond reason, have forced identically similar burdens on the mine operator. Poor roadbeds and badly maintained trackage such as have reduced the running time of railroads and rendered their maintenance excessive, find their parallel in the mine. A well-laid track, rails of proper weight or if this is out of the question at least properly ballasted and

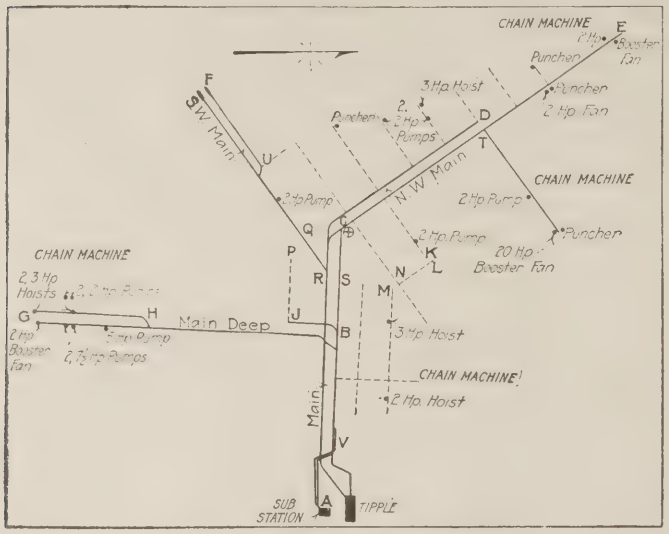


FIG. 22. DIAGRAM OF THE COPPER CONDUCTOR IN A CERTAIN MINE

properly laid, is one of the best investments that a mine owner can make.

In past years it has been the complaint that many of the old Pennsylvania, Ohio and Illinois mines could not be profitably operated on account of the long haul. The deduction is an incorrect one. There hardly exists in this country a mine where the area of development is such as would make the haulage system the determining factor with respect to economical operation.

A properly laid track kept in good repair means an increased production with a decreased cost per ton of coal mined. The reasons for this are clear; however, they may be stated as follows: There results a speeding up of the entire haulage equipment; decreased maintenance cost of locomotives and cars—bumpy track causes rapid deterioration of all rolling stock; wrecks are practically eliminated; rails not properly ballasted or maintained rapidly lose shape not only at the joints, but along the entire length.

VIII—Condition of Generating Plant

If you generate your own power, what is the condition of your engines and boilers? Will indicating engines derive such a curve as that shown in Fig. 24? I have observed and helped to make many engine tests at mines. Cards such as those shown in Fig. 24 are by no means exceptional.

I recently observed the investigation of a power plant of a mine which in most respects is well operated. Seven 150-hp. boilers were feeding three 200-kw. engine-driven generating sets. Using a high-grade fuel five firemen were having a hard time maintaining 60 lb. of steam pressure. The operator in question proposed to purchase additional boilers and generating equipment. Acting on the advice of an engineer, he decided not to purchase this equipment but to rebore the engines and reset the valves, cover the steam piping and install a feedwater heater. The scale was removed from the boilers, the tubes thoroughly cleaned and the settings repaired. As a result, four of the boilers and two of the generating sets carried the load readily.

This example may appear extreme; but if the manager of the average operation really thinks it is, let him conduct a test at his own plant. There is no great expense attached to such a trial, and I believe that the results in many instances will be amazing.

IX—Relative Output of Electrified versus Unelectrified Mines

Table V makes a direct comparison between two mines operating in the same coal bed, the one electrically equipped and the other hand-worked. The table shows that the average number of tons produced per day by each man is 3.94 in one case and 2.64 in the other.

TABLE V. COMPARISON BETWEEN AN ELECTRICALLY EQUIPPED AND HAND-WORKED MINE

	Electrified	Unelectrified	Increase Output Electrified Mine Over Unelectrified	
Thickness of seam	8 ft.	8 ft.		
Kind of opening	Shaft	Slope		
Method of mining	Machine	Pick		
Kind of machines	Electric	None		
Method of haulage	Mechanical	Mules		
Men employed, total	402	550		
Miners	234	305		
Inside men	108	120		
Outside men	60	125		
Yearly output in tons	485,806	450,389	Amount	Per Cent.
Output per miner	2,092	1,476	616	42
Output per man, total	1,218	819	399	48
Number of days operating	308	310	....	..
Number of tons per man per day (total)	3.94	2.64	1.30	50
Number of tons per miner per day	6.79	4.7	2.09	45
Kind of haulage { Electric Locomotive	.....		....	..

Thus, there is shown a clear gain of 1.3 tons, or 49 per cent., each day by each man in the electrically equipped mine.

Considering the state in which these two mines are located and giving due consideration to the characteristics of the different seams operated, it is estimated that if all the mines now hand-worked were to be

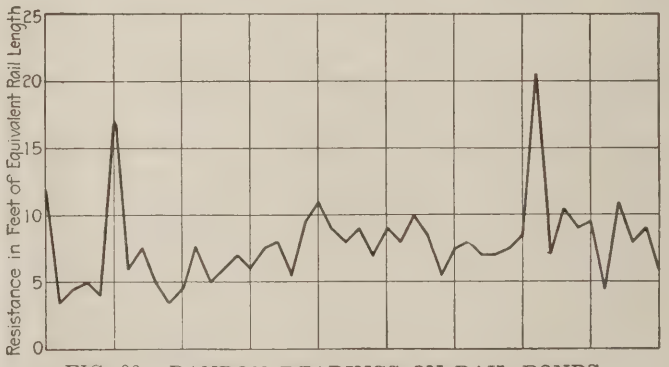


FIG. 23. RANDOM READINGS ON RAIL BONDS

electrically operated, there would be an increase in output of over five million tons; that is to say, the output of the state would be increased by over 25 per cent.

To obtain this increase in output there would be necessary an expenditure of about four million dollars, or approximately 75c. for each ton of increased yearly production. This sum of money in its relationship to the value of the increased production and as measured by the increased requirements of machinery is relatively

small when compared with the cost incident to coal conservation measures which are under way in many sections of the country.

Table VI shows the cost of cutting coal at a certain operation and the estimated cost assuming that electrical equipment were installed. Data gathered since a partial electrification has taken place fully bear out the figures shown. The table is introduced to show the magnitude of the saving made possible through the application of the electric drive.

This table shows that a saving of from 15 to 20c. on each ton produced should be possible when the operation

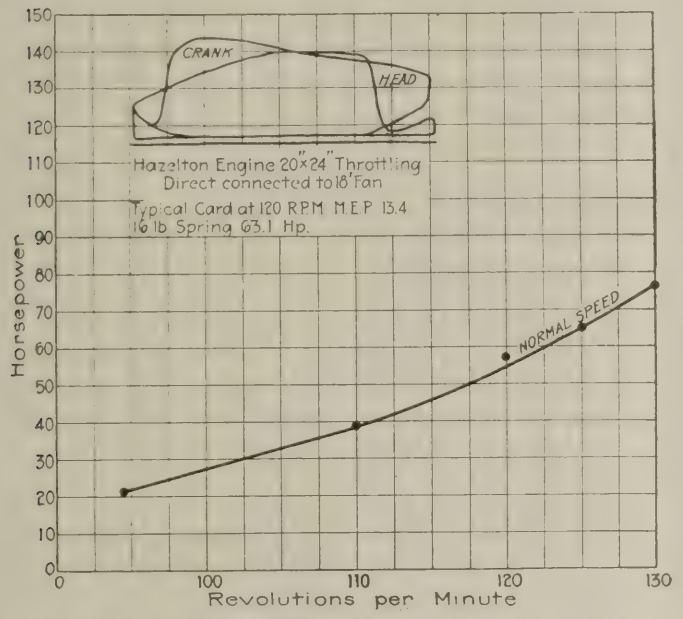


FIG. 24. A NOT EXCEPTIONAL INDICATOR CARD AND POWER CURVE

is completely electrified. In the state where this operation is located, assuming a saving of 15c. per ton, and with a total production from unelectrified mines of 11,000,999 tons, the figure of approximately one year ago, there would accrue a saving in the cost of production in the period of one year of $1,770,000.

These figures, as stated, represent an analysis made

TABLE VI. VARIOUS ITEMS IN PRODUCING COAL UNDER PRESENT UNELECTRIFIED AND UNDER PROPOSED ELECTRIFIED CONDITIONS

Cost of Cutting Coal	Present	Proposed
Labor	17.00c.	5.70c.
Power	4.93	1.12
Total	21.93c.	6.82c.
Cost of Haulage		
Rope	0.25c. labor	3.30
Mule	8.00 power	1.40
Gas engine	1.70 hoist	0.20
Total	9.95c.	11.72c.
Cost of ventilation	0.49	0.63
Cost of dewatering	0.10	0.08
Cost of screening	0.19	0.17
Cost of washing	0.58	0.27
Total	33.24c.	12.87c.
Cost of Pumping		
River pump	0.63	0.39
Cost of operating gin engine larry and tabby	0.23	0.32
(Not total, but cost affected by change in power)	34.10c	13.58c.
Saving		20.52c.

in one state. There is, of course, considerable variation in costs in this state and with respect to the different coal beds operated. Relatively, however, the estimates both as to increased production and decreased cost will hold true as between the different beds. They are also valuable when considering operating conditions in other states.

The mines that remain unelectrified are numerous. In the majority of operations, however, competition has forced electrification, even where decreased cost and increased production have not proved a sufficient incentive. The position of the partially electrified mine can be deduced to some extent from the facts given.

(To be continued)

Direct-Current Armature Trouble

By Frank Huskinson
Trinidad, Colo.

A peculiar case of trouble with a direct-current armature that will be of interest to those having to do with electrical work at the mines, came under my notice recently. The commutator of a 25-hp. direct-current armature was removed for rebuilding. The connections were marked so they could be put back in the same position as they were before. This was a rush job, and the time of testing out the connections was to be eliminated by simply marking the pairs of leads as they were removed from the commutator and then reconnecting them in the same way.

After reconnecting all the leads a bar-to-bar test was made with a milivoltmeter. This test showed all connections O.K. The machine was then assembled and put into service on a pump. The motor seemed to run all right but showed an increase of speed of at least 15 per cent. over what it had run when driving the same pump previously. After running about half an hour, it was noticed that the armature had developed an excessive amount of heat, not confined to any one point but uniform all over the armature and commutator.

Several tests were then made and all connections as well as the voltage were found to be all right. Several trial runs were made, with the same results as before, the armature and commutator heating up excessively. There seemed to be good commutation as there was practically no sparking of the brushes and the commutator had been undercut.

Finally, I decided to remove the armature and give it another bar-to-bar test with the milivoltmeter. The result was the same as before. I thereupon removed all the leads from the commutator and made a rotation test, with the result that at one point I found that the leads had been interchanged so that the top lead of an adjacent commutator bar had been connected with the top lead of the next bar, and the bottom lead of an adjacent commutator bar was connected with the bottom lead of the next bar. This resulted in the windings being split at this point, putting them in series-multiple instead of straight series.

This armature was connected up to operate in a six-pole machine, and the motor was fitted with six brush holders. It was a compound-wound, 220-volt interpole machine. The action of the milivoltmeter in showing all connections O.K. can readily be explained. The current for testing was taken from a bank of lamps in series with only a small portion of the coils on the armature at a time. If the testing current had been used through one-half of the armature at once, it would have shown up this trouble; but the fact that the armature was for a six-pole machine was not even considered.

Chance Acetylene Safety Lamp*

THE lamp to be described in this article presents many interesting features. Although it is not claimed to have reached the final form for regular mine service, it marks distinct progress. Safety being assumed, the whole question of new lamps turns on the amount of light they will give. As a general indication some figures have been calculated showing that oil lamps will average 7.5, electric lamps 10.7 and the new Chance lamp 37.7 lumens, or about five times the illuminating value of the average oil lamp and 3½ times that of the average electric lamp. This increased lighting capacity will enable the miner to perform his work under conditions conducive to greater efficiency, will tend to reduce the falling of coal and rock, and will undoubtedly lessen the risk of all those accidents which, more or less directly, are the result of ineffective lighting.

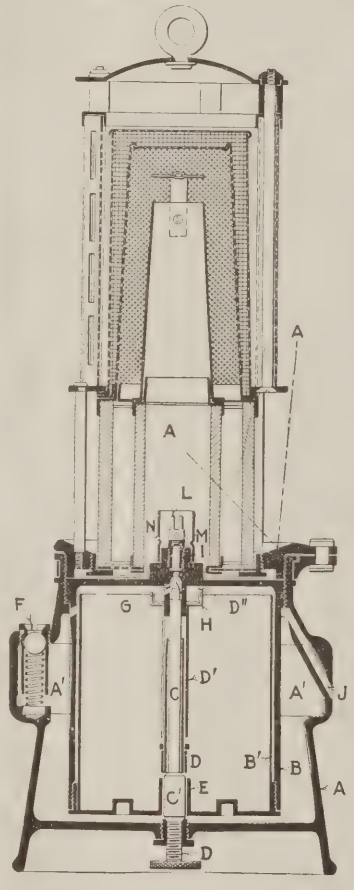
A satisfactory acetylene safety lamp should be strong and so constructed as to withstand considerable rough handling without injury or deformation; be simple as to closure and operation; be compact, without projecting parts liable to damage; be reasonably light in weight; give a better light than any alternative type of lamp; be so designed that it can be inclined or even laid on its side for a few moments, without going out or causing excessive production of gas; be self-regulating, so that once lit the regulation of the flame does not require attention; be convenient to use, well balanced, fitted with suitable handle or hook, and preferably about the same weight and dimensions as the lamps ordinarily in use; be capable of detecting inflammable gas and a deficiency of oxygen and generally comply with the usual official tests for safety lamps; generate gas evenly under all ordinary working conditions; not be a source of danger in itself, either by liberation of a dangerous volume of unconsumed acetylene or through starting methane ignitions through the gauze. The cost of maintenance should lie within reasonable limits, having due regard to the fact that effective lighting is a source of profit both to owners and miners.

Advantage of Acetylene Safety Lamp

The Chance acetylene lamp, which is a combination of the American type of Wolf lamp with the Mueseler principle adapted to burn acetylene by means of several ingenious advances upon earlier practice, can be used to detect the presence of firedamp in the mine air and to indicate a deficiency of oxygen. It gives increased illumination and is provided with a special reflector which furnishes sufficient illumination of the roof without tilting the lamp, and allows a proper examination to be made. The upper part follows the construction of the ordinary Wolf-Mueseler lamp, with corrugated shield, double gauzes and Mueseler chimney. The novelties of construction are in the design of the generator and in the use of a special form of burner.

Referring to the accompanying drawing, the outer shell *A* (made of cast aluminum alloy) forms the water vessel. The carbide container consists of the inner cylinders *B*, *B'*, the cover *B* being screwed into the water vessel from above. The cylinder *B* is open at the bottom, which is threaded to fit the cylinder *B'* the latter forming the carbide holder proper. Concentric with these vessels there is the gas-regulating valve *C*, operated by the thumbscrew *D*, which is situated at the base of the lamp. This arrangement permits the raking of the carbide by movement of the valve stem *C'* acting through the water-feed tube *E* at the container base.

The enlargement of the water vessel near its middle, as shown at *A'*, is for the purpose of securing a more uniform head during the working of the lamp. The spring mechanism *F* is a water-filling valve. The gas generated by the upward percolation of water through the upper layers of carbide filters through the felt pad *D''* and into the burner tube *I* by way of the side hole *G* in the valve tube. The valve serves to shut off gas or to lower the flame for methane testing. There is no water valve, the gas control being automatic. When the valve is partly closed, the gas pressure increases, thereby pushing back the water into the outer vessel. If the gas pressure is not sufficiently relieved in this way, water is forced out of the lamp by way of the overflow tubes *J*, of which there are two. The brass tube *I*, shown surrounding the valve stem *C*, and resting on the enlargement *C'* at the base of this stem, is intended to prevent carbide from falling into the water-feed tube when the lamp is being charged. During charging this brass tube slips down into the water-feed tube *E*, and is lifted therefrom by the enlargement *C'* on the valve stem to the position shown when the carbide container is assembled in the water vessel.



DETAILS OF THE CHANCE SAFETY LAMP

The lamp is not dependent for safety on the presence of a rubber or fiber washer at any point. The gas is water-sealed with the addition of the mechanical seal formed by the screw thread at the upper end of the carbide container. The Chance lamp combines the use of the Mueseler chimney with that of the double glass safety lamp. It is thus practically two safety lamps in one. The inner glass chimney is virtually spring-supported, so that falls or blows which might break the outer glass have little or no effect on the inner one.

The air feed is from the lower portion of the bonnet

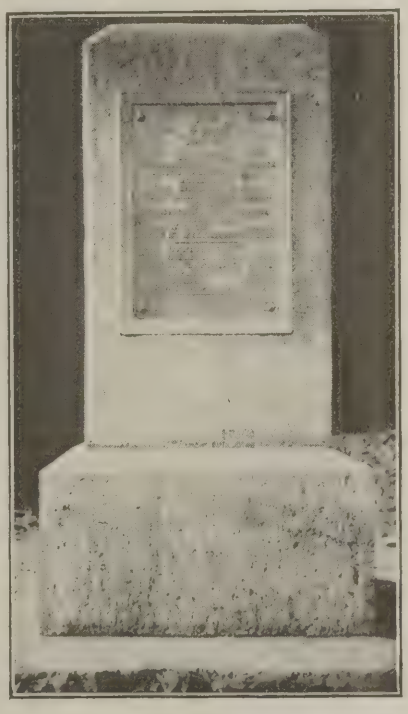
*From a paper by William Maurice presented at the Nottingham (England) meeting of the Institution of Mining Engineers, Sept. 13, 1918.

downward in the annular space between the glasses and through the bottom horizontal gauze to the flame. The weight of the lamp shown is approximately 4 lb. 2 oz. uncharged, and 5 lb. 4 oz. when charged for a 10-hour shift. It requires a charge of from 7½ to 8 oz. of carbide for 10 to 10½ hours burning time. After 4 hours working it is desirable that the water vessel be refilled, which is accomplished through the spring plunger filling hole. Actually the water vessel contains enough water to run a full shift, but during the later hours the gas pressure drops if more water is not added.

The lamp is of the lead rivet locking type with slip ring. The one lock completely secures both the whole of the generator parts and the internal fittings. Points in favor of the Chance lamp appear to be: Increased illumination, availability as a gas detector, facility afforded for roof inspection, reduced risk of extinction, increased safety, absence of perishable joints and portability and absence of deterioration during storage.

Pioneer Anthracite Mining Engineer

The monument illustrated is a tribute to Archibald Faulkender Law, who was the mining engineer of the first underground anthracite mine. This pioneer operation was opened near Carbondale in June of 1831. Up to that time anthracite had always been obtained by removing the surface; in fact the extensive introduction of stripping in recent years by engineers has been a reversion to the general principles which were accepted almost as final in the earlier days of the industry. According to the record on the stone which was laid in 1901 on the 50th anniversary of the City of Carbondale, Penn., the mine was opened by the Delaware and Hudson Canal Co. The names of John Wurts, president, and John H. Williams, treasurer, appear with those of the officers of the Delaware and Hudson Co., Robert M. Olyphant, president; C. A. Walker, treasurer, and C. C. Rose, superintendent of the coal department.



ERECTED AS A TRIBUTE TO ARCHIBALD F. LAW

Archibald Law was born in Scotland and came to this country in 1830, a year before he opened the Carbondale mine. He came to an extremely sad end. His back was broken in the performance of his duties in the mines and he lingered for five years. The memory of his patience under those years of affliction is still impressed on the minds of his descendants. It may well be said of him that he was bold in enterprise and patient in trial.

Legal Department

SUBSIDENCE OF SURFACE OF LEASED PREMISES.—When a coal lease purports on its face to state the full agreement of the parties, any invention of the lessor to waive the right to support of the surface must be determined by an interpretation of the written contract, without consideration of any extraneous evidence tending to alter, vary or contradict the terms of the writing. The following clause in a lease does not show any waiver of right to have the surface supported: "Said second party [the lessee] to work and mine said coal in a good, careful and workmanlike manner, and not leave unnecessarily any coal which should be and can be mined with safety to the mine and miner, and said second party shall not be required to work low places or rolls which cannot be mined except at a loss." Under the Kansas statute, which requires suit for damages on account of subsidence of the surface to be brought within two years after the right to sue accrues, the two year period commences to run from the time of subsidence, and not from any earlier date when the removal of coal resulting in the subsidence occurred. (Kansas Supreme Court, Walsh vs. Kansas Fuel Co., 169 Pacific Reporter, 219.)

USE OF CONVICT LABOR IN MINES.—A contract for working defendant's mine by convicts provided that the State of Alabama should have entire control of the convicts, who were to be worked under mine foremen and pitbosses to be selected, controlled, and paid by the state; and that the mines should be worked according to directions given by the defendant's mining engineer. Plaintiff, a convict, while working in one of defendant's mines was injured by fall of rock from a mine roof. Under these circumstances, the supreme court of the state holds in the case of Parker vs. Sloss-Sheffield Steel and Iron Co., 76 Southern Reporter, 924, that defendant's engineer was not charged with any duty to inspect the mine during operation to prevent or remedy dangerous conditions of entries and roofs arising from time to time from the operations of the miners in removing coal; and that the defendant cannot be held liable for injury resulting to plaintiff through failure of the state's bosses to discover a dangerous condition of overhanging rock. Liability could not be predicated on any negligence of the defendant's fireboss, in the absence of proof that it was his duty to make inspections for loose rock or to warn miners of its presence; his duty apparently being limited to inspections to discover the presence of explosive gas, and post or give warnings against its presence, and to look out for proper ventilation.

LESSEE'S RIGHT TO REMOVE MACHINERY—A lease of Arkansas coal land contained a clause providing that the "lessees shall have the right to remove all and any machinery placed upon said lands under this contract upon the termination of same." After the lessees had ceased to operate or pay royalties for several years, and had apparently abandoned the lease, the plant was badly damaged by fire. Later the lessors sued to cancel the lease and on cancellation being decreed granted a new lease to a coal company, which took possession of the premises and plant and repaired the machinery. No attempt on the part of the original lessees to recover the machinery was taken for several months after cancellation of the lease. Under these circumstances, the Arkansas Supreme Court holds that the original lessees forfeited all claim to the machinery, saying: "The original lease provided that the lessee might remove the machinery upon the termination of the lease. This did not mean upon the exact moment the lease was terminated, but it did mean that the property should be removed within a reasonable time after the termination of the lease. The facts in this case disclosed that they waited an unreasonable time, and, during that time, permitted the original owners and its lessees to place repairs on the property greater in value than the original property itself." (Heim vs. Brock, 202 Southwestern Reporter, 36.)



Work Sundays to Make Up Tonnage Loss

To offset loss of tonnage more than 70,000 miners in the central Pennsylvania district have agreed to work Sundays in order to keep up production during the epidemic of influenza. Charles O'Neill, the district production manager, reports that some fields have been very seriously hit by the epidemic. Some mines have been forced to close entirely for several days at a time. By working extra hours and on Sunday, it is believed that a considerable portion of the loss will be made up.

"For the week ended Sept. 28, central Pennsylvania produced 1,306,408 tons," says Mr. O'Neill in a report to the Fuel Administration. "Since then we have been losing tonnage, owing to the influenza epidemic. For the week ending Oct. 5, we produced 1,203,942 tons, or a loss of 102,466 tons, compared with the previous week; for the week ending Oct. 12, we produced 1,234,337 tons, or a loss of 72,071 tons, compared with the week of Sept. 28, making a total shortage of 174,337 tons to Oct. 12. The week ending Oct. 19 will show a greater loss."

More than one-tenth of the miners in the Pocahontas district are suffering from influenza, according to R. D. Patterson, the production manager, who has reported to the Fuel Administration for the week ended Oct. 19. He also reports the disease is raging among the employees of the coal-carrying railroads. In addition to the miners, themselves, who are ill, many are kept from work due to cases of influenza in their families.

Middle West Car Situation Satisfactory Says Regional Director Holden

Performance of the railroads in coal loading in the Middle West is all that could be asked, Hale Holden, the regional director for that section, says in a report which follows:

The coal situation in Illinois and Indiana during the month of September was more satisfactory in point of car supply than during the month of August, but much less satisfactory from a production standpoint, as indicated by the following figures, which cover loading in the central zone, or district, and are little more in excess of the actual coal loading in the central western region:

	August	September
Cars loaded, 1918	184,235	172,585
Cars loaded, 1917	150,940	146,302
Increase over previous year	33,293 (22%)	26,283 (18%)

It will be noted less cars were loaded in September than during the previous month due to mines not working Labor Day and many mines being down on the 18-45 registration day, and for the primary a few days later. Conversely, these holidays enabled the railroads to make a better showing as to car supply.

Even with the decreasing loading the Fuel Administration has been pressed to provide markets, and has only been able to do so by arranging for the sale of coal to railroads for movement beyond the normal commercial zone. In order to continue the ratio of increased loading over last year, particularly in Illinois, the Fuel Administration gave consideration the latter part of September to the established zone lines. As a result, the present summer zone line through Wisconsin and Minnesota will be continued as a winter line on all prepared sizes and mine-run. The lower peninsula of Michigan will be held open all winter for Indiana, all grades, and for Illinois screenings.

The accumulation of coal on track in the Chicago district is growing less and is practically down to normal. The state and Cook County organizations of the Fuel Administration have taken hold of the situation vigorously and will undertake to force unloading.

Taking it as a whole, the performance of the railroads during the month of September in this territory in coal loading was all that could be asked by the Fuel Administration. There is the closest coöperation between the railroad officers and the Fuel Administration, and the general organization is working harmoniously and to the best interests. Reports for the five months since April indicate that the commercial coal requirements for Illinois consumption were 48,360 cars per month, or a total of 241,800 cars. We have loaded and handled 290,330, an excess over the requirements of the Fuel Administration of 48,450 cars, or 17 per cent. Figures for September not yet available in detail indicate a still further excess over the requirements.

Treasury Department to Facilitate Handling of Taxes from Mining Companies

With the idea of facilitating the handling of taxes on mining properties, a separate division is to be formed in the Treasury Department. Examiners who are specialists in mining taxation will handle the returns from mining companies. Heretofore, returns from mining companies have given a great deal of trouble, much of which is thought to be due to lack of knowledge of the mining business on the part of examiners. The new plan will be resorted to in an effort to improve that situation.

What One Ton of Coal Will Do

In order that it may be easier to visualize the value of a ton of coal, the Fuel Administration has compiled a number of equivalents. For instance, one ton of coal will make 20,000 cartridges, or 400 bayonets, or 250 helmets, or one-fourth of a ton of steel. It will generate 200 kw.-hr. of electricity. It will carry 15,000 soldiers in one ship two miles at sea. It will move 50 freight cars 50 miles. It will build two tons of shipping. It will make 1400 lb. of coke and the following by-

products: 6200 cu.ft. of gas; 23 lb. of ammonium sulphate; 6 gal. of tar; 2 gal. of benzol; four-tenths of a gallon of toluol, in addition to many drugs, disinfectants and other chemicals. The materials can be gathered and an 8000-ton ship built with 9760 tons of coal. On the other hand, it does not last long when converted into shells being fired against the Germans. In the seven months' defense of Verdun, the French fired 60,000,000 shells, containing 1,800,000 tons of steel. The manufacture and transportation of these shells called for 9,000,000 tons of coal.

Fuel Administration Speakers Urge Large Production on Patriotic Grounds

While the epidemic of influenza has interfered importantly with the plans for stimulating coal production, the Fuel Administration has not called in its speakers. These men, instead of addressing audiences, are spending their time mixing with the men in order to put into circulation the thoughts which otherwise would have reached them from rostrums.

The message which these speakers carry is based on patriotism. The man is urged on patriotic grounds only to make his maximum endeavor. No appeal is based on the incidental fact that his earnings will be increased. No opportunity is lost to point out that six days' full time work every week is the best way a coal miner can back up his comrades at the front.

Holland to Get American Coal

Holland will begin again to take coal from the United States in the near future, it is believed. The War Trade Board has offered to supply her 100,000 tons of coal a month, if she will come for it. If the full amount is taken, however, it will not interfere with the coal budget, which provides 6,000,000 tons for export.

Holland will pay the mine price plus the bunker surcharge and the freight. This will represent a tremendous saving over the price of $36.18, plus a commercial credit of $12.06, which Holland must pay for each ton of German coal. The clearing of the Belgian coast so reduces the danger from submarines to Dutch shipping that it is expected Holland will take its full quota of American coal in the future.

Coal Loading Shows Decrease

Coal loading on railroad cars for the week ended Oct. 19, together with the figures for the corresponding week of 1917, according to the Railroad Administration are as follows:

	1918	1917
Total cars bituminous	195,143	171,041
Total cars anthracite	33,603	41,277
Total cars lignite	3,610	3,976
Grand total cars all coal	232,356	216,294

Increase of 1918 up to and including week ending Oct. 19 over same period of 1917 ..... 730,203 cars

The number of cars loaded with bituminous coal at all mines throughout the country during the week of Oct. 19 showed a decrease compared with the previous week, amounting to 7 per cent. The falling off occurred mostly in the territory east of the Mississippi, and apparently is a direct result of the epidemic of influenza which has been existent in that territory for some time, and seems to have reached the mining regions to an extent sufficient to affect coal loading during the week of the 19th and to a lesser extent during the previous week.

On those roads where the coal loading fell off more than 5 per cent., it was quite usually the fact that the orders for empty cars placed by the mines also fell off to the same extent or greater. The mines were not, however, able to load even up to their expectations, as evidenced by their car orders, a fact which is demonstrated by an extraordinary increase in the number of empty cars left standing over at these mines unloaded from day to day during the week.

The information concerning loading for the succeeding week of the 26th would seem to indicate that conditions have not improved in the coal-loading territory, and a further decline in production must be expected during the week ending Oct. 26.

American Coal Exports in August

Exports of coal, as reported by the Department of Commerce, for August, 1918, and the figures for August, 1917, as finally revised, are as follows:

Coal	August, 1917	August, 1918
Anthracite	678,797	411,804
Bituminous	3,051,628	2,222,187
Exported to:		
Italy	41,519	None
Canada	2,424,668	1,959,017
Panama	72,274	52,831
Mexico	10,389	13,082
Cuba	217,524	105,408
Other West Indies	19,373	12,367
Argentina	35,229	None
Brazil	132,898	46,877
Chile	None	22,720
Uruguay	9,971	7,245
Other countries	87,783	2,640
Coke	107,978	131,751

Retail Prices of Hard and Soft Coal

Retail prices of anthracite and bituminous coal in the principal cities of the country have been ascertained by the Bureau of Labor Statistics of the Department of Labor. The figures for some of the more representative places are as follows:

	January, 1913	January, 1918	July, 1913	July, 1918
Baltimore (2,240 lb.):				
Pennsylvania anthracite—Stove	$7.70	$9.60	$7.24	$10.45
Pennsylvania anthracite—Chestnut	7.93	9.75	7.49	10.55
Boston:				
Pennsylvania anthracite—Stove	8.25	9.85	7.50	10.25
Pennsylvania anthracite—Chestnut	8.25	9.85	7.75	10.25
Chicago:				
Pennsylvania anthracite—Stove	8.00	10.35	7.80	10.90
Pennsylvania anthracite—Chestnut	8.25	10.39	8.05	10.98
Bituminous	4.97	6.67	4.65	6.48
Cincinnati:				
Pennsylvania anthracite—Stove	8.25	9.50	7.50	11.66
Pennsylvania anthracite—Chestnut	8.75	9.50	7.75	...
Bituminous	3.50	6.10	3.38	6.73
Detroit:				
Pennsylvania anthracite—Stove	8.00	9.88	7.45	10.15
Pennsylvania anthracite—Chestnut	8.25	10.08	7.65	10.52
Bituminous	5.20	8.27	5.20	8.18
New York:				
Pennsylvania anthracite—Stove	7.07	9.06	6.66	9.30
Pennsylvania anthracite—Chestnut	7.14	9.08	6.80	9.29
Philadelphia (2,240 lb.):				
Pennsylvania anthracite—Stove	7.16	9.59	6.89	9.85
Pennsylvania anthracite—Chestnut	7.38	9.68	7.14	9.89
St. Louis:				
Pennsylvania anthracite—Stove	8.44	10.43	7.74	11.00
Pennsylvania anthracite—Chestnut	8.68	10.53	7.99	11.25
Bituminous	3.36	5.44	3.04	5.89
San Francisco:				
Bituminous	12.00	13.87	12.00	14.08
Seattle (Zone A):				
Bituminous	7.13	7.87	7.20	9.13
Washington (2,240 lb.):				
Pennsylvania anthracite—Stove	7.50	10.10	7.38	9.96
Pennsylvania anthracite—Chestnut	7.65	10.19	7.53	10.06

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The anthracite settlement has gone one step forward for it has been approved by the Conference of National Labor-Adjusting Agencies, which Conference adopts the regulation defense of the wage increase; namely, that it is necessary to prevent a depletion of mine labor and to avoid dissatisfaction. It declares that the wage scale is given for these reasons only, the mine workers having loyally stood by their contract.

A contract rightfully should require the man accepting it not to leave for other industries while under the contract. The ethics of this matter has never been worked to a finality and perhaps should not be pressed at this time. Furthermore, a dissatisfaction with a contract, such as is here alleged, has not been held in the past a good reason for its discontinuance or revision. As for the contract having been lived up to, that is true of a majority of the men. A large minority, however, has struck frequently to force the hands of the authorities.

Old Anthracite Contract None Too Generous

As a matter of fact the main reason for a change in the contract, namely that the old contract was none too generous, is only implicitly embodied in the statement of the Conference. It seemed reasonable to the labor-adjusting agencies that in view of the high cost of living and the improved status of those engaged in war industries, a better wage should be paid. It is therefore to be granted. It is to be feared that it will do little to reduce labor depletion, and there is a serious danger of its causing difficulty in the bituminous regions, where an increase is expected every time the anthracite region is granted one. Usually the bituminous region has been forehanded and secured its increase first.

Dr. Garfield has refused to consider the demand of the bituminous mine workers, at least at the present time. There is no argument justifying any increase in wage in the bituminous coal industry. The anthracite mine workers said the high wages of bituminous mine workers made an increase in anthracite wages essential. Now the bituminous mine workers say that the increase of the wages of the anthracite mine workers justifies the highly paid bituminous mine workers in seeking a proportionate wage increase.

Plan To Revive Inequitable Differential

To concede what they ask would be to reëstablish the differential in all its pristine inequity, and thus give the anthracite mine workers an excuse for more dissatisfaction and a further increase.

Dr. Garfield is to be congratulated on his decision. His patience with the anthracite claimants was excusable, but patience with the bituminous mine worker would be without excuse. The public is not ready to pay these men an outrageous price for their labors. The Government is little disposed to make the workingmen of America pay any larger wages to these workingmen than it is paying at present.

It is not willing to let a few men in key jobs make the workingmen in less strategic jobs sweat for them. The bituminous coal miner has been squealing about the cost of living, but he has been one of the most persistent boosters of living cost. He is like the man in the crowd, who roughly elbowing his way to the front, angrily demands of the bystanders that they "quit shoving."

It has been estimated that the influenza epidemic has cut the output of anthracite coal between 1,000,000 and 1,200,000 tons a month. When there is sickness, the mines become disorganized. Some who would work are not given the opportunity, and there is general dissatisfaction with the slower run. Moreover, many who come to work are rendered listless either by reason of their own sickness, the sickness of others or fears for themselves. Funerals also occur, keeping men from work. In some places the grave diggers could not perform the large amount of work demanded, and mine workers had to provide for the interment of their own relatives and friends.

Some Greensburgers Who Are Workers

The Fuel Administration has published an interesting account of the performance of the men working for the New Alexandria Coke Co. at Andrico, not far from Greensburg in central Pennsylvania, a mine operated under the supervision of C. L. Clark, a man whom all the members of the Coal Mining Institute of America remember with affectionate good will and whose success is as much due to his amiable personality as to ability as a mining man. Forty-eight men, or 38.3 per cent of the working organization at his mine won honor distinctions for full-time service during July, August and September. Each man worked 78 days during the three months, and the individual tonnage of the 48 men averaged 17 tons a day.

A big celebration will be held at the New Alexandria works this week and personal letters of congratulation and appreciation will be presented the honor roll workers. These letters have been addressed to the men by J. B. Neale, production manager of the United States Fuel Administration. James S. Amend, district production manager, will present the letters and will personally commend each worker for his loyal and patriotic service.

Records of the New Alexandria Coke Co. show it carried an average of 128 men on its pay roll during the three months. Of the forty-eight workers on the honor list 22 are Austrians, 14 Americans and 12 Italians. Each man who retains a record of 100 per cent service during October will receive an industrial service flag. These flags will be displayed by the miners in their homes and will serve as a badge of loyal war-time service.

Austrian Dug and Loaded 323 Tons Each Month

Frank Corent, an Austrian, made the high production record at the New Alexandria. In three months his output totalled 1615 tons. It does one good to commend these New Alexandrians who come from lands with which we are at war and who so admirably sustain us in our efforts. Their loyalty shows that they appreciate America. We could ill afford to intern such men. Good judgment has been shown by the administration in exhibiting resentment toward the subjects of enemy alien countries and toward naturalized citizens from those countries only when they exhibit by their lack of service or by outspoken attacks on the United States a lack of respect for the country of their residence. There are many men among these enemy alien residents who are doubly loyal, loyal for what they have sworn, and loyal again for what they have foresworn.

The miners in central Pennsylvania worked quite generally on Sunday, Oct. 20, to make up for the loss of tonnage due to the influenza, and at last reports were preparing to work again on Sunday, Oct. 27. They are determined to fill their weekly quota whether sickness intervenes or not. As the soldiers are forced to fight on Sunday, the industrial soldiers are backing them by working on that day. It is much to be regretted that such a sacrifice is necessary.

The Spanish influenza still rages in West Virginia. It has not abated to any appreciable extent and few are the coal districts that have escaped it. In the Pocahontas and Tug River districts there are 2100 cases of the epidemic and only 8000 miners are left to maintain the production.

In the New River district a large number of cases are reported, especially in the Loop Creek section and along

the main line of the Chesapeake & Ohio Ry. The production has accordingly been much reduced. The Kanawha and Fairmont districts have also suffered severely. The West Virginia coal association has thought the situation serious enough to put out a general bulletin on the subject.

The question of who is responsible for curtailed coal production has been brought up by the miners in Local No. 1421 at Buckner, Ill., in the form of a resolution which was adopted at a meeting a few nights ago. It declares that, although the Buckner mine was sunk and developed to have a capacity of 4000 tons a day, as much as 5040 tons have been hoisted in a single day, but under existing conditions it is turning out only 2853 tons daily. The reason, it is declared, is lack of cars and underground equipyment. The resolution states that one crew stayed in the mine 6 hours one day and 4 hours on each of three days of last month, and was given only two or three mine cars to fill. A St. Louis newspaper man who made inquiry at the request of the Buckner local found similar complaints at other mines, except at Mines No. 1 and No. 2, of the St. Louis & O'Fallon Coal Co.

Five hundred miners employed at the Security Coal and Mining Co.'s mine at Duquoin, Ill., refused to go to work on Oct. 23 because the Illinois Central R.R. did not provide suitable equipment to convey them to the mines.

There appears to be no finality to the demands of British Columbia mine workers. In the past year and a half, or two years, the wages of coal miners in British Columbia, roughly speaking, have risen 45 per cent., in addition to a 50-cents-a-day war bonus. In other words a man who was receiving $3.65 a day in wages now is getting $5.79 or, if he works an average of 30 days in the month, which most of the overmen do, he gets approximately $174.00 a month. But this is a small wage compared to what some of the best coal miners are making. Yet, on the other hand, it is much more than the wage paid to some of the coal mine inspectors.

The continued advance in living costs, however, has resulted, according to authoritative report, in the decision by the miners to request a further increase and it is understood that they have forwarded to the proper quarters a request that the scale be boosted a further $1 a day. It remains to be seen whether the Fuel Controller will find that this is justified by present living conditions in comparison with those who existed at the time the last raise was allowed. If the men are supported it will mean, no doubt, corresponding addition to the selling price of coal, which went up only a short time ago despite the protests of an indignant public.

Labor-Adjusters Approve Wage Contract

The Conference of National Labor-Adjusting Agencies has authorized the following statement:

"Since the beginning of the war the number of mine workers in the anthracite coal fields has decreased from 180,000 to 144,000, and, under existing conditions, a further depletion, which will seriously affect the output of coal, seems to be inevitable.

"An anthracite wage agreement was entered into last December [November?] by the operators and mine workers, a pledge being made at the time to the Fuel Administration that the contract should continue in force for the duration of the war; but events have made a continued performance of the obligation a real hardship to the mine workers. Yet in spite of this fact the mine workers and operators have adhered to their undertaking and have patiently exerted their energy in order to maintain the required output of coal. They regard the obligation as binding whatever hardships it may entail on them.

"But other considerations than the contract made by the men are involved; for time has revealed conditions that were not anticipated last winter. There has been a movement of men away from the mines to other war industries and a growing feeling of restlessness among the men at the mines. To continue the arrangement of last winter without any readjustment is to disregard a situation that threatens to interfere with the successful prosecution of the war.

"Therefore, in order to ascertain all the facts and to find a remedy for the situation, representative anthracite operators and mine workers have been meeting, in accordance with your [the Department of Labor's] suggestion, with Dr. Garfield and representatives of the Fuel Administration. They have thoroughly considered the figures available in regard to the increase that has occurred in the cost of living since last winter, the relations between wages in the anthracite and bituminous fields, and between anthracite and other war industries.

"As a result of these studies and deliberations, a plan of adjustment designed to check depletion and unrest in the anthracite coal fields has been submitted to this conference for our independent judgment and recommendation in view of the labor situation of the entire country. After careful study of the suggested plan of readjustment and the grounds upon which it is based, we are convinced that the interest of the whole nation compels this readjustment.

Wage Rate From $3.36 To $6.60 per Day

"We, therefore, recommend the readjustment of the anthracite wage scale, as provided in the plan submitted to us, which establishes, in substance, a scale of wages ranging from 42c. per hour for laborers outside of the mine to average earnings for contract miners approximately estimated at $6.60 per day. This scale we have found to be in line with the wages already established by governmental agencies for other industries, and we are convinced that its adoption will act as a stabilizing influence. Without such a readjustment, the vital coal needs of the country are jeopardized. With such readjustment, there should be no further drains on the labor force of the anthracite mines and production should be maintained and, probably, increased.

"Before reaching the conclusion that the readjustment we herein recommend is necessary to meet the national situation, we satisfied ourselves that in no other way can the necessary supply of labor be maintained or stability in the industry be assured. Prior to the European war, labor in the coal fields was largely recruited through immigration. Since 1914 this flow has entirely ceased. Therefore, especially in view of the increased coal need of the country, it is essential that the anthracite industry retain the labor resident in that region.

"The mine workers are fully alive to the country's need for production, and their organizations have carried on an intensive campaign to stimulate output. The efficiency of the workers is attested by the fact that, although there are 36,000 less to do the work now than there were before the war began, the production of coal has been maintained. It is gratifying to know that the mine workers have generously undertaken, for the period of the war, to continue steadily at work even though the observance of religious and other holidays has to be foregone.

Unascertained Factors in Labor Situation

"One matter was made clear in our meetings and we deem it pertinent for the consideration of the Fuel Administration. It appears that there is no scientific knowledge in regard to some of the underlying facts of the anthracite industry, though upon these facts all decisions as to wages and output should ultimately be based.

"Representatives of both mine workers and operators have urged upon us that steps should, at once, be taken so that systematic and authoritative information will be obtainable in the future, in regard to such fundamental questions as comparative earnings, labor turnover, continuity of employment and sufficiency of output. It was agreed that we must create conditions which will assure greater continuity of employment, greater regularity of work, greater quantity of output and that at the same time every safeguard must be provided that will protect the workers in this hazardous industry.

"In a word, the conditions of the industry must be stabilized. Therefore, the attitude of mind of those in the industry in regard to those conditions must be organized. As a necessary prerequisite we must have that basis of knowledge upon which alone we can act wisely and with justice."

EDITORIALS

Peace Without Victory

WE WANT peace because we did not enter the war from any pleasure in fighting. We do not keenly desire victory, for it was not a thirst for glory that made us take up arms. We have no purpose in this war but justice—justice especially for Germany.

And by justice we do not mean that right of "life, liberty and the pursuit of happiness" which the Declaration of Independence, written for well-intentioned people and intended for their governance, said was the right of all the well-intentioned. We, here in America, deny and have long denied the unrestricted rights of "life, liberty and the pursuit of happiness" to such men as are guilty of criminal actions. We do not give them the justice of the well-intentioned, but instead what is known as retributive justice.

That is the justice which for the present we desire for Germany. We seek for an unconditional surrender. If Lincoln was in any way justified in leaving the issue of peace and war to Grant, if Grant was in any measure justified in demanding "unconditional surrender," surely Wilson is today justified in leaving the terms of surrender to Foch; and Foch is authorized by all the dictates of conscience in requiring that the enemy shall admit itself beaten and without any defense but a plea for mercy. What was forced on the knightly Robert E. Lee should be demanded of the unnamed successor or successors of the bestial Ludendorff.

When the sheriff goes to get his man, does he argue with him? Does he promise him just what the jury shall decide as to his guilt? Does he announce to him what the judge shall award him as his deserts? If he did, the sheriff would be considered as violating the law and overstepping the measured limits of his domain. He catches him first, and the law tries him later. He is not suffered to compromise the court.

Of course, the judging and the apprehension of international offenders have not been by law circumscribed, so that we can say the chiefs of the armies and navies may not discuss terms with the offender; but in this case, at least, it would seem well to ask them to avoid doing so. We do not want the administration of justice to be hindered in any way by an agreement that may be used by the ruffianly Hun in such a manner that we may be adjudged as compounding with his villainy.

Economic Losses Arising from High-Ash Coal

DURING the past year or so much complaint has been heard concerning the large amount of slate and bone in the coal shipped by some operating companies. Although much improvement has been made in the matter of clean coal, there is still much room for betterment. Both in transportation and consumption dirty coal entails needless waste and loss.

Of course, the logical place to rid coal of its objectionable impurities is before these impurities have had an opportunity to begin their work; that is, objectionable impurities should never be allowed to travel farther or in any other direction than form the coal face to the gob, a few feet away. Once bone or slate enters a mine car it begins to be a drag and a drain upon transportation, and it never ceases its bad work until it lands upon the ash heap of the ultimate consumer. The farther it travels the more harm it does. The trip from face to gob is the shortest journey possible and consequently the least expensive.

When a coal bed contains high-ash impurity and the miner is paid by the ton, when the cry is constantly for coal and more coal, when miners are scarce, the union vindictive and employers can ill afford to "fire" anyone, the temptation to load out everything that comes down is ever-present. To some it is apparently irresistible. The loader who succumbs to this temptation certainly does not realize the effects of his iniquity. He sees only a chance to clean up his place a few minutes quicker or possibly get out an extra car of coal before quitting time. He does not realize that in loading out bone and slate and similar impurities he is "giving aid and comfort to the enemy."

American miners as a class are unquestionably patriotic. Should you search the country over from Tamaqua to Issaquah it would be difficult to find one who would willfully do aught to aid the Kaiser or any of his infamous brood. None would knowingly or wittingly harbor an enemy agent or spy within his gates—he would like nothing better than the chance to turn such a person over to the proper authorities. The enemy agent is in this country—figuratively speaking—to throw sledge hammers into the gear wheels of American industry. The miner who loads out dirty coal accomplishes this same result. He could scarcely perfrom a greater service for the Hun were he actually in the Kaiser's pay.

Will the Enemy Alien Return?

AFTER the war the enemy aliens are quite likely to return to Europe, those who are favorably disposed toward America as well as those who are not. The best and the worst will go back—the best because their hearts are the largest and they will want to return to restore those they left behind them, and the worst because this country never appealed to them.

It is a question, however, just what will happen to the men who go back. As they are citizens of foreign countries they may be held, and their earnings may be sequestrated in the land of their birth. No great regard will be felt for the sanctity of such property as they have secured by working in the mines of a nation with which their natal country was at war. It is not likely that Germany or Austria will be kindly disposed toward those who thus return. Moreover, their very leaving of their native land was in many cases a violation of the law, for which they may be punished.

It would be a kindness to such men to warn them about the dangers of a return. Their best interest would be served by prudently waiting till they discover just what happens to those who first venture to go home. It is by no means certain that they will not regret the rashness that led them to return to the lands from which they came.

Should there be a military occupation of those countries, perhaps it might be safe to revisit them. But if a revolution occurs, a visit may be anything but prudent; for the United States will not protect aliens, its ægis being held over only its own citizens. It would seem that few would be disposed to leave their jobs and risk their earnings if they only knew that some one would find their loved ones, report their condition faithfully and take charge of the money to be given toward their reëstablishment.

The Red Cross could perform this service for enemy alien laborers in this country, perhaps at a small charge. In fact it could do it better than the emigrant, should he return to do it himself, and meanwhile he would be earning good American wages.

It appears likely that by pointing out the dangers of a return and by providing the emigrant with a means for caring for his family without returning home, most of the enemy alien mine workers would willingly retain residence in America and become desirable citizens. After the war there will be need for them all. With the glories of their native land somewhat abated by the action of our valorous troops, and with a sense of the fair treatment accorded to them in a great war despite the stress of circumstances, they would be prepared to submit themselves to something better than naturalization—the mere letter of nationhood—and accept what is larger, patriotism, which is the nation's very breath and spirit.

Corporational and Personal Cleanliness

THE average mine village is none too cleanly. Some there are which are models in this respect, but in too many cases little attempt is made to keep them clean. What the tenants have to waste they throw on the roadways where a kindly wind may or may not carry it away, if it be light; where animals may devour it, if it be edible; or time convert it into some unobjectional form of matter, if it be perishable.

Some people have tried to blame the street conditions of mine villages for the present influenza epidemic, but if there is any relation between the two it is most indirect. What relation there is may be briefly stated as follows: Tenants who keep and are allowed to keep a noisome street are apt to be careless in the home and to omit these precautions which will prevent the spread of influenza.

The disease largely spreads by reason of personal uncleanliness. If everyone kept his own towel, soap, washrag, pencil, pen and pillowslip; if there had been no promiscuous dipping of individual spoons, knives and forks into a common dish; had knives not been used as forks; if individual knives thus used had not been allowed to slice butter from a common roll; had spitting and sneezing been controlled; had soiled handerkerchiefs been placed in a separate receptacle so that they could be dumped into scalding hot water where the germs in them would not be able to infect the clothes of others; had rooms been properly ventilated day and night, and had all cups and saucers been plunged into scalding water after being used, the germs would have been propagated only with difficulty and probably not in such an intensive way that they could not be resisted by those in good health. Frequent cleansing of the hands would also assist in keeping germs from the mouth. Cleansing the teeth and applying a little antiseptic to the throat and nostrils would give further assurance.

All this seems a terrible waste of time and effort, but who shall say it is unreasonable seeing that the little town of Wishaw, near Punxsutawney, Penn., lost from influenza 65 inhabitants, or one in every six persons. The neighboring town of Du Bois, in a frenzy of fear, is washing its streets with the hose daily and compelling the business men to flush the sidewalks every morning. Excellent measures these, but not nearly as important as that domestic hygiene which is too often neglected.

At the mines of the Lehigh Valley Coal Co., up in the anthracite region, 784 men were laid off at one time. How many of sick there were, in all, it is hard to say. There are probably more in the mines of other companies, for the Lehigh Valley Coal Co. has a splendid nursing and medical system where others have none of the first and less of the second, and have not taught hygiene in season and out of season as has the Lehigh Valley Coal Company.

Just think what the loss of wages must be from such a disturbance as that described. How many towels, pieces of soap, washrags, tooth brushes and glasses might be purchased with the money thus wasted. How many ablutions and scaldings could have been paid for with the money had it been earned! We have yet to learn the cost of disease in decrease of earnings and in loss of life. Some day we will perhaps admire in full measure the old Mosaic laws which kept a people alive when occupying the houses, operating the farms and drinking from the wells of a people who were fast dying out from virulent disease.

With our epidemics we have two mental periods. In one we say we do not know whether the threatened plague will come, therefore why waste time and effort and make ourselves foolish by ridiculous prophylaxis. Then the epidemic steals on us, and we take a new viewpoint. "The evil has reached its height. Those appointed to die are dead. The living are more or less immune, so why worry?"

We shall persist, it is to be feared, in our unprophylactic methods till the next epidemic, though perhaps if we used ordinary methods of self-protection it might never invade our homes. At no time can we train people in hygienic methods as well as we can immediately after an epidemic. We need now to get ready for the return of the disease that is promised for the spring. Had we acted early we could have doubtless prevented the scourge from invading America and spreading from shore to shore.

One great source of danger too often overlooked is the barber. That functionary should be more careful than ever about his ablutions, and when epidemics are rife he should wear a mask for the protection of himself and his patrons. In many towns the barber shaves, and thus infects, a large proportion of the people. A word from the owner of the mine would do wonders for sanitation in which, alas, few barbers have any devoted belief.

Don't Let Up Till He Puts Up Both His Hands



On hearing that the Kaiser had given up his throne and that the surrender of Germany was to be expected any moment, many miners quit work entirely. At other mines men took a day off so that they could celebrate an event which may not occur for several months.

To Your Shovels and Your Picks, Mine Workers, the Hun Is Not Yet Downed!

DISCUSSION BY READERS

Estimating Power in Haulage

Letter—No. 1—Kindly permit me to draw attention to one or two errors, in the reply to an inquiry regarding the manner of estimating the power in mine locomotive haulage, which appeared in *Coal Age*, Sept. 26, p. 615.

The weight of the loaded trip, which is given as 40 tons, is evidently estimated on the weight of coal hauled, instead of on the weight of the loaded cars in the trip, which is $25(3200 + 1200) \div 2000 = 55$ tons. Also, it is quite evident that the fraction, $\frac{1}{16}$, used for determining the tractive effort of the locomotive from its weight, is a typographical error for $\frac{1}{8}$. Permit me to say, however, that even this fraction would be low.

For steel-tired locomotives, the tractive effort may be taken as high as $\frac{1}{4}$ and, for chilled-iron wheels, $\frac{1}{5}$ of the weight resting on the drivers. Making these corrections and assuming the above factor for steel-tired locomotives, gives for the weight of locomotive required as $7\frac{1}{2}$ tons; or, for chilled-iron wheels, say $9\frac{3}{4}$ tons, the power, in the first instance, being 63 hp. and in the second instance 65 hp. But, this horsepower should not be confused with the horsepower rating of the locomotive given by the various manufacturers, in setting the size of motor for locomotives. The characteristics of each motor must be considered.

MANUFACTURER'S METHOD OF ESTIMATING POWER

It is my custom, in making this calculation, to multiply the weight of the loaded trip hauled by the sum of the track and grade resistances, and divide this product by a constant determined by the kind of wheels with which the locomotive is equipped, less the sum of the track and grade resistances.

Thus, taking the sum of these resistances, as given in the reply to this inquiry, as 60 lb. per ton, and the weight of the loaded trip as 55 tons, and using a factor of 500 for steel-tired locomotives, I find, for the required weight of locomotive, in this case

$$W = \frac{55 \times 60}{500 - 60} = 7\tfrac{1}{2} \text{ tons}$$

In like manner, using a factor of 400 when the locomotive is equipped with chilled-iron wheels gives for the required weight on the drivers,

$$W = \frac{55 \times 60}{400 - 60} = 9\tfrac{3}{4} \text{ tons}$$

Now, taking the efficiency of the motors as 90 per cent., and multiplying the weight of the locomotive resting on the drivers by its tractive effort per ton (500 for steel tires and 400 for chilled-iron wheels) and that product by the speed of hauling, in this case, 500 ft. per min., and, finally, dividing the last product by the efficiency of the motors and again by 33,000 gives the required hopsepower. Thus,

Steel tires, $H = \frac{7\frac{1}{2} \times 500 \times 500}{0.90 \times 33{,}000} = 63$ *hp.*

Chilled-iron wheels, $H = \frac{9\frac{3}{4} \times 400 \times 500}{0.90 \times 33{,}000} = 65$ *hp.*

Track resistance depends on type of bearing and the condition of wheels, track and bearings and may vary from 10 to 50 lb. per ton. E. STECK.

Chicago, Ill.

[We thank this correspondent for drawing attention to the inadvertent errors in the reply to the inquiry mentioned. However, we cannot agree with his suggestion to use a smaller factor than $\frac{1}{8}$ of the weight of the locomotive resting on the drivers when determining its tractive effort, in coal mining practice.

MINING CONDITIONS REQUIRE CONSERVATIVE AND SAFE ESTIMATE OF POWER

Coal Age has often drawn attention to the fact that the conditions existing in coal mines are such as to make it advisable to use a factor representing an adhesion of the wheels to the rails sufficiently small to insure that the tractive effort thus found will not be overestimated. Nothing is more exasperating or annoying in mining practice than to find that a locomotive will occasionally fail to haul the estimated load, because of a condition of the track so common in coal mining. It is far better to be on the safe side and underestimate the tractive effort of a locomotive than to err on the other side.—EDITOR.]

Steel Tires vs. Chilled-Iron Wheels

Letter No. 1—I have read with considerable interest and profit the articles presented in *Coal Age*, relating to mining equipment. The character of the equipment used in a mine should be vitally associated with the production of coal, as well as directed toward increasing the safety of mining operations. Much attention and good judgment based on experience must be given the matter of rolling-stock equipment and the maintenance of track in mines.

In this connection, it has occurred to me that much can be said with profit regarding the relative utility of steel tires and chilled cast-iron wheels for mine cars and locomotives. I believe that the cast-iron wheel on mining locomotives is more general than steel wheels or wheels equipped with steel tires. This is probably owing to the fact that the cast-iron wheel is cheaper and, perhaps, more readily obtainable.

In respect to the relative service given by these two types of wheels, it is worthy of note that where comparative tests have been made, the steel wheels, or wheels with steel tires, have been shown to give the most satisfaction. In many instances, it has been found that they have given two, three and four months'

more service under severe conditions of hauling. At times, it has been found that the steel tires last twice as long as a cast-iron wheel. Also, after a steel tire has been worn considerably, it can be turned down to the depth of the blind flange.

In the operations of hauling it is true that the steel wheel has been found to require much less sand than a cast-iron wheel, the amount being about half as much when pulling the same load. Further, a locomotive equipped with wheels having steel tires possesses the advantage that it will pull a much greater load on the same grade, as one equipped with chilled cast-iron wheels. The steel appears to take a hold on the rails, while the cast iron has a tendency to slip, even when pulling a light load. In my experience, I recall an instance where a 10-ton electric locomotive equipped with steel tires pulled a load weighing 10 tons heavier than another locomotive equipped with cast-iron wheels could haul on the same grade.

These facts are extremely interesting to the mine operator, as they show the advantage to be gained by enabling the locomotive to pull a much greater load by reason of this item of its equipment, while consuming the same power and yielding a longer service, which means a great saving in the cost of operation. Even the sand saved is no small item in the mine expense, where the haulage road has some grades requiring its use. W. H. NOONE.

Thomas, W. Va.

The Miner and His Pleasure

Letter No. 6—The letters in the discussion department of *Coal Age* are always interesting to me, but none have given me greater pleasure than those that have been written on this subject, as I am a miner myself and know what it means when one is obliged to forego the pleasure of the few hours he spends on the surface and devote these wholly to the interests of his country.

We have, in our locality, several mines, none of which are the heaviest producers, however, but employ an average of about 200 men. I believe I am safe in saying that 95 per cent. of these men work every day the mines hoist, while 3 per cent. of them may lose a day or two a month and the remaining 2 per cent. perhaps a little more.

MINERS SET ASIDE PLEASURE TILL AFTER THE WAR

Let me say that our miners here enjoy the pleasures of life about as well as any to be found anywhere; but they seem always willing to lay aside their pleasure trips, drunks, etc., until a more convenient season. It may surprise many to learn that about 50 per cent. of the miners in this immediate field own their own homes, and very attractive little homes they are, too.

It was a very common sight, the past summer, to see miners out digging in their war gardens, who, heretofore, had been accustomed to spend their evenings automobiling, playing cards, or loafing in the pool rooms and on store fronts. Almost without exception these men have answered the call to duty, and their evenings are now spent at work in the gardens. It is my belief that they derive as much pleasure in this work as when the hours were formerly spent in pleasure. As the season advanced, and the gardens began to take on a productive appearance, there was a sharp rivalry between neighbors, and a pardonable jealousy was often aroused when another garden nearby appeared a little more advanced than one's own. In other words, the gardening scheme was competitive, each striving to outdo his neighbor.

WORK OF MINERS IN FOURTH LIBERTY LOAN

Speaking of automobiling, several of our boys own cars, but not many trips are taken that lose the owner of the car a shift in the mine. As showing the patriotism of our little community, however, I need only mention the way the Fourth Liberty Loan went over the top in a single day's time, in our township, which is one of nine townships in the county. Our population is principally miners, while the adjoining townships are chiefly farmers, retired farmers, merchants, bankers, etc. We have one town of about 2500 inhabitants and six or eight small villages in our township, while another township has a small city of 6000 or 7000, besides villages. In the recent drive our quota was $82,500, while that of the remaining township was $237,000.

When the drive started, Sept. 28, everybody in our township got busy at once, with the result that we went over the top at noon and had an overplus of $10,000 at 6 p.m. that first day, and there were yet several to be solicited. Two days later, Sept. 30, another township was $48,000 behind its quota, and the remainder of the county is $127,000 behind. It is no exaggeration to say that our men have derived much pleasure from the results of this drive in the Fourth Liberty Loan. Everyone is happy.

OBSERVE STRICTLY BAN ON USE OF GASOLINE

Before closing, I want to say a word on the ban on gasoline. Sunday is the only day the miner really has for rest and pleasure; but the announcement of gasless Sundays found our men well content to abide by the ruling. Although our local fuel administrator gave his permission for the use of an automobile where a man had a long distance to walk to church or to his work at the mine, in one or two instances, such a use was hailed by the cry of "slacker," and, it is needless to say, that put an end to the use of autos on gasless Sundays.

No! The feeling here is that we have no time for pleasure as long as our boys are sacrificing their lives on the battlefields of Europe. Our purpose is to produce enough coal to meet all demands and carry the war to a successful issue and freedom and liberty are proclaimed in Berlin. VICTORY.

————, Ind.

The Wagon Mine a Menace

Letter No. 3—While I cannot agree with everything said by H. E. Gray, in his letter, *Coal Age*, Aug. 8, p. 282, I am in favor of closing most of the small wagon mines, so many of which have been opened recently and have a tendency to draw miners from their work in larger mines where they would be able to mine and load a much larger amount of coal.

My conviction is that a miner will produce more coal in a day when working in a large mine equipped with up-to-date machinery than he could if employed in a small mine not possessing the same advantages. There are many reasons for this.

Ordinarily the ventilation of these smaller mines is poor, owing to the fact that there is not enough coal in the tract to pay for building and operating a suitable fan, and the mine must depend perhaps wholly on natural ventilation, or that produced by a furnace.

Small Operations Lack Necessary Capital

Again, the usual operator of a small mine has not the capital to install pumps or other suitable means of drainage. Instead, he must employ waterboxes, which afford a poor means of keeping the mine free of water. Anyone familiar with the use of waterboxes knows what a disagreeable task it is, especially in the winter time when one is liable to contract a serious disease if obliged to work all day in wet clothing, to say nothing of walking two or three miles to his home at the close of the day.

Further, the small operator generally employs no particular system of mining. Such is his desire to put out coal and realize on his investment, that he adopts the quickest means of accomplishing this. The majority of small mines are opened and operated on the single-entry system. Rooms are turned off this entry as fast as the place is extended, and what ventilation is provided must pass through these rooms. The result is that the circulation is often blocked by a fall of roof in one or more of the rooms and the men suffer for want of air.

Conditions in respect to timbering and haulage of coal are practically on a par with those just described. Mules are employed on all the roads in the mine. Light iron and even wooden rails are used, resulting in many wrecks and delays and increasing the danger to the workmen.

Modern Equipment Means Greater Production

There is truth in the statement of George Bowker, in his letter of Sept. 5, p. 464, that every ton of coal mined is that much help in winning the war; but he must remember that the miner working in a small mine and producing four or five tons of coal a day would probably be able to mine from ten to twelve tons a day in a large mine equipped with modern machinery and appliances. The difference between the man's actual production and his possible output represents our loss and the Kaiser's again.

Speaking of clean coal, I agree with Mr. Bowker that the small mine compares favorably, in that respect, with the larger mine, except where the former may be working outcrop coal, which is more or less impure and cannot be satisfactorily cleaned, since the coal itself is of a low quality. However, his statement that the small operator visits the working places every day to inspect them and see that the men are working under same conditions is far from the truth. It is the exception where a small operator does not devote all of his time to working in a place by himself or superintending the hoisting and loading of coal at the surface and other matters, which seldom leave him any time for inspecting the working places of his men.

While the majority of so-called "wagon mines" are operated under the conditions I have described, there are a few of these that, while obliged to haul their output from the tipple to the railroad for shipment, do not deserve the same classification as the local wagon mine. Many of the former are equipped with good machinery and work enough men to call for state inspection by the district mine inspector. Let me suggest that any ruling regarding the operation of small mines should discriminate in favor of such as these.

A competent committee should be employed by the Government to look into the matter and decide what mines are being operated to advantage, and should be permitted to continue operations, and what mines should be closed for the period of the war.

Cleaton, Ky. Ostel Bullock.

Transportation of Coal by Canal

Letter No. 4—Last March, there appeared in *Coal Age* [Vol. 13, p. 402] an article by W. W. Wotherspoon, superintendent of public works for the State of New York, regarding the cost of transportation on the New York Barge Canal, the operation of which has been taken over by the Federal Government.

A little later the question of the relative cost of transporting coal by railroad and canal was discussed, in *Coal Age* [Vol. 13, pp. 938, 1075, 1172] by Mr. Wotherspoon and myself, with a view to showing the practicability of utilizing the canal system of the state for that purpose and the ultimate effect on the taxpayers.

Shortly after the Government assumed charge of the canal, Mr. Tomlinson, the operating manager for the Government, wrote a letter to the New York Chamber of Commerce, in which he said:

> The Government has established identical rates for canal and rail service. . . . But business is not being offered to the canal. . . . I am compelled to admit that traffic if not at a standstill is very small in volume. . . . I have contracted for a considerable fleet of large new steel and concrete boats, which will be built in a few months provided material for their construction is forthcoming.

Following this is Mr. Wotherspoon's statement, in the New York Times, June 22, "We have experienced much disappointment in our attempt to influence private capital to form boat lines and engage in the canal business." Again, June 25, Alfred H. Smith, Regional Director for the Government for Eastern Railroads, for the purpose of inducing shippers to use the canal, issued a tariff making the Railroad rates 20 per cent higher than both canal and former railroad rates.

In view of the foregoing statements, it would be interesting to learn the following facts regarding the operation of the canal under Government control:

1. How many boats have been built by private owners, and what is their carrying capacity?
2. How many boats have been built by the Government and what is their capacity?
3. Has the 20 per cent. raise in the railroad rates resulted in private shippers sending their freight by the canal instead of by rail?
4. If private shippers are using the canal, how many through trips of loaded boats were made from Buffalo to Albany only, and what total tonnage did they carry?
5. How many through trips were made from Buffalo to New York, and what was the total tonnage carried?

6. How many empty trips were made between Buffalo and Albany, in both directions?

7. How many empty trips were made betwen New York and Buffalo, in both directions?

8. What has been the average time of trips between Buffalo and Albany, and between Buffalo and New York?

9. What has been the total tonnage, including through and local, carried on the canal proper, between Buffalo and Albany, in both directions?

If *Coal Age* can obtain answers to all or any of these questions, from either Mr. Tomlinson, Mr. Smith or Mr. Wotherspoon, considerable light will be thrown on the subject of whether the canal will prove to be the economic and commercial success that its advocates have prophesied would result. G. W. WILKINS.

Pittsburgh, Penn.

Air-Cylinder Lubrication

Letter No. 1—I have been very much interested in the inquiry on this subject contained in *Coal Age*, Sept. 12, p. 522, and the reply to the same. My interest in this subject is greater owing to the fact that we have experienced, in our plant, the same trouble from the accumulation of a carbon residue in the air cylinder of our compressors. In some instances, the residue has so choked the valves as to interfere with the proper operation of the compressor.

For a long time, we sought to find a proper remedy for this difficulty, which not only caused much trouble and annoyance but was expensive to remove. It would happen that from two to three times a year, it was necessary to take the compressor apart and scrape the residue out. At times, we have put the cylinder in the lathe, for the purpose of cutting away the deposit from the metal.

EMPLOYS A CARBON REMOVER WITH GOOD RESULTS

After awhile, we learned, through a friend in charge of a large plant, of a carbon remover that he was using that had given good results. It was known as the "J & J" carbon remover. My friend had found that it was also very useful in cleaning out the gummy deposit and carbon residue from gas-engine cylinders. The gummy deposit, he explained, came from the use of a lubricating oil that was not adapted to gas-engine practice. The "J & J" carbon remover cleaned out the cylinders and the valves, in every case.

We had been frequently troubled with a residue that formed a coating similar to oyster or clam shell. Upon the recommendation of my friend, I determined to use the carbon remover he named. Instead of taking the cylinder apart and cleaning it, as previously, I simply attached a belt and ran the compressor, injecting some of the carbon remover through the air valves. The result was simply marvelous, as it cleaned the valves and cylinders from the deposit, which gave no further trouble.

Since that time I have recommended the use of this carbon remover to others. We have found that, by using a small quantity of it, occasionally, the cylinder and valves are kept clean and no trouble is experienced in the operation of the machine. I thought that this information would be of interest in connection with the subject discussed and offer it quite gladly.

———, Colo. B. B. T.

Travel of Electric Current

Letter No. 6—Kindly permit me to refer to a few of the statements made by correspondents who, in attempting to give their understanding of the question of whether an electric current flows through the body of a conductor or over its surface only, may have confused the matter in the minds of many.

The flow of an electric current in a conductor is a question that should be left to scientists only, as it possesses no practical value for the electrical engineer. For the most part, the statements made by others are prone to give the impression that there are still great unknown mysteries about electricity, which tends to develop a lack of confidence in the work of the practical electrician.

As a matter of fact, there is probably no other branch of engineering in which the basic facts relating to the application of any particular form of energy to the work it is designed to perform is more perfectly known than in the electrical field. I would even say that the electrical engineer is able, in most instances, to work with far greater precision, in designing means for utilizing the power he employs, than most other engineers.

PRACTICAL APPLICATION OF ELECTRICAL POWER

While it is not known what electricity is, and its nature may not be understood completely, this fact does not hinder the utilizing of this form of energy by the practical engineer. Speaking of the flow of current in a conductor, correct and reliable results are obtained by assuming that a direct current flows practically uniformly throughout the entire section of a conductor, whether the latter be magnetic or nonmagnetic. As has been stated, in the use of alternating current there is a tendency of the current to flow near the surface of a conductor, rather than in its interior. This has been spoken of by some as a "condensation of the current at the surface of the conductor," but is more commonly described as "skin effect."

It can be said, with more or less certainty, that the three factors concerned in this characteristic of alternating current are: The frequency of the current; the magnetic quality of the conductor; and its nearness to the return, which apparently exerts an influence beyond itself having a tendency to modify the flow.

However, in his practical work the electrical engineer can safely forget all that scientists have said about the flow of an electric current not being confined to the conductor. Scientists may have good and proper reasons for this assumption. In like manner the practical engineer, with the exception, perhaps, of the electrochemist, may forget that electricity probably flows from negative to positive, or in the opposite direction to what is universally assumed, which is from the positive to the negative element or electrode.

In other words, our highly esteemed Benjamin Franklin, who formulated this long established theory, may have guessed wrong. But the point I wish to emphasize is that these scientific questions should only concern the practical engineer, in as far as they have a bearing on the use he wishes to make of the matter in practice. Otherwise the discussion may do more harm than good by casting doubt on results already accomplished.

Kansas City, Mo. ELECTRICIAN.

INQUIRIES OF GENERAL INTEREST

Working a 22-Deg. Pitch

I am the foreman of a mine here that has been opened in a seam pitching 22 deg. The coal varies from 3 ft. 6 in. to 4 ft. in thickness and is full of spars, rolls and dykes. The coal has been worked thus far by driving dip planes and turning rooms on 60-ft. centers. Owing to the bottom being quite uneven, it is impossible to drive the rooms on sights; but they must follow more or less the contour of the floor, so as to avoid the necessity of brushing the roof to obtain headroom for the cars. The rooms are widened out on the lower side to a width of 20 ft. The coal is cut with a Sullivan iron-clad, electric chain machine.

Formerly, the rooms were widened on the upper side of the track, but this was changed and they were then widened on the lower side, because so much trouble was caused by the rooms cutting through the pillar. In many cases, hardly any pillar was left, and what remained was too hard to get and did not pay. To avoid this trouble, the company decided to change and widen out the rooms on the lower side of the track.

I have been trying to find a way to widen out the face so that the machine can do better work. It is hard to cut the rooms downhill, and there is not sufficient room to square the machine around and "sump in" at the lower corner so as to enable the machine to cut uphill.

The machine cuts in the bottom slate, which is very soft. Indeed, the bottom is so soft that it is necessary to use planks under the machine. Much time is required to unload the machine and "sump in" and then load it again when the cut is finished. The difficulties encountered in working this seam have caused me to wonder if there was not a better method to employ and one that would give less trouble and produce better results.

In studying over the matter, I thought it might be worked on the longwall panel system that I have seen described in books. Neither myself nor any of the men working with me have had any experience in longwall work. The most of our miners are Mexican and Spanish miners and require much care and watching. I shall be glad if *Coal Age* and its readers can give me any suggestions in regard to a better method for working this seam. MINE FOREMAN.

Madrid, N. M.

It is difficult to give a wholly intelligent answer to a question of this kind and suggest a method of working that would be adapted, in every respect, to the conditions described in the inquiry. In order to form a correct judgment, in the mining of any coal seam, it is necessary to be well acquainted with the situation in all its details. Without being on the ground and making a careful survey of the proposition, it is only possible to give, in a very general way, the outlines of a method that would seem to be adapted to suit the conditions described by this correspondent.

In the first place, assuming that the rooms are driven, on 60-ft. centers, off the dip inclines and widened out to 20 ft., as stated, the thickness of the remaining pillar would be 40 ft. It is hard to see how the rooms would cut through this thickness of pillar when widened on the upper side of the track; or how this difficulty would be avoided by widening out below the track.

However, it is stated that, owing to the uneven formation, the rooms have not been driven on sights. In that case, it is easy to understand that adjoining rooms might hole into each other at any time, unless great care was taken to keep them apart and maintain a good thickness of pillar. This, we assume, is the real cause of the rooms cutting through the pillar.

We understand that when the rooms were widened out on the lower side of the track, the difficulty arose of sumping in the machine, at the lower corner, so as to enable it to cut uphill, instead of starting the cut at the roadhead and cutting downhill. Our suggestion, in this respect, is that the rooms should be widened out, as formerly, on the upper side of the track so that the machine can start at the roadhead and cut uphill.

The necessary precaution must then be taken to maintain the full thickness of the pillar. There is no excuse, in good mining, for permitting rooms to hole into each other, especially where pillars are supposed to be left 40 ft. in width. If the rooms are not driven on sights, they should be surveyed at regular intervals and the position of the roads determined closely in order to avoid the trouble mentioned.

Speaking of longwall work in this seam, we would suggest working the seam on a panel system, by driving places off 300-ft. levels, say 100 yd. apart. When these have been driven up a suitable distance, say 75 or 100 yd., the pillar of solid coal between two adjoining places should be cut across at the face. This can be done by driving a crosscut 20 ft. wide directly across the pitch until it intersects the face of the adjoining place.

By this means, a panel of solid coal will be cut out 100 yd. square. This panel can then be worked out on the retreating system. The machine should start to cut the coal at one corner of the crosscut and cut the full width of the panel, or 280 ft. As the coal is cut and loaded, it can be taken along the face to the roadhead where it is lowered to the level or gangway and hauled to the main slope to be hoisted.

This system would have the advantage of giving the machine one continuous cut for a distance equal to the width of the panel which would mean much time saved in loading and unloading the machine, and sumping. As the cut is started from the roadhead in one of the rooms, it will not be necessary to sump in the machine.

We recommend this system of working as being best adapted to the conditions described. No doubt many of our readers who have had practical experience in the working of such seams will be able to give further suggestions that will be helpful.

EXAMINATION QUESTIONS

Miscellaneous Questions

(Answered by Request)

Ques.—What is the breaking strain and safe working load of a good steel hoisting rope $1\frac{3}{8}$ in. in diameter?

Ans.—For a six-strand 19-wire hoisting rope of crucible cast steel, having a diameter $d = 1\frac{3}{8}$ in., the breaking strain is calculated by the formula

$$S = 39d^2 = 39(1\tfrac{3}{8})^2 = 73.73 \text{ tons}$$

The safe working load varies from one-fifth to one-eighth or even one-tenth of the breaking strain, depending on the depth of the shaft, speed of hoisting and importance of the operation. In this case, for a depth of shaft not exceeding 100 yd., the safe permissible load may be taken as one-fifth of the breaking strain, or, say 15 tons.

Ques.—The current of air entering a mine is 32,000 cu.ft. at the inlet and 34,000 cu.ft. at the outlet. What is the cause of the increased quantity?

Ans.—Assuming that the observations have been carefully taken showing an increase of 2000 cu.ft. per min. discharged at the outlet, the cause may be ascribed to an increase in the temperature of the air current after it has passed through the mine workings. Since the increase, in this case, is one-sixteenth of the intake volume, the increase in temperature of the return current will require to be one-sixteenth of the absolute temperature of the intake air. Assuming the intake temperature is 60 deg., or 460 + 60 = 520 deg. absolute, the required increase in temperature would be 520 ÷ 16 = say 33 deg. F.

In other words, if the increase in the return volume is wholly due to the increase in temperature, the return air current must have a temperature, in this case, of 60 + 33 = 93 deg. F., which is not probable in the normal working of a mine. However, the intake temperature may be much lower, say 32 deg. F., while the return temperature will frequently be 65 deg. F., which would easily account for the observed increase in this case.

Another cause for increase in the return current, in a mine, is the generation of gas in the workings. For example, take a mine generating large quantities of gas, and assume an increase of 2000 cu.ft. per min. makes the return volume 34,000 cu.ft. If this increase is all gas the return air must carry (2000 × 100) ÷ 34,000 = say 6 per cent. of gas, which would show a highly dangerous condition in the mine that can hardly be supposed to exist.

Again, in both the blowing and exhaust system of ventilation the pressure on the intake air is always greater than that on the return. This decrease of pressure will cause a slight increase in the return volume. However, ventilating under, say a $2\frac{1}{2}$-in. water gage (2.5 × 5.2 = 13 lb. per sq.ft.), the atmospheric pressure due to 30 in. of barometer being 2160 lb. per sq.ft., the drop of pressure on the return, in this case, would represent only (13 × 100) ÷ 2160 = 0.6 per cent. of the absolute pressure on the air. Hence, for a circulation of 32,000 cu.ft. per min., under a $2\frac{1}{2}$-in. water gage, the increase on the return from this cause would be only 34,000 × 0.006 = 204 cu.ft. per minute.

Therefore, replying to the question asked, it may be assumed that the increase of 2000 cu.ft. in the return volume, in a mine generating no gas, is due largely to an increase of temperature in the mine when the outside temperature is low. Or, the observed increase may be due to all three causes mentioned.

Ques.—It is proposed to work a pump, which it is estimated will require 23 hp. to drive it. Give particulars of size of motor, dimensions of cable, etc., assuming the pump to be 1300 yd. from the dynamo.

Ans.—Allowing for a line drop of 10 per cent. makes the required power of the generator, in this case, 23 ÷ 0.90 = 25.6 hp. Then, estimating on a 500-volt circuit gives a current of

$$C = \frac{746H}{E} = \frac{746 \times 25.6}{500} = 38.2 \text{ amp.}$$

In order to transmit this current, a distance of 1300 yd. and return, allowing a 10 per cent. line drop, will require a copper wire having a sectional area (A), expressed in circular mills,

$$A = \frac{10.8 \times 2(1300 \times 3)38.2}{500 \times 0.10} = 64{,}360 \text{ cir.mil.}$$

Referring to a wire table, it is found that a No. 2 B. & S. gage wire most nearly corresponds to this requirement, the diameter of this wire being 257.6 mils, or slightly exceeding $\frac{1}{4}$ in.

Ques.—Find the size of an engine required to drive a fan to produce 200,000 cu.ft. of air per min., with a 3-in. water gage.

Ans.—In estimating the size of engine required to drive a mine ventilating plant, it is well to allow for the combined efficiency of the fan and engine of, say 60 per cent. The horsepower on the air required to produce this circulation is

$$H = \frac{(200{,}000 \times 5.2 \times 3)}{33{,}000} = 94.45 \text{ hp.}$$

Assuming an efficiency of 60 per cent., the required indicated horsepower of the engine is 94.45 ÷ 0.60 = 157.4 i.hp. Now, estimating on a piston speed of S = 600 ft. per min. and a mean effective pressure in the cylinder of $p = 76$ lb. per sq.in., the required sectional area (a) of the cylinder is

$$a = \frac{33{,}000H}{pS} = \frac{33{,}000 \times 157.4}{76 \times 600} = 114 \text{ sq.in.}$$

The required diameter (d) of the cylinder then is

$$d = \sqrt{\frac{114}{0.7854}} = \text{say } 12 \text{ in.}$$

Assuming a stroke of 18 in., the piston speed being 600 ft. per min., this engine must run at a speed of (600 × 12) ÷ 18 = 400 r.p.m.

COAL AND COKE NEWS

Harrisburg, Penn.

Urgent representations made to United States Senator Boies Penrose at Washington by state officials, and statements by W. J. Richards, president of the Philadelphia & Reading Coal and Iron Co., as to conditions in the anthracite field, have brought about the issuance of the order by the war department canceling the movement of drafted men from Pennsylvania to Camp Greenleaf scheduled for the week beginning Oct. 28. Under the schedule prepared 6740 men would have gone from Pennsylvania to the southern camp. It was impressed upon the army officers that there are many men ill and that drafted men would go from infected homes, while the coal production was being menaced at the same time.

From all parts of the Central Pennsylvania district messages are being received of Sunday work by the miners, who volunteered following the receipt of telegraphic requests for such service. In those districts where no Sunday work was done the men decided to work from nine to ten hours three or five days each week instead of eight hours, and two days at regular hours, so that the output might be increased. Mines in which the epidemic is prevalent worked with reduced numbers of miners, although several districts, notably the Clearfield, near DuBois, portions of Indiana, Jefferson, Clarion and Cambria, were obliged to suspend operations entirely last week.

Hazleton, Penn.

While the daily papers have published figures showing the tonnage loss due to the influenza epidemic, the figures are not official, and no attempt has been made to total the loss in coal due to the disease, which appears to be on the decrease in Southern Schuylkill and moderating in the Hazleton region. The companies are doing all in their power to stamp out the discase. A daily report of every absentee reported "off sick" is made and nursing help given where needed.

Purchasing departments ordering brass valves and other brass goods are now required to furnish a Government affidavit when placing an order, and in this way they obtain permission for the manufacturing people to ship the material needed.

The Lehigh Valley Coal Co. has notified its Drifton shopmen that the recent wage increase will apply to them. Many of these employees were preparing to seek other employment, as they did not believe the new increase would affect them. The company's action will help to retain these men.

When the first Liberty Loan drive was on, John Markle, president of the G. B. Markle Co., authorized a reduction of 50 per cent. in the rental of the company's houses, giving the employees a chance to invest in bonds. In the Fourth Liberty Loan campaign, Mr. Markle authorized the purchase of $500,000 of bonds by the company in addition to the bonds bought by the men. The credit for the sale of the bonds was given to the villages where the Markle Co. employees reside.

Uniontown, Penn.

The fuel production campaign for the Connellsville coal and coke region, which has for its aim the increasing of the average weekly output to 800,000 tons, 50,000 tons above the present maximum, opened this week under most discouraging conditions. Hardly had the campaign gotten under way when a car shortage paralleling that of last winter struck the region. This shortage is not due to a scarcity of cars, but the lack of railroad crews to move them. The condition grew gradually with the influenza epidemic, but did not reach an acute stage until this week, when it caused a virtual paralysis of the transportation systems in this region. Commencing on the Baltimore & Ohio system, the congestion has gradually extended until it has now affected all lines.

While the car situation had not reached the acute stage for the week ended Oct. 19, the weekly production of the region took a drop of 35,266 tons over the previous week. The output in terms of coal was 714,118 tons. Coal shipments aggregated 246,077 tons, while 312,027 tons were manufactured into beehive coke. In his weekly report to Director of Production J. B. Neale, W. L. Byers, manager of production, stated that had the car placements been normal the figures would at least have reached the last high record of Oct. 12, despite the loss of some 600 workmen because of influenza.

The bone-dry liquor order of the state health department is still in effect, but its good results have been nullified by the combination of car shortage and influenza at the plants.

Charleston, W. Va.

There was not as much of a drop in production in the Tug River and Pocahontas districts as might have been expected in view of the fact that there were 2100 cases of influenza in those regions, the decrease being only 394 tons during the week ended Oct. 19, as compared with the previous week—tonnage produced being kept up to 463,151. Tonnage lost from all causes was 588,684. An increasing car shortage cost 17,539 tons in production, while 37,457 tons were lost because of a shortage of labor. No loss, at least no material loss, in the coke output was recorded, the production of coke being 50,627 tons.

The output for the Fairmont district has been reduced by half during the last few weeks. That is not hard to understand when it is said that the car supply, for instance, on Oct. 19 was only 613 cars, on Friday 579 cars, on Thursday 770 cars, and that on all three days only 500 cars have been placed on time. The loss of production in the field the week ending Oct. 19 varied between 33,000 and 47,000 tons a day. On Oct. 19 there were over 4000 men idle and out of 177 mines reporting 53 were shut down. Lack of cars has caused much enforced idleness and of course has seriously interfered with the movement for the increased production of coal.

Mines in the Upper Potomac region, especially in Mineral County, have been hard hit. This has been particularly true at Elk Garden. A telegram from that point to Governor Cornwell this week requesting two doctors and a few nurses stated the situation was serious and that the coal mines had been paralyzed.

Heavy inroads were made on production in the Kanawha region the week ending Oct. 19 through the wider prevalence of influenza, and even at points where there were comparatively few cases fear of the disease tended to keep the men out of the mines, thus making it impossible to secure the capacity output. As a result of such conditions production dropped from 178,000 tons to 148,380 tons. Some idea of just how badly crippled the mines are may be gathered from the fact that only a few weeks ago 217,000 tons were produced. Total hours worked during the week under review were reduced to 4482. There was a greatly augmented shortage of cars, 1029 hours alone being lost from that cause. The labor shortage was responsible for the loss of 733 hours.

Production sagged in the New River district the week of Oct. 19. While in some parts of the district there was a tendency to take advantage of the situation created by the influenza epidemic, nevertheless on Loup Creek and in that part of the district on the main line of the C. & O. sickness kept many men out of the mines. Taking both the New River and Winding Gulf districts there was a decrease of 15 per cent. in production, as compared to the preceding week. This decrease may be attributed solely to the prevalence of influenza and a car shortage on the C. & O. Cars were plentiful on the Virginian Railway.

Birmingham, Ala.

The coal-mining situation in the Birmingham district at present is not as bright as it might be, the influenza epidemic making itself heavily felt throughout the district. In several camps the physicians themselves were stricken with the disease and were unable to attend sick miners. The state health authorities and the Government were applied to for assistance, and physicians have been sent those asking for them.

The production of coal for the week ending Oct. 12 was 382,846 tons, against 409,022 tons for the week ending Oct. 5. Transportation facilities in the district have been good recently, everything considered. Operations at mines throughout the district have been greatly curtailed during the past ten days, and as a consequence, the demands for cars were not so urgent. In other traffic, however, there has been no decrease in the demand for cars. The records show an exceedingly fine business being done by the railroads.

The Woodward Iron Co. is planning extensive improvements to its plant at Bessemer during the coming year, according to rumors in industrial circles and especially at Bessemer, where the improvements will be made. The taking on of H. M. Urban, former superintendent of the byproduct plant of the Tennessee Coal, Iron and Railroad Co. at Fairfield, is declared most significant.

Victoria, B. C.

In view of the discussion as to the production of British Columbia's coal fields this year, and the possibility of the output meeting at least the most pressing demands, both domestic and foreign, it is interesting to give the results of a rough estimate made by a high authority. Up to the end of the month of August the production was 1,821,681 tons, and an estimate of the output of the month of September (the returns being not yet available) is 167,301 tons, making a total of 1,988,982 tons up to the last day of last month. From this must be taken 221,840 tons, which was used in the making of coke. The total coal marketed from this Province for the first three quarters of the year, therefore, would be 1,767,142 tons. At the conservative valuation of $5.50 a ton, this would be $9,719,281. In this period it is estimated that the Crow's Nest Pass Collieries had produced 130,389 and the Canadian Collieries (D) Ltd. 19,196 tons of coke, a total of 149,585, which at a valuation of $9 a ton, equals $1,306,265. So that the value of the coal production of British Columbia may be said to aggregate approximately $11,025,546.

The opening up and development in a small way of coal outcroppings is being given more attention in British Columbia as a result of the increased demand and the higher prices received for coal. One of the most important of these is situated on the Grand Trunk Pacific Ry. not far from the City of Prince Rupert. The Government has assisted in the construction of a road to the property, and the owners and operators are confident that they will be able to take care of the greater part of the domestic demand of Prince Rupert and the adjacent district this winter. Another enterprise of a somewhat similar nature is that of the Osoyoos Coal Co. at Ashnola, nine miles from Princetown, B. C. This has been reopened and the coal will be hauled into Princetown by motor trucks for local use and for shipment by railway to outside markets.

PENNSYLVANIA

Anthracite

Jeddo—The G. B. Markle Coal Co. has installed 30 cots in the Jeddo Casino, which will be used as an emergency hospital for influenza victims.

Tamaqua—The Maryd Coal Co., operators of the Maryd colliery, near Tamaqua, have lost 18 miners by death, due to the influenza.

The Mill Creek Coal Co. has electrified its New Boston colliery, and the same work is now under way at the Shepp mine at Tamaqua, Penn.

Hazleton—M. S. Kemmerer & Co., operators of the Sandy Run colliery, have let the contract for an addition to their breaker.

Bituminous

Waynesburg—A deed was recently recorded here by which W. F. Bute disposed

of a one-half interest in four tracts of land in Green and Monongahela townships, Green County, to W. Harry Brown, for a consideration of $55,211.04.

Uniontown—O. M. Coughenour, of Uniontown, has sold a one-half interest in the coal underlying three tracts of coal land in Green and Monongahela townships, Green County, to W. Harry Brown, of Pittsburgh, for a consideration of $1.

Greensburg—All production records for the Westmoreland district were broken last month, when the mines produced 401,000 tons of coal. The output was 13,000 tons in advance of the previous high mark of the district since the coal production campaign began July 1.

Boswell—The Atlantic Coal Company is abandoning its mine at Boswell, Somerset County, on account of the large number of rolls and faults encountered in the seam. This mine is in what is known as the "E1" seam, the company having previously exhausted the "C1" seam of coal below it.

Homer City—The Homer City Coal Co. is erecting a bathing and dressing house for its miners at its Tearing Run Mine near here. The building will include shower baths, dressing rooms and clothes-drying room. There is also provided a first-aid room and a room for use of the officials.

Fallen Timber—Announcement has been made that M. Hempskie, a coal miner at the local plant of the Fallen Timber Coal Co., recently broke all records for large earnings. A total of 116 tons of coal was mined in two weeks, including 17 yards of main heading, 13 yards of back heading, and four yards of room, for which he was paid $246.28.

Orbisonia—James L. Devveny, broker, reports the sale of the Daugherty mine at Rocky Ridge, Huntingdon County, to Thomas and Roth of Wilkes-Barre. The mine has been operated by Henry M. Kerr, of Philadelphia. The new owners will greatly increase the production by installing new machinery and making a number of improvements.

Uniontown—The Vanderbilt Coal and Coke Co. has taken over the old Clarissa plant of the James Cochran Sons Co. and has resumed operations at the works. Eighty ovens have been reconstructed and a number placed into blast. More will be fired when labor conditions permit. A new tipple has been erected. Forty-four houses at the plant have been repaired. Between 75 and 100 workmen are employed at the plant, of which A. C. Stickel is president and Gaetano Corrado of the same place is treasurer and general manager. What coal is not used at the plant is shipped for by-product purposes.

ILLINOIS

Freeburg—The five mines in the vicinity of Freeburg have been facing a shutdown during the past week for lack of water. The lake and ponds from which they had drawn their supply had about gone dry, and the Government had interdicted the bringing of water from the Okay River at New Athens in tank cars. Rainfall has in a measure relieved the situation.

Williamson—The Mt. Olive and Staunton Coal Co. has offered a reward of $500 each for the bodies dead or alive of the four men who robbed the company's cashier here on Oct. 15 of $14,000, and an additional bonus of $1000 if all are taken together, and 10 per cent. of all or any part of the stolen money that is recovered. Information is to be communicated to B. G. Valentine, Chief of Police of Staunton, Ill. The men are described as dark complexioned, apparently either Italians or Greeks, between the ages of 20 and 25. Three were smooth shaven and wore caps. One had a black mustache and wore a black soft hat. They escaped in a new black automobile.

O'Fallon—Steps are being taken to resume construction work at the O'Fallon mine, which was stopped some time ago on account of financial embarrassment of the promoters, John Hargraves and W. A. Knapp. The property has been taken over by Albert W. Black, John L. Lamont and William S. Fotheringham, of Bay City, Mich., to protect a loan which they made when the sinking of the shaft was begun. Besides the unfinished mine they find themselves with about $70,000 obligations on their hands. Arrangements have been made to compromise the claims with the exception of those of the miners, which will be paid in full. The shaft will be completed at an estimated cost of $200,000. A new pump has been installed and the water is being drawn from the shaft. Two carloads of machinery are on the way. Alex Jeffrey, of Bay City, will be general manager, and Oscar L. Pyle, of O'Fallon, will superintend the construction work.

OREGON

Marshfield—The old Klondyke coal mine of Beaver Hill was opened recently for the first time in twenty years and 160,000 tons of coal was found in the tunnel. The output will go to the Government for fuel in engines used in hauling logs from the Boutin tract of spruce now being cut by the Government, which has a force of 200 men at work building railroads to the mine and to the timber. The Government has contracted for the entire output, and any surplus not used by the engines will be handled by the Fuel Administrator.

WASHINGTON

Chehalis—W. F. West, W. D. Sheldon and Ben Sheldon, owners of the Sheldon Coal Co., have disposed of their interests in the mining property near the town of Coal Creek to Gay & Olson Co., of Tacoma. The property is to be immediately placed on a production basis of 550 tons per day. At present an 8 ft. sub-bituminous vein is being worked. A new slope is to be sunk at once.

Personals

O. P. Chatfield has severed his connection with the Kanawha Central Coal Co. and will hereafter be associated with the Carbon Fuel Co.

W. B. Plank has been transferred from the Bureau of Mines Rescue Station at Urbana, Ill., to take charge of the Bureau of Mines Rescue Station at Birmingham, Ala.

E. T. Twescher has been appointed office manager for the Campbell's Creek Coal Co.'s harbor at Point Pleasant. Mr. Twescher was formerly with the Producers Coal Co. at Cincinnati.

B. E. Geer, of Greenville, S. C., has been appointed fuel administrator for South Carolina. He is a manufacturer of cotton goods. He succeeds **B. B. Gossett**, who has entered the military service.

Jerome Watson, of Neffs, Belmont County, Ohio, has been appointed chief mine inspector for Ohio by the Ohio Industrial Commission, to fill the vacancy caused by the death of L. D. Devore. He has assumed his duties.

J. C. Maguire, formerly construction engineer for the Wilmot Engineering Co., Hazleton, Penn., has entered the service of Wentz & Co. as mechanical engineer. Mr. Maguire will have charge of breaker machinery, a line in which he specialized while with the Wilmot company.

W. D. Tyler has been made acting director of the Bureau of Prices of the Federal Fuel Administration. For the past twelve years, Mr. Tyler has been in charge of the real estate department of the Clinchfield Coal Corporation. He succeeds **E. Q. Trowbridge**, who has entered military service.

Samuel Jones, formerly mine foreman at McIntyre, Penn., for the Jefferson & Clearfield Coal and Iron Co., has resigned his position as mine foreman for the Morrellville Coal Mining Co., Johnstown, Penn., to accept the superintendency of the Union Central Coal Co., Inc., Butler, Penn. Mr. Jones will assume his new duties on Nov. 1.

Richard D. Maize, mine inspector, of the Fifth Bituminous district at Uniontown, Penn., has been granted a leave of absence by the Chief of the Department of Mines of Pennsylvania, to enter the army. Mr. Maize will enter the University of Pittsburgh for intensive training. **Silas C. Hall** of Van Voorhis, has been appointed temporary inspector.

Wade H. Horn, formerly chief engineer of the Raleigh Coal and Coke Co., at Raleigh, W. Va., and at present right-hand man to Frank A. Ray, consulting mining engineer, Columbus, Ohio, has accepted a position with the Wisconsin Steel Co., Benham, Harlan County, Kentucky. The company contemplates the doubling of its present coal output, and Mr. Horn will be in charge of the new construction work.

Obituary

Charles G. Roebling, president of the John A. Roebling's Sons, Co., Trenton, N. J., manufacturer of wire rope for coal mining, died on Oct. 5.

W. H. Christ, a prominent mining engineer and former official of C. M. Dodson & Co. at Beaver Brook, Penn., died at his home in Mahanoy City recently.

Donald B. Earwood, store manager of the Ingram Branch Coal Co., died Oct. 22 of pneumonia, following an attack of influenza, at Beckley, W. Va. Mr. Earwood was sick for only a week.

W. W. Harding, superintendent of the No. 9 works of the United States Coal and Coke Co., died Oct. 22 of influenza. Mr. Harding had been for ten years with the United States company and was one of the most efficient mining men in the region. He was buried at Wilkinsburg, Penn.

J. M. Guthrie, of Indiana, Penn., died Oct. 19 after a short illness of pneumonia. He was the pioneer coal operator of Indiana County and was instrumental in opening the Graceton, Tearing Run and other mines in the county. He was the builder of the first coke ovens in this section. He was aged 87 years.

Frank I. Parker, of the Cutler-Hammer Manufacturing Co., Milwaukee, Wis., died at his home in Milwaukee on Oct. 18, at the age of 36 years. His death was due to pneumonia contracted through Spanish influenza. Mr. Parker was graduated from the University of Wisconsin in June, 1906, and in July became engineer in charge of production in the magnet and clutch department of the Cutler-Hammer company. Since 1911 Mr. Parker has had charge of sales service work on clutch department products. He was made an associate member of the American Institute of Electric Engineers in 1910 and in 1913 became a member. He is survived by his widow and one child.

Industrial News

Columbus, Ohio—The Columbus city government has purchased a coal conveyor for the municipal coal yard from the Columbus Conveyor Co., for $3875.

Cleveland, Ohio—The Lakewood Engineering Co. announces the opening of offices in New York City, at 111 Broadway, in charge of George S. Hedge, district manager. The company specializes in construction plant and industrial haulage.

New York, N. Y.—Morris & Co., of Chicago, Ill., recently placed an order with the Locomotive Pulverized Fuel Co., of New York, for the installation of a complete "Lopulco" system for crushing, drying, pulverizing and burning coal. The equipment is to be installed at the company's steam power plant at Oklahoma City, Okla., and native coals and Texas lignite will be used.

Cleveland, Ohio—The Barber-Greene Co. announces the strengthening of its organization as follows: F. E. Smith, chief engineer, formerly of the Engineering Department of the Stephens-Adamson Manufacturing Co., of the Granby Mining and Smelting Co., and the American Zinc and Chemical Co. George C. Sanford, superintendent, formerly of the Elevator Supplies Co., and of the Otis Elevator Co.

Washington, D. C.—Despite speed at which coal is being produced in this country, and the increasing danger of accidents, there was a reduction of 121 fatalities the first six months of this year as against the same period last year. Figures issued by the Federal Bureau of Mines show that fatalities during the first six months last year totaled 1298. During the same period this year the number dropped to 1177.

Wallace, Idaho—Robert N. Bell, state mine inspector, who recently inspected the Teton Valley Coal property, stated that the development work being carried on will insure hereafter the whole upper Snake River valley against future coal famines and will make coal prices considerably lower in this section. As soon as a ten-mile spur track is completed the mine will be able to supply the entire southeastern section of Idaho.

St. Louis, Mo.—The Walter A. Zelnicker Supply Co. announces the appointment of R. H. Wilson as assistant to the president, with office at St. Louis. Mr. Wilson, who has been with the company for years, latterly as Houston representative, is succeeded there by E. O. Griffin, well known in Southwestern railroad circles for the past twenty years as storekeeper and assistant general manager of the International & Great Northern, and more recently as assistant to the President of the St. Louis Southwestern in charge of purchases.

Toledo, Ohio—Because of the prevalence of the influenza epidemic lake shipments from Ohio and West Virginia have been slightly reduced. This is shown by the record of the tonnage handled by the docks at Toledo. For the week ending Oct. 19 Hocking Valley docks loaded 151,780 tons, as compared with 206,508 tons the previous week, making a total of 4,234,433

tons for the season. The Toledo & Ohio Central docks during the same week loaded 89,000 tons, as compared with 91,000 tons the previous week, making a total of 1,979,000 tons for the season.

Springfield, Ill.—Governor Lowden of Illinois has appointed a mine investigation committee to pass upon proposed amendments to the state mining laws which are to be offered to the next General Assembly. The first meeting was held this week at Springfield, at which Thomas A. Jeremiah, of Williamsville, was chosen chairman and Charles M. Jones, of Marion, secretary. Meetings will be held at intervals and miners and operators will be summoned to give their views on proposed changes in the law. A number of recommendations will be made by the State Mining Board.

Charleston, W. Va.—Casualties in the mines of West Virginia during September reached a total of 37, by far the largest proportion of such deaths being due to falling roof and slate or coal, no less than 20 men meeting their death in such a manner. Mine cars within the mines killed five and a motor one. Two were electrocuted, two died in inside explosions and one was killed by a mining machine. Outside the mines there were only six deaths—four being killed by mine cars, one by a motor and one under the head of miscellaneous. The heaviest death rate was in McDowell County—8. Of the 37 men killed, 24 were Americans and 13 were foreigners.

Columbus, Ohio—A general advisory committee to have charge of production of coal in Ohio has been named by James H. Pritchard, production manager for southern Ohio, and J. J. Roby, production manager for eastern and northern Ohio. These two production managers felt the need of a general committee in order to coördinate the production campaign which is to be started soon. The committee consists of three miners and three operators. For the operators G. C. Weitzell, resident vice president of the Pittsburgh Coal Co.; A. A. Augustus, president of the Cambridge Collieries Co., of Cleveland, and S. H. Robbins, president of the Pittsburgh Vein Operators' Association, Cleveland.

New York, N. Y.—The Anthracite Committee of the Fuel Administration, composed of J. B. Dickson of Dickson & Eddy of this city; S. D. Warriner of the Lehigh Coal and Navigation Co., and W. J. Richards of the Philadelphia and Reading Co., have about completed arrangements governing distribution in the United States and Canada of virtually every ton of domestic anthracite which can be supplied to consumers up to next April. This includes all coal that can be produced between now and then. Since last April the committee has controlled and distributed some 45,000,000 tons of anthracite, in accordance with the allotment as announced by the committee on May 29.

Uniontown, Penn.—Activity in water transportation down the Monongahela River as the Clairton byproduct plant increases its capacity for coal has resulted in several steamers changing hands, and within a short time new boats will be put in the river service. The Carnegie Steel Co. has purchased the steamer "Monitor" from the Diamond Coal and Coke Co. for $70,000 and has added it to the regular towing fleet. Within a short time the "W. H. Clingerman," the new stern wheeler being built in Pittsburgh, will be placed in service. Captain John F. Klein has sold the steamer "E. F. Jackson" and a fleet of 21 barges to the Lyons Coal Co. at Fairmont, W. Va. Coal will be towed from the company's operation there to the Pittsburgh harbor. The consideration was $27,000.

MARKET DEPARTMENT

Weekly Review

Coal Production Affected by Influenza Epidemic—Output Still Ahead of Last Year—Need for Economy—Domestic Sizes of Anthracite Scarce—Small Sizes Plentiful—No Prospect of Bituminous Shortage.

BOTH anthracite and bituminous coal suffered a setback during the week ended Oct. 19, owing to the epidemic of influenza in the mining regions. The 11,523,000 net tons of soft coal produced in the week under review, though 800,000 net tons behind the output of the week ended Oct. 12, exceeded by 1,300,000 net tons the production during the same period of 1917. Reports show that influenza caused a decrease in the shipments of soft coal from all fields except western Pennsylvania. The epidemic has not helped the anthracite situation. Production of hard coal during the week ended Oct. 19 totaled 1,715,000 net tons compared with 1,955,000 net tons the preceding week. The total output of anthracite from April 1 to date is estimated at 57,573,000 net tons, as against 56,736,000 net tons for the same period of 1917.

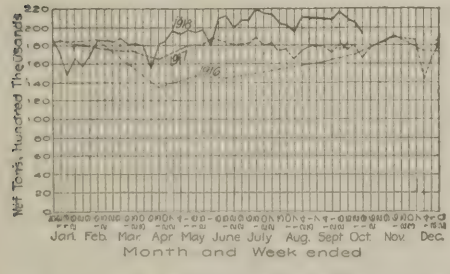
Though the country as a whole is rather well supplied with bituminous coal, the necessity still exists for the exercise of the strictest economy. The quantity of anthracite distributed so far this year to those sections which are permitted to burn hard coal is greater than in normal years. The demand for domestic sizes is strong.

Prepared sizes of anthracite, such as egg, stove and chestnut, are scarce. Many consumers have been advised to purchase the smaller sizes, and mix it with the larger grades. The small sizes of anthracite are plentiful and in order to move some of their surplus stocks of these coals several shippers have been cutting the prices somewhat.

Summed up concretely, the coal situation can be said to be generally satisfactory. There is no prospect of a serious shortage in bituminous, and the belief is expressed that domestic consumers will receive their share of anthracite before November closes.

WEEKLY COAL PRODUCTION

Production of bituminous coal for the week ended Oct. 19 not only decreased 800,000 tons, or 6.7 per cent., due to the influenza epidemic, but fell to the low weekly record of last May of 11,500,000 net tons. Preliminary estimates place production during the current week at 11,523,000



net tons, and while 800,000 net tons below the week of Oct. 12, exceeded production during the corresponding week of 1917 by 1,300,000 net tons, or 12.3 per cent. The average production per working day is estimated at 1,920,000 net tons, during the week ended Oct. 19, as compared with 2,056,000 net tons during the week preceding, and as against 1,702,000 net tons produced during the week ended Oct. 19, 1917. The average daily production for the coal year to date is estimated at 1,992,000 net tons, which is slightly below requirements, and in order to make up the deficit it is necessary that daily production during the balance of the coal year should be equivalent to 2,039,000 net tons, or 2.4 per cent. in excess of the average daily production to date. Carriers' reports show that the influenza epidemic caused a decrease in shipments from all fields with the exception of western Pennsylvania.

The influenza epidemic also caused considerable loss in the anthracite fields, and production during the week ended Oct. 19, estimated at 1,715,000 net tons, is a decrease of 240,000 net tons, or 12.3 per cent. compared with the week of Oct. 5. The daily average during the current week is estimated at 286,000 net tons, as compared with 326,000 net tons during the week of Oct. 12, and as against 335,000 net tons during the coal year to date. Total production for the period Apr. 1 to date is estimated at 57,373,000 net tons compared with 56,736,000 net tons for the same period of 1917.

Production of beehive coke in the United States during the week ended Oct. 19, is estimated at 575,000 net tons, a decrease of 25,000 net tons or 4 per cent. compared with the week preceding. The average daily production is estimated at 96,000 net tons as against 100,000 net tons during the week ended Oct. 12.

The operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania report production of beehive coke during the week ended Oct. 19 at 360,488 net tons, and the operation of their plants at 75.1 per cent. of full time as compared with 77 per cent. during the week ended Oct. 12. In addition to labor shortage which was, as in previous weeks, the limiting factor, shortage of coke cars caused a loss of 2.5 per cent. of full time, as against 0.9 per cent. during the week preceding.

Byproduct coke plants of the United States were operated during the week ended Oct. 19 at 91 per cent. of their full time as compared with 91.3 per cent. during the week preceding. Of the total loss of 9 per cent. 1.3 per cent. was due to lack of byproduct coal, 0.6 per cent. to shortage of labor, 5.7 per cent. to repairs to plants and 1.4 per cent. to other causes.

Material improvement was reported during the week in the Maryland, Pennsylvania and Tennessee plants. In Maryland the operators attribute the improvement to better labor conditions, in Pennsylvania, to other causes, and in Tennessee, to repaired plants. Operators reporting a noticeable decline in production during the week ended Oct. 19 compared with the week preceding were those in Kentucky, Minnesota, New Jersey and Ohio. In Kentucky and Ohio, the limiting factor was repairs to plants, in Minnesota, other causes, while in New Jersey, the lack of byproduct coal curtailed production.

BUSINESS OPINIONS

Marshall Field & Co.—Current distribution of dry goods is slightly in excess of the corresponding week of 1917. The volume of road sales for both immediate and spring delivery is well ahead of the same period last year. There was a falling-off in the number of merchants in the market. Collections continue good.

American Wool and Cotton Reporter—Release of wool for civilian purposes is the subject of some discussion in the wool trade. It is not likely, however, that any wool will be released before the first of the year, for it is understood that the Government wants to be absolutely sure that there is plenty on hand for its needs before any is sold to the manufacturers for civilian purposes. No great change has taken place in the cotton market during the week under review. Brokers are not looking for any big drop in the market.

Dry Goods Economist—The order issued by the Priorities Division of the War Industries Board, limiting the production of silk goods of all classes to a maximum of 50 per cent. of the average quantity produced in 1915, 1916 and 1917, has caused no serious comment, it being recognized that for months past the output has not exceeded 60 per cent of the average of the last three years in any line of silk goods and that in many lines it has been as low as 40 per cent. The order is effective as of Dec. 1, and is to continue in force for six months.

Bradstreet's—Maintain production and speed it if possible, is the order of the day in the iron and steel line, and such essentials as plates and sheets are in great demand, while mills making barbed wire for export to France are oversold; but on the other hand, calls for pig iron have abated somewhat. Besides buying heavily of oats, the government is expected to soon give out large orders for woolens, and contracts for auto trucks, calling for the expenditure of $132,000,000, practically have been placed. Shortage of labor is as marked as ever, in some sections more acute, in fact, and even the most essential plants complain of the frequency of the turnover, but from some quarters come intimations that munition and powder plants may soon provide relief in this respect.

The Iron Age—The quieting effect of peace talk has been noticed particularly in the markets for pig iron, scrap and ferro-alloys, all of which have until lately shown more freedom of action than finished steel. Some pig iron sellers are protecting themselves by the proviso that unless changed by Government action the present prices shall apply on all iron delivered under the contract. Thus if the war ended suddenly and the controlled price policy were terminated, the prices now prevailing would continue to be the basis of settlement. Consumers have not taken kindly to these riders in the case of allocated iron. The distribution of 137,000 tons of barbed wire to the Allies—65,000 tons to Italy, 50,000 tons to France and 22,000 tons to Great Britain—and the setting aside of 60,000 tons for the United States have tied up most of the wire capacity for some time.

Atlantic Seaboard

BOSTON

Chief factors of situation are influenza epidemic and volume shipments overseas. Hampton Roads dumpings for New England continue light. Baltimore clearances also relatively few. New York piers slow dumping because of sickness. All-rail receipts average about as last week, but less regular, due to local conditions. Wagon coal practically ceased moving to this territory, at least through Fuel Administration channels. Less heard of coal offered for delivery extending over twelve months period. Anthracite shipments by water improve slightly. "Storrow anthracite" coming mostly from "independents" is less eagerly sought, although there are still many holes.

Bituminous—New England is thoroughly well stocked with steam grades, but there is yet a little doubt whether current requirements will be allowed to come forward in sufficient tonnages. The war program so far as industrial plants are concerned shows no sign of easing off, and it is only because of the tremendous effort in July and August to "stuff" New England that the situation here is so quiet in a coal way. The cost of all-rail deliveries from Central Pennsylvania at practically every point in this territory is less than any coal by water, and that of course restricts current buying of water-borne coal to a minimum. All buyers are taking their commitments, provided the fuel authorities leave the way open, and it is only this possibility of interference always hanging over us that today gives occasion for any anxiety as to the coming winter.

A number of lake-built steamers of around 2500 to 3000 tons have now been substituted for the larger colliers that were taken for transatlantic carrying. In a more restricted sense, therefore, contract coal is coming forward from Hampton Roads. Deliveries are less regular, and generally the use of smaller steamers will mean a distinct curtailment in receipts at this end. Dumpings for New England have fallen off materially and from the standpoint of the distributor inland it is well they have. To place any more coal than is now being absorbed, and still follow the directions of the various state administrators, would be at least embarrassing to the wholesaler. Average dispatch at the Norfolk and Newport News piers is now from three to four days, a marked improvement over conditions a month ago.

Baltimore loadings for New England are also very light. Line and offshore requirements have stiffened the past fortnight, and these together with the slack in production and the disinclination of shippers to risk sending coal to Boston for distribution have had their effect. Except for railroad purposes we are likely to get less coal from Baltimore this winter, although it is possible that a new blocking out of territory by the fuel authorities at Washington will make a difference in this.

At New York the loading piers are still seriously handicapped by the lack of men to handle coal as it arrives. At times there has been only a corporal's guard to dump long lines of cars, and meanwhile bottoms have waited and demurrage has accrued. In some cases barges have waited in excess of two weeks and have then been taken away to load at other piers. At Port Reading manifestly too much has been attempted. In the opinion of several who are competent to judge, the Railroad Administration will be forced to resume sending P. & R. barges to Philadelphia, at least in part, unless the use of valuable transportation is to be wasted.

For the seven days ending Oct. 24 the receipts of commercial bituminous at the five New England gateways averaged 383 cars. The movement of railroad fuel has again dropped off to about 150 cars daily, so that the total movement of bituminous is now down to about 535 cars per day, or only slightly less than a week ago. Daily receipts have been much less even, however, due doubtless to suspensions local in the mining districts.

In the Central Pennsylvania district wagon-coal is still being distributed by the Fuel Administration, but calls are sufficient from other sections to take care of current receipts without sending much to New England. In fact, the receipts here of wagon coal through Administration channels have practically ceased. There has been a sentiment here in some quarters none too cordial to the effort made by the District Representative to clear up the box-car situation, but there was enough support at the time it was most needed. The cars came forward, they were placed, and the billing was most carefully supervised. The result is an end to price-monkeying on wagon coal and for his courage and initiative in carrying through a difficult program Mr. Cameron deserves much praise.

This week there is less talk of contracts being offered for delivery over a twelve months period. So far as we are advised there has been practically no business closed on this basis.

The local fuel authorities are again busily revising their embargo lists to conform to the most recent modification from Washington of the rule covering permissible reserves. In Maine non-essentials are now allowed to have 90 days supply, where a few weeks ago, had the rule been strictly adhered to, a number of plants would have been practically put out of business.

Anthracite—Shipments of domestic sizes have increased slightly by water the past week, although the comparison is with the first three weeks of the month when New York loadings had dropped way off. As it is, a large proportion of the cargoes coming forward have broken and pea sizes, with only small doles of either stove or chestnut. The Boston Fuel Committee is expected to issue an order directing dealers to deliver with each order for domestic sizes some stipulated proportion of pea. Rail receipts at the five New England gateways are practically on the same footing as a week ago, an average of 400 cars daily, domestic sizes.

It develops that most of the free "Storrow anthracite" coming forward is from "independent" operators, and therefore carrying the 75c. additional. As rural dealers come to realize this they are inclined to rely more upon their regular sources of supply, and the result is that this emergency supply is somewhat less sought after. This is quite likely to change, however, with the approach of more seasonable weather.

NEW YORK

Influenza epidemic cuts production at the rate of nearly a quarter million tons each week. New England wants more hard coal, but boats find it difficult to get cargoes. Physicians are sent into the coal fields to fight malady. Bituminous market in good shape. Manufacturers are well stocked. Bunker situation serious.

Anthracite—Receipts of anthracite here have been further reduced because of the influenza scourge throughout the coal regions. Production is being curtailed at the rate of nearly a quarter million tons weekly in spite of the efforts of the Fuel Administration. The epidemic has also left its imprint on the local situation, workers at the loading docks having in some cases been reduced to one-fifth of their normal number and the local dealers, already short of help, being further hindered in their deliveries.

Dumpings at the local piers for the seven-day period ending Oct. 25 were 5597 cars as compared with 6050 cars the previous seven days, a decrease of 453 cars. With the exception of the week ending Oct. 11 this was the lightest in several months. Should similar conditions continue for any length of time, they will have a serious effect upon the program of the Fuel Administration and dealers to give every consumer at least part of his winter supply of fuel before cold weather sets in.

Not only is New York feeling the effects of the curtailed production, but towns along Long Island Sound and as far north as Maine which receive their coal in small schooners from this port are hard-hit. The lack of fuel at this time means considerable to these small towns, many of which are so far removed from a railroad that if coal could be shipped by rail it would mean a long haul by wagon to the place of consumption.

The State Fuel Administration is advising consumers to mix the small anthracite sizes with those ordinarily used, telling them that they cannot get a full supply of stove and chestnut for the reason that only 41 per cent. of the anthracite mined comes through the screens in these two sizes.

The local market is being crowded with the smaller sizes from pea down to and including No. 4 buckwheat and culm, while the prepared coals are becoming scarcer and harder to get. There is scarcely any egg, stove or chestnut in the market, orders for these two sizes being placed far ahead so that the dealer anxious to find a loose lot finds it difficult to obtain it.

Pea coal is plentiful, but the demand is not heavy. Buckwheat and the smaller sizes are nearly a drug on the market and various shippers have been cutting prices slightly in order to move their surplus. Retail dealers are not anxious at this time to take any more of the small coals than they have a market for, hence the overstocks in the hands of the shippers and producers who have no place to store it.

Retail dealers are being hard pressed. They cannot obtain all the coal they want and on the other hand if they could they would not have the help to take care of it. Between the lack of labor and the influenza epidemic raging in the city, the dealers are in a quandary, but hope to be able to give all of their customers some coal between now and the first of November.

Current quotations, per gross ton, f.o.b. tidewater, at the lower ports are as follows:

	Circular	Individual		Circular	Individual
Broken	$6.75	$7.50	Buck	$5.10	$5.90
Egg	6.65	7.40	Rice	4.65	5.10
Stove	6.90	7.65	Barley	4.15	4.30
Chestnut	7.00	7.75	Boiler	4.60	
Pea	5.50	6.25			

Bituminous—At this port receipts show a decided decrease, but loadings based upon the tonnage received show a better average than existed a couple of months ago, and this in view of the fact that the working forces at the various docks are greatly depleted because of the epidemic, some of the docks having about one-fifth of their usual working forces on hand.

The dumpings at the local docks for the week ended Oct. 25 were 6430 cars, a decrease of only 13 cars as compared with the previous week, but, with the exception of the week ended Oct. 11, the smallest week in several months.

Locally the situation as regards commercial coal is not serious. There is plenty for all, as most owners of essential plants are well stocked and under the new regulations regarding the storage of coal all

others are now permitted to carry larger stocks than for some time past. Large consumers are not now inclined to add to their stocks, preferring, presumably, to take chances of picking up some coals at lower prices later on.

That the situation in New England is much easier is evidenced by the presence here of many empty bottoms used in that trade. Empty boats are to be seen everywhere. This situation is due as much to the lack of anthracite as to the lack of orders for bituminous for points along the Sound and the New England waterfront.

Large producers and shippers of the better grades have a steady call for their product, and some of them claim to be behind on their contracts.

The bunkering situation is not encouraging to shipping interests. Supplies are short and coal is not being received in sufficient quantities to guarantee continuous loading should there be any transportation interruption. The Pocahontas district has been hard-hit by the epidemic, the railroads as well as the mines being the sufferers.

Current quotations, based on Government prices at the mines, net ton f.o.b., tidewater, at the lower ports, are as follows:

	Mine Gross	F.o.b. N. Y. Gross
Central Pennsylvania:		
Mine-Run, prepared or slack	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of Mine	3.08	5.23
Prepared	3.36	5.51
Slack	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite receipts short. Illness cuts production 25 per cent. Companies, however, promise to meet allotments. Water yards being filled. Stove and nut still in heaviest demand. Steam coal quiet. Bituminous coal in fair supply. Decreasing production beginning to be felt. Scarcity of gas coal.

Anthracite—This city has probably received less coal during the past ten days than during any similar period of the present coal year. At the office of the largest operating company it was learned that their production is at least 25 per cent. short owing to the prevalent illness among the miners, and that the current shipments are practically all being consigned to tide points and to the western market. Another one of the big companies reports a labor shortage of 20 per cent., with by far the larger proportion of the production also going to tide. At the offices of this company we learned they were giving their Philadelphia trade, located on the P. & R. tracks, positive assurance that they would receive every ton of their quota based on the 1916-17 allotment, and that it was expected to increase same about 20 per cent.

While the trade as well as the public is growing more impatient, yet we can only report that all signs indicate there is no real cause for alarm. Philadelphia will surely be supplied beyond all fear of suffering, providing reasonable economy and wise distribution especially by the dealers themselves, is shown. We are also firmly convinced that the heavy tonnage will not begin to arrive until cold weather sets in. The dealers dread the prospect of being responsible for its delivery to the consumer during the winter months, with the accompanying bad weather. It will be remembered that the local fuel administrator promised to have the suburban dealers supplied early because of the more difficult deliveries in the outlying sections of the city, but it begins to look as if they too would have to wait. Of course, the principal cause of the retailer's concern regarding these late shipments is the labor situation, which is certain to be more difficult to control as the season advances.

Locally the only dealers who have any stocks to speak of are those with water yards. The shippers who were responsible for their supply have all along tried to dispose of their obligations to them while navigation is open. When prices advance these dealers are wondering if the fuel authorities will allow them to charge the new rates for the coal on hand.

There are no stocks to speak of. The supply of egg that a few dealers had accumulated is rapidly disappearing. The same is true of pea coal, but it had been stored in larger quantities. Stove and chestnut is in as much demand as ever and is in even shorter supply than at any time during the past month.

Attention has recently been directed to the peddler trade, who it is estimated supply about 15% of the city's domestic coal requirements. Although efforts are being made by the fuel administrator to protect the small buyers who are usually supplied with a bucketful at a time at a greatly increased cost to the dealer, the prices fixed under the present ruling will cost small buyers at the rate of $19.10 for chestnut and $16.70 for pea coal. These are the sizes handled almost exclusively by the peddlers. Stores handling coal by the bucket and bag are compelled to sell at 3c. less than the peddlers, the prices being 19c. and 16c. for nut and pea respectively in bags, and 13c. and 11c. in 10-quart buckets. The difference in price is due to coal being handled as a side line by storekeepers, and they are thus not put to the same expense as the peddlers.

The steam coals still continue to be very quiet. While there is no particular heaviness with buckwheat, yet on the other hand users of this size are doing very little urging for increased shipments. Those concerns who have been permitted to stock this coal have ample piles, and while they do not refuse additional shipments, in many cases it is for the reason that they do not want to hurt their case when the pinch comes this winter. Rice is quite plentiful and some of the larger companies continue to place a light tonnage in the storage yards near the region. The same can also be said of barley. Culm is out of the market.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.25	Buckwheat	$3.40	$4.45
Egg	4.80	6.15	Rice	2.90	3.80
Stove	5.05	6.40	Boiler	2.70	3.70
Nut	5.15	6.50	Barley	2.40	3.30
Pea	3.75	5.00	Culm	1.25	2.15

Bituminous.—While the market continues to be fairly well taken care of, there is beginning to be some evidence of a falling production. Many operators report the influenza epidemic as reaching its height in the western part of the state now, and it is thought by the end of the week there will be a somewhat serious shortage. One operator advised us that 50 per cent. of his men are out on account of the illness. The miners are also somewhat restive due to their wage demand having been denied by the National Administration.

In this market there is a particular shortage of gas coal, which is principally used by the steel plants in and about the city. Some of the largest plants have only a five-day supply ahead. Much of this coal comes from the Greensburg district, and the statement is made that relief cannot be expected from that quarter for some time on account of the illness now prevalent there.

BALTIMORE

Influenza continues to play havoc with production and distribution of soft coal. Demand growing steadily as consumers run low on their stored stocks. Improvement in grade of shipments. New order disturbs jobbers. Hard coal situation unimproved.

Bituminous—Influenza still holds the upper hand in this section. Not only do mine reports show efficiency cut from 30 to 50 per cent. by the disease, but the Baltimore & Ohio R.R. is seriously crippled and has been shipping less than half of its normal coal tonnage. In distributing the coal coming through there are complications due to inadequate pier handling forces.

The demand is growing steadily, as the stored stocks of both non-essential and essential industries run below their permissible 15- and 30-day allotment. Several industries that had been cut off the delivery list for weeks because they had stored from 60 to 120 days ahead before the Fuel Administration's limitation order are now back in the market for more coal.

A feature of interest just now is the steady improvement in some of the box-car coal coming through. For such coal consumers have been entirely willing to pay the added price on box-car movement and for unloading. The old jobbing trade is somewhat disturbed over a new order from the National Fuel Administration which says that all coal requisitioned on the order of a state administrator shall at his request be invoiced to a licensee named by the purchaser, unless the producer prefers that it be invoiced directly to the purchaser. Such licensee named by the purchaser may, if the coal is invoiced to him, charge a purchasing agent's commission subject to the rules and regulations governing licensees. Purchasing agents here feel that this may result in mines dealing direct with many of the best customers they have had for years, and for whom they have at times recently been forced to appeal to the fuel administrator to get requisitioned coal to cover their contracts.

Anthracite—Little or no improvement is noted in the hard-coal situation. Coal is now coming through at the rate of about 50,000 tons a month, while there still remains about one-fourth of the homes of the city without coal. Some dealers here are still giving two-thirds on orders when they get coal, while others deliver in one- and two-ton lots. Probably 30,000 homes will still be without coal when cold weather arrives. The receipts here since last April have not only fallen below the allotment for the city, but have fallen below the receipts for the same period of last year. This spring, also, the city started off with a deficit of probably 75,000 tons, as against the yard and home holdover supplies of the previous spring. The local fuel administrator is now advising householders to burn soft coal. The trade also faces the fact that just now a large proportion of the coal coming in is of sizes which are unsuited to their household trade.

Lake Markets

PITTSBURGH

Price shading in some Ohio districts, but wider distribution now allowed. Heavy pressure on Pittsburgh district for lake coal, particularly gas and by-product. Serious effects of influenza.

The market for coal in the Hocking, Goshen and some other Ohio fields has been soft, and at times there has been considerable price shading. Some coal allowed a Government limit of $2.90 has sold down to the general standard of $2.35. A part of this congestion arose from the recent recasting of zone limits, whereby more territory was given to Indiana and Illinois, this being followed lately by a curtailment in the amount of coal that could be received for lake movement, on account of vessel and dock conditions. The situation is likely to be relieved, and a broader market furnished for the coal that is in excess of demand, by the recent opening of the Black Rock, N. Y., gateway, giving Ohio coal a wider field.

As to the Pittsburgh district there is no relaxation in the pressure for lake coal, as gas and byproduct coals are given precedence in the matter of lake carriage, and such coal must come chiefly from this district. As noted a fortnight ago, the coal distributor has been permitted to divert 200 carloads additional weekly to retail dealers, and lake shipments are at a correspondingly lower rate; but hopes are entertained of shipping 300,000 tons a week to the lakes from the district unless production is seriously curtailed.

Influenza has been affecting production of coal more than a week ago, some mines being seriously affected while others are almost free. The influenza is much worse in the Connellsville region than in the Pittsburgh district. No opinion is hazarded as to whether the epidemic has passed its crest, as it has a way of affecting large centers of population first and then working out into regions where population is not so dense.

There are no market transactions in Pittsburgh coal as all coal is moving under contract or allocation, but there has been some activity in coal from a few Ohio districts. The market remains quotable for the district at the set limits: Slack, $2.10; mine-run, $2.35; screened, $2.60, per net ton at mine, Pittsburgh district, with 15c. brokerage allowed to be charged in addition by regular brokers.

BUFFALO

Bituminous more plenty. Some shippers say the market is pretty flat. Consumers do not seem to be afraid of a serious shortage right away. Influenza affects mining. Anthracite very short locally.

Bituminous—The trade is easier than it has been in a long time. There is still complaint of coal being ordered to various consuming plants, some of them here, faster than it can be unloaded, so that while the consumers that the shpipers are trying to serve are going without coal the concerns that do get it are paying demurrage. What the shippers hope for now is coal enough before long so that no further commandeering will be practiced. At present the railroads are taking large amounts.

In general the jobbing interests are selling only small amounts of coal, though a few manage to get near enough to the operators to obtain a pretty good tonnage. The jobbers generally agree that the zonal authorities are still undermining them, and

that if the present method of distributing the coal continues long the business of the middleman will mostly be transferred to the zones.

All reports agree that the active manufacturing plants the country over are pretty well supplied with coal, so that they can afford to buy soaringly for awhile and most of them seem to be doing so. Slack is especially plenty and only lump is at all scarce. Prices continue on the basis of the Government figures, $4.65 for Allegheny Valley thin vein, $4.45 for Pittsburgh lump, $4.20 for Pittsburgh mine-run and slack, $5.85 for smithing and smokeless and $5.60 to $6.10 for cannel, all per net ton, f.o.b. Buffalo.

Anthracite—The complaints of no coal are heard about as much as ever. They are met as before by statements from the fuel authorities that they are taking care of every emergency case, and that the winter's supply will be forthcoming before it is needed. As a rule the city anthracite distributors are declaring that they have kept up former delivery amounts, but their neighbors have not. It will all be easy if the shipments to the lakes are turned in on the city a short time after the lakes close early in December. The influenza is cutting down the production and may make a serious difference with the movement if it continues. It has not abated to any extent yet here.

Shipments by lake are about as formerly, being for the week 107,633 net tons, of which 57,400 tons cleared for Duluth and Superior, 15,000 tons for Milwaukee, 17,233 tons for Chicago, 5500 tons for Port Arthur, 3000 tons for Gladstone, 2700 tons for Fort William, 2500 tons for the Sault, 2400 tons for Manitowoc, 1000 tons for Depere and 900 tons for Lake Linden.

Freight rates remain strong at $1 to Sault and Depere, 48 to 75c. to Lake Linden, 60 to 65c. to Chicago, 55c. to Milwaukee, 50c. to Manitowoc, 48c. to Duluth, Port Arthur and Fort William.

CLEVELAND

Bituminous for the lake trade is tapering off somewhat—though October shipments will come close to exceeding the schedule by 1,000,000 tons—while the receipts for domestic and industrial consumption have gained in proportion. Domestic orders are on the decline, indicating the well-coaled condition of the district. Improved car supply is aiding in offsetting lost production attributable to influenza.

Bituminous—Receipts for the industrial and domestic trade, as well as for dumping for the Northwest, are holding up remarkably well in the face of the epidemic of influenza that is sweeping the No. 8 district. While some mines have been forced to suspend entirely, others have scarcely been affected. On the whole, the inroads have been more mild than expected, though many operators fear the crest has not yet been reached. More serious inroads seem to have been made on the train crews of the roads supplying southern Ohio mines. Car supply, despite this handicap, is averaging 85 per cent. or better. The real truth of the labor situation is almost impossible to determine because of the sick lists.

The movement of bituminous into Cleveland and northern Ohio for industrial and domestic consumption is slightly heavier, at the expense of the lake trade. For the first time, a falling off in new business is noted by domestic dealers. Their increased receipts, however, are more than taken up by deferred business. Industrial stockpiles, which only in rare instances are below the 30-day mark and run as high as 120 days in instances, continue to be added to, and advantage is being taken of the extension of stocking limits. This is most comforting to operators, who point out that the one factor that will cut off spot shipments this winter—extreme cold paralyzing the railroads—will at the same time increase consumption out of all normal proportion. Some fair-sized lake shippers of coal, who assert they have been most diligent in heeding the Federal Fuel Administration's admonitions in regard to contracting, assert that all but 25 per cent. of their contract business will expire with the closing of navigation on the Great Lakes the middle of December. While they expect industrial and domestic demands will take up whatever slack results, they predict that many wagon mines will be compelled to close. A slight surplus of coal is looked for by some interests unless much more than the expected tonnage released by the lake trade is diverted toward the east. The report of the Pittsburgh Vein Operators' Association of Ohio on car supply to its members for the week ended Oct. 12 places the shortage of cars in that week at an average of 28.41 per cent., and the lost production chalked up to this factor as 119,100 tons. The average car shortage in the preceding week was 15.49 per cent. The diversion of all B. & O. cars to the Fairmont region for the last half of the week is blamed for the extremely poor showing. Shipments in the week ended Oct. 12 totalled 5,419 cars as against 6,103 in the week preceding.

Anthracite—Receipts continue to drag along at from 150 to 200 cars a week, about 25 per cent. of what ordinarily could be disposed of at this time. Upper lake dock interests complain that to Oct. 15 they have received only 1,325,000 tons of anthracite, compared with 1,950,000 tons to the same date last year.

Lake Trade—Unless shipments of bituminous in the last week of the month fall down unexpectedly, the Northwest will have been given fully 4,500,000 tons in October, or 1,000,000 more than the Federal Fuel Administration called for. To Oct. 15 the total bituminous loaded at lower lake ports for the Northwest—exclusive of vessel fuel—is estimated at 23,050,000 tons. From Oct. 1 to 21 the loading is placed at 3,450,000 tons. Receipts at the docks in the last 10 days of the month slumped somewhat owing to the influenza epidemic. Instead of fearing that the Northwest will not get its 28,000,000 tons of bituminous this season, the Great Lakes vesselmen in charge of the downward movement of grain in November and the first half of December are hoping coal operators will purposely slow up shipments in order to leave some coal for ballast in December. Barring the slight recession the past few days, the October movement is proving the fastest of the season, and some operators predict that the high mark set in August, when 4,996,929 tons of both cargo and bunker coal were handled over Lake Erie car dumpers, will be broken.

DETROIT

Reserve piles strengthen position of numerous industrial consumers. Fine weather in October brings relief to many domestic consumers. Lake shipments heavy.

Bituminous—Though there is less coal available in the Detroit market than a few weeks ago, the demand from consumers of steam coal is apparently not urgent. Jobbers explain this as being an indication of successful accumulation of large storage piles by many of the great industrial and manufacturing plants of the city. Profiting from their experience of last year, many of the consumers of steam coal, according to the jobbers, have been gradually building up reserves through a large part of the summer. Some of these consumers have on hand so abundant a supply that they are said to be meeting their present requirements from storage stocks rather than by direct shipments. By following this course a number of manufacturing plants are able to avoid using the coal now coming to Detroit from Illinois and Indiana, which, in the opinion of some of the buyers, is undesirable stock likely to damage furnaces. The supply of steam coal is being augmented somewhat by shipments of slack from mines in Ohio, but not all of the industrial plants are able to handle the fine coal to advantage. Only the continuance of unusually mild weather throughout the month so far has saved hundreds of household consumers from experiencing hardship and suffering. The favorable conditions have made it possible for retail dealers to speed distribution to an unusual degree, despite the handicaps of shortage of labor and, at times, deficient coal supply. The latter difficulty has been relieved by the action of the Federal Fuel Administration in placing an embargo on shipments of domestic lump and prepared sizes from Ohio, West Virginia and Kentucky, except when sent for domestic use or for gas and byproduct plants or railroads. Mine run later was made available for use of the domestic consumers.

Anthracite—Improvement in volume of anthracite receipts, though not very great, has tended to aid in relieving the situation. Base-burner users are still receiving most of the anthracite distributed.

Lake Trade—Coal is moving freely over the lake routes and from present indications shipments in October will exceed 5,000,000 tons. For the week ending Oct. 19 vessels loaded more than 1,800,000 tons of cargo coal.

COLUMBUS

With a serious reduction in output in Ohio fields as a result of the influenza epidemic, the Ohio coal trade is in a rather uncertain condition. There is still a good demand for domestic and lake tonnage. Screenings and mine-run are rather plentiful.

The outstanding feature of the coal trade in Ohio is the reduction in output due to the prevalence of Spanish influenza which has become widespread in mining districts. But the output has not been curtailed as much as might be expected under the circumstances, although it is a serious reduction. There is a marked car shortage on certain railroads, more especially the Toledo & Ohio Central and the Kanawha & Michigan. The shortage appears to be due largely to a lack of train crews to handle the trains promptly. The output in the eastern Ohio field is reduced to about 60 per cent. of normal. In the Pomeroy Bend district it is about 50 per cent., and in the Hocking Valley and Jackson fields it is about 65 per cent.

The domestic trade rules firm in every particular. Retailers have accumulated rather large stocks in order to be in a position to take care of the rush when colder weather arrives. There is a good supply of mine-run in the yards of retailers, but lump is not so plentiful. As a result dealers are in the market for prepared sizes. Retail prices are firm at the levels which have prevailed for several weeks. Pocahontas is not out of the market. There is a fair supply of West Virginia splints, but on the whole the bulk of domestic tonnage comes from Ohio mines. Reports show that a much larger tonnage than ever before has been stored up to the present by householders.

Lake trade is rather active, despite the general reduction in production. The docks of the lower lake ports are busy loading vessels which are being moved promptly. The upper docks are in good shape as the interior movement is prompt. Prospects are for a complete supply for the Northwest unless something unforeseen occurs.

Steam trade is rather slow in many respects, largely due to the oversupply of screenings and mine-run on the local market. Some modifications of the embargo against shipping those grades into Michigan have been received, but these are not yet sufficient to relieve the situation. Storage in the hands of large steam users is up to the limit, and in many cases in excess of the amounts permitted by the Federal Fuel Administration.

CINCINNATI

Production and shipments have been reduced by influenza among miners and railroad men, but demand is not heavy, as weather continues moderate.

In spite of the high degree of activity among industrial plants in this section, calling for a correspondingly large consumption of coal, conditions have brought about the old-fashioned state of a weather market, a thing which was hardly anticipated for this fall or winter. The answer seems to be that storage by domestic consumers, and, to a large extent, by others as well, coupled with such shipments as are coming forward, is taking care of all needs very nicely.

So far during the current month the weather has been mild and pleasant, with very little rain and only a few frosty nights. Inasmuch as the prevalent epidemic of influenza has hit the mining regions hard, this is especially fortunate, as it seems that so many men have been out of the mines on account of illness that production could not possibly have kept pace with a heavy demand. In some sections as high as 50 per cent. of the men have been ill, reducing production to a corresponding extent. However, indications are that the epidemic is on the wane in this section, and it is hoped that another week will see it virtually at an end.

LOUISVILLE

A decrease of 50 per cent. in coal production of the state is claimed as a result of the influenza epidemic. Demand for Western Kentucky domestic draggy. Steam coal generally draggy, as industrial consumers are well stocked, and industrial consumption is lighter due to curtailment on account of illness of employees.

The influenza epidemic is having a serious effect on the coal man at the present time. Many large industrial plants are operating on one wheel due to the shortage of hands brought about by illness, this reducing industrial demands considerably. Domestic demand is dull on account of mild weather, with the result that a slight surplus stock is being accumulated in the local yards. Much trouble is being experienced in securing hands for unloading coal from cars.

At the present time the western Kentucky mines are so short of hands that many of them are down, and the car supply for the first time in months is showing a surplus, although it would be a shortage with normal shipments.

In eastern Kentucky the car supply is fairly adequate for the small shipments moving. It is estimated that the mining sections are not operating more than 50 per cent. full as a whole, as many of the mines are closed.

BIRMINGHAM

Steam market soft despite the restricted output. Domestic demand continues strong while the supply is short. Sickness proves disastrous to production.

Steam coal in the local market is reported easier than at any time before in months, and some distributing agencies report some effort is being required to dispose of the full tonnage at their command. Some industries are said to have accumulated several months' supply ahead and have had shipments suspended temporarily, though railroad fuel is moving in about the normal volume.

There is no semblance of softness in the domestic trade and dealers are unable to get anything like the desired tonnage to fill orders in hand. There is very little coal on local yards, and not an infrequent sight to see them completely bare.

Production took a big slump for the week ending Oct. 12, the output being only 382,846 net tons, or 26,000 tons less than the previous week. This loss was due in a measure to the large number of mine workers suffering from influenza, the epidemic being very much worse during the week just past. Numbers of operations in Walker County worked not more than half time last week while others were closed down entirely. The situation is still serious, both as regards coal production and physical distress. Mines in Jefferson County have also been affected to some extent, particularly in the western part of the county.

Transportation service is now good and ample cars are being supplied. The tug boats and barges purchased by the Government from private interests operating them on the Warrior River in handling coal to New Orleans, Mobile, and other points are now being repaired and will be placed in service soon. It is announced that the Government has appropriated $6,170,000 for the purchase of six towing steamers and 40 steel barges for use in the Mississippi and Warrior Rivers, the barges each having a capacity of 2000 tons.

Coke

CONNELLSVILLE

Production reduced by influenza. Extensive inoculation. Efforts to speed production continue under handicaps. Market conditions unchanged. Blast furnaces fairly well supplied.

Production of coal and coke in the Connellsville region has suffered seriously from the influenza epidemic. Output in the week ended Oct. 19 showed a noticeable curtailment, while there has been a further loss since then. The medical staff of the H. C. Frick Coke Co. took measures early against the disease and have inoculated all employees with the "anti-flu serum," while they are now inoculating members of employes' families when requested. Many of the independent operators are inoculating their men. While the number of cases in the region is large the mortality is reported much lower proportionally than in other districts. Precautions are being taken against men returning to work too soon.

All the machinery of W. L. Byers, production manager for the district, to stimulate production of raw coal and of coke is in operative condition, but actual work in the campaign has been materially interfered with by the epidemic, particularly by the impossibility of holding meetings. Good results are expected in the long run, however. No material shortage of coke is reported by blast furnaces, which seem in nearly all cases to be well supplied, though there is little opportunity to accumulate stocks. There remains much complaint as to the quality of beehive coke furnished, although there has been some improvement since the Fuel Administration started its vigorous campaign nearly two months ago to bring about an improvement in quality. Some furnace managers estimate that one-third the coke operations have shown a market improvement in quality of coke turned out.

There are practically no market transactions in furnace coke, the current output moving against contracts or allocations. In foundry coke there is a little activity and foundries engaged in important work can generally secure supplies without much difficulty. A good trade continues in screenings from old dumps, for household use, and present operations have enough material as a rule to keep them going for two months or longer. The market remains quotable at the set limits: Furnace, $6; foundry, 72-hour selected, $7; crushed, over ⅝-in., $7.30; clean screenings from old dumps, over ½-in., $5.50 per net ton at ovens.

The "Courier" reports production of coke in the Connellsville and Lower Connellsville region in the week ended Oct. 19 at 314,045 tons, a decrease of 8875 tons, and shipments of coal out of the region at 246,078 tons, a decrease of 20,475 tons.

Buffalo—The supply is fairly good to the smelting furnaces and is likely to continue, as this district is pretty well provided with byproduct plants. Some jobbers in fuel coke complain of careless preparation, consumers finding it with a high percentage of dirt and other foreign matter. An effort will be made to correct the abuse. Prices run from $2.75, a cut, to $7.68, a regulation figure, at the ovens. Only government prices are allowed on smelting coke. Lake receipts of iron ore are still good, being 367,591 gross tons for the week.

Middle Western

GENERAL REVIEW

Mining districts suffer from influenza epidemic. Market continues weak in both steam and domestic sizes. A serious situation predicted for first of year if steam users do not come into market early.

Influenza has a strong foothold in the mining districts of Illinois, and the situation today is more than serious. We are advised that the tonnage for the week will suffer heavily, some authorities going so far as to state that the production figures will be decreased from 25 to 50 per cent. It will not be a surprise to anyone in close touch with operating conditions in Illinois if the epidemic becomes as serious as it is in the anthracite fields of Pennsylvania and the southeastern district of Kentucky.

Market conditions in the Middle West remain, generally speaking, unchanged. In spite of the fact that coal-carrying equipment continues to move to the mines in the east, and in spite of the fact that the man shortage caused by influenza is beginning to be felt, the market continues weak, both on steam and domestic sizes.

The weakness of the steam market is explained easily, as the majority of the manufacturers have enough coal on hand to last until the latter part of December or the early part of January. The domestic market appears to be purely a weather proposition, and as the weather in this territory has been unusually mild, there has been little purchasing on the part of the retailer.

A number of operators are looking forward and predicting what will probably happen about Jan. 1. As we stated before, the average steam coal user has enough fuel on hand to last until this time, and consequently will not be interested in purchasing additional coal until at least the latter part of this year. As a natural result, the operators will be swamped with orders—far more than they can begin to take care of—and the manufacturers will be out of coal. It will naturally follow that there will be a panic similar, if not more serious, to that experienced last winter. The only way to avoid this threatened state of affairs is to advise the steam user to come into the market early, and gradually; otherwise, nothing can hinder a very serious situation.

CHICAGO

Most of the large industries are well supplied and are not interested in coal. No improvement in the anthracite situation.

Steam coal continues to be offered freely, a substantial tonnage of it at a discount, and little interest is taken in it by the average purchasing agent. Most of the industries have a big supply of coal on hand, and no coal to speak of is being purchased, in spite of the fact that operators are predicting freely what will happen to the tonnage production from the influenza epidemic and from the probable car shortage.

Little interest is shown in anything but the high-grade and well prepared coal from the southern part of the state. As soon as a cold snap comes, operators are anticipating a strong market on all domestic coals, but until then the retail trade will continue weak and erratic.

The anthracite situation does not appear to improve much from day to day. The epidemic in the hard coal field of Pennsylvania will further hinder any favorable developments, and the retailers in Chicago are expressing, pretty generally, an intense dissatisfaction in the manner in which the State Fuel Administration is handling the anthracite problems.

ST. LOUIS

Market continues with a surplus of all coals. Mild weather and no domestic demand. Steam business easy and light, and no storage purchases. Country Demand slow. Cars plentiful and transportation good. Tonnage decreasing.

The local situation is one that continues serious for both operator and retailer. With unbilled coal at the mines in the Standard and Mt. Olive field, the operator cannot look ahead to any extent without figuring idle time on account of no orders. With the domestic demand in St. Louis filled, the retailer finds his equipment idle and his stock eating up the profits.

In the face of these conditions, the Fuel Administration at Washington has not consented to eliminate the zone lines as far as shipments to western Missouri, Nebraska, Iowa and the Northwest are concerned. In these places, which in the past have been the logical territory for Illinois coal, there is a scarcity of fuel.

There are no prospects of any business developing in St. Louis until real, cold weather comes, and that business will be light, both as regards steam and domestic.

The country demand within the zone of Illinois fuels in Missouri and the southeast is pretty well taken care of. Car supply is plentiful and transportation shows considerable improvement.

In the Standard and Mt. Olive field there has been a decreased tonnage at many mines on account of the influenza epidemic. This is not so serious as in the Carterville field, where one-fourth of the men at some mines are idle on account of sickness, and in some places in the state some mines are idle altogether on account of sickness of the engineers, firemen, and other essential men, whose places cannot be readily filled.

The railroad tonnage from all the fields in Illinois continues good. That is the only thing that is keeping business going in the Standard and Mt. Olive fields.

There is still a good tonnage of domestic booked in the Carterville field moving north, but the demand for that coal in the southwest is easy and light, excepting on the Iron Mountain lines proper.

There is no outside coal coming in to speak of, excepting a few cars of Arkansas anthracite, and there is no change in the local price from that of the past few weeks, excepting that Standard 2-in. lump is down to $2.25 and $2.30, and screenings around $1.50. All other coals seem to be holding their own, at the Government maximum, in the face of the surplus.

The prevailing market prices per net ton f.o.b. mines, are:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump..	$2.55@2.75	$2.55@2.75	$2.40@2.70
3x6-in. egg..	2.55@2.75	2.55@2.75	2.40@2.70
2x3-in. nut.	2.55@2.75	2.55@2.75	2.40@2.70
Washed:			
No. 1.....	3.05@3.20	3.05@3.20	.....
No. 2.....	3.05@3.20	3.05@3.20	.....
No. 3.....	3.05@3.20	3.05@3.20	.....
Mine Run..	2.35@2.50	2.35@2.50	2.20@2.30
Screenings..	2.17@2.32	2.17@1.32	1.50@1.60

Special prepration on Carterville is 10 cents extra.
Williamson & Franklin Co. rate is $1.10.
Other fields 95 cents.

SEATTLE

Fuel Administration to conduct campaign of conservation throughout the Northwest. Railroad consumption to be given first attention.

A campaign for the conservation of coal is to be inaugurated throughout the Northwest at once by the United States Fuel Administration, the first effort being confined to the various railroads operating in this section, following which the education will extend to power plants and other industries. E. P. Roesch has been appointed supervisor for the entire district and will have his offices in the Union Pacific depot with W. C. Wilkes, assistant to the regional director, railway administration. The department is not connected with the railroad administration, however. The first meeting called by Mr. Roesch was attended by the railroad superintendents, trainmasters, roadmasters, master mechanics, superintendents of bridges and buildings, road foremen and the chairmen of the brotherhoods of trainmen, and ways and means discussed in unloading and firing locomotives with reference to fuel conservation.

The retail coal trade in Seattle reports a brisker movement in winter storage coal, due likely to the persistent reports here that prices of fuel are to be materially advanced before November and to the curtailment of coal supplies to certain industries. While the curtailment does not apply to home consumers, it has caused a flurry among those who were over-anxious.

1st —Output Increased
2nd—Labor Saved
3rd—Coal Breakage Minimized
4th —Cars Promptly Released
5th —Mine Car Costs Reduced
6th —Car Repair Bills Lowered

7th —Dust Explosion Risk Lessened

BY using solid cars and the Pneumatic Rotary Dump, most of the coal dust on roadways may be prevented. That is of value in every mine, and particularly in those mines where the dust is of an explosive character.

Of course, cars with open ends or doors can be kept in use with the

Pneumatic ROTARY DUMP

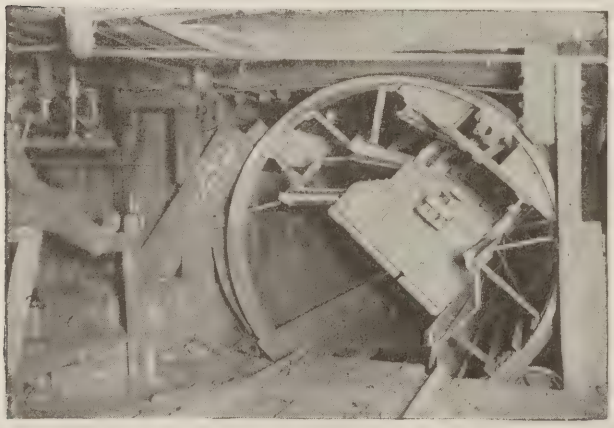
until they are worn out in service. Afterward, when more substantial, less costly solid cars replace them, the fine dust and coal will stay in the solid cars, rather than be distributed along the track.

This is only one of the many advantages of the Rotary Dump. Why not write for Bulletin 180-A and see what are the others?

WOOD EQUIPMENT CO.

General Offices and Works, Grand Crossing, City Offices, McCormick Building, CHICAGO

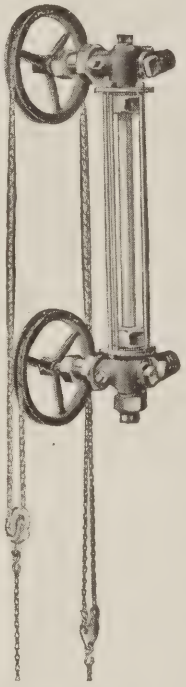
New York	Pittsburgh	Knoxville	Denver
Architects Building	Union Arcade	Holston Bank Bldg.	1707 Franklin St.



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29

LUNKENHEIMER Water Gauges and Gauge Cocks



"MONITOR" Automatic Water Gauge

are boiler accessories of exceptional merit, possessing qualities which make them the most substantial, practical and durable devices of their kind.

All parts are interchangeable, permitting the repair or replacement of a worn or broken part when occasion requires. Users should follow this principle in preference to discarding the entire device. To repair means to conserve. To conserve means to economize. CONSERVATION and ECONOMY are necessary to our success in the war.

Our "War Period" Appeal

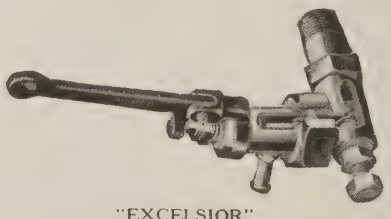
Engineering Appliances Are Prime War Essentials

Stocks of distributors and facilities of manufacturers must be adjusted to care for essential needs.

Lunkenheimer patrons are earnestly requested to assist in the common cause by confining their War Period specifications to requirements for essential plants, craft, vehicles or equipment.



Plain Water Gauge with Regrinding Valves



"EXCELSIOR" Extra Heavy Gauge Cock with Emergency Valve



Self-Grinding Rotating Gauge Cock

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—"QUALITY"—
Largest Manufacturers of High Grade Engineering Specialties in the World
CINCINNATI

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COAL AGE

Volume 14 New York, November 7, 1918 *Number* 19

Let Safety Help the War

DURING the past few months, Uncle Sam has made two demands and one request of the coal industry. All three have been complied with so promptly and willingly that the entire country is proud of the men in and about the coal mines.

The Government has demanded that the men load clean coal at the working face, and that the operator ship only coal that will pass a rigid inspection as being practically free from slate and bone. The nation also demanded that the mines and the individual miners work full time as far as humanly possible. These were followed by the request that the coal companies and their employees invest a large part of their earnings in Liberty Bonds.

How well the two demands have been met can be determined from a study of the reports of the Fuel Administration and by a comparison of tonnages for 1917 and 1918. The spirit with which the request was responded to is readily revealed by a visit to any mining town, where the honor flag of the Third Liberty Loan and the newer flag of the Fourth Liberty Loan float proudly below the Stars and Stripes.

We now have another duty to our Government —one that is peculiar to this season of the year, and which is especially important at this time. The country needs every ounce of coal that can be produced if our boys on the other side who have the "Hun on the run" are to keep him going. We cannot produce this coal unless we look at once into the condition of our mines and take the necessary steps to insure that they do not, with the coming of cold weather, become so dry that they are in an explosive condition. An explosion that closes down a mine may result in the loss of an important battle, or in the slowing down of a big drive toward Berlin.

Our mines must not get into such a condition this winter that an explosion may occur. It is the duty of every one of us to see to this. Each of us has his part to do in this work, the miners no less than the superintendent.

Mr. Superintendent and Mr. Foreman, your part is to see that there are no accumulations of explosive coal dust anywhere in your workings. Remove all such accumulations at once, and watch carefully for any sources of explosive coal dust. Remember that a dry and dusty mine is a dangerous one. Don't let yours be of this character.

Miners, your part is to see that nothing is done in your working place that may bring about an explosion. Make sure that every shot has a good chance; don't drill a hole "on the dead." The due observance of these precautions will make blownout shots less likely, and you well know that every windy or blownout shot may mean an explosion that may shut the mine down indefinitely —perhaps with you and your buddies inside. If the mine in which you work is gaseous, remember that a smoke after dinner may also cause a serious explosion. Take your last smoke on the surface before going into the mine, and don't run the chance of hindering Uncle Sam by "lighting up" underground.

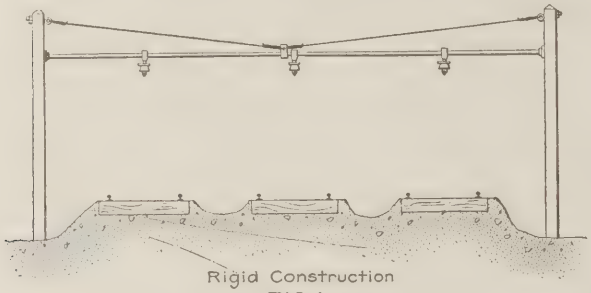
Let's all keep our mines safe this winter and help put the German back where he belongs.

IDEAS AND SUGGESTIONS

Flexible Trolley Construction for Mines

The more flexible or yielding overhead trolley construction is made, the longer will be the life of the trolley wire and wheels that operate on it. There are some conditions under which it is not feasible to install the trolley from flexible supports. Inside coal mines it is most convenient and economical to attach it to insulated hangers fastened rigidly to the roof or overhead timbers. Also lack of headroom in the mine often prevents the use of flexible construction.

Outside the mine there are no such limitations as underground, and it will be found usually that considerable saving can be effected by suspending the trolley from a flexible cross-span wire. The common practice of continuing outside the same rigid construction that is used inside the mine shortens the life of wire and wheels and requires a large amount of material that could be saved. Great lengths of pipe have been used, some spanning four or five tracks, and quite low, in an endeavor to make the overhead rigid.



FIGS. 1 AND 2. TROLLEY DESIGN FOR MINE WORK

Fig. 1 shows an installation of the rigid type. Hangers are secured to cross pipes spaced about 30 ft. apart. There is a great weight of material to be supported. A better construction for such a condition is shown in Fig. 2. Light $\frac{3}{8}$-in. soft steel cross-span wires take the place of the heavy pipes, hangers are snapped into the strand without cutting and the whole line is flexible, thus insuring maximum life of wheel and wire.

At 1800 lb. trolley tension, which is good practice, a 4-0 hard-drawn trolley wire supported every 30 ft. sags only about $\frac{1}{2}$ in.—*Ohio Brass Bulletin.*

Various Types of Pipe Hangers

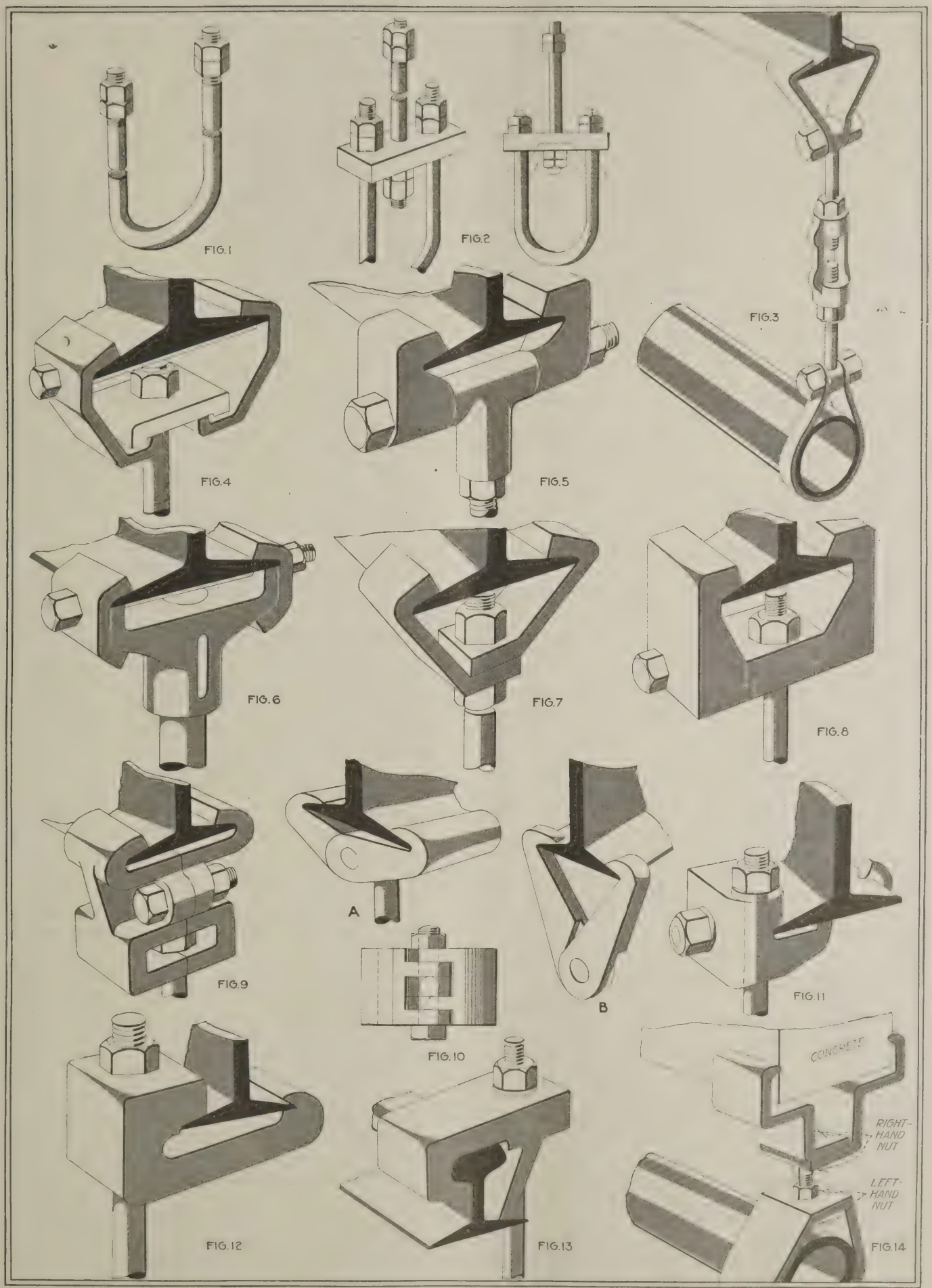
The common U-bolt, as shown in Fig. 1, on the facing page, forms about the simplest and cheapest pipe hanger when there exists a suitable structure overhead for attaching it. The rod should be threaded for a considerable distance on each end for adjustment, and for pipes subject to vibration, such as steam, exhaust, hydraulic-pressure lines, etc., there should be jam nuts or other form of nut locks. Where the distance to the joint of support is excessive, or the overhead structure favors attachment at a single joint, the pipe hanger in Fig. 2 is suitable. If a flat bar is used for the cross-beam, it should be bent as shown in dotted lines.

Fig. 3 illustrates a complete hanger with clamp suitable for attachment to the lower flange of an I-beam. The strap in which the pipe rests is made from a broad flat bar of wrought iron or steel, varying in thickness from $\frac{1}{8}$ in., or even less for very small pipes, to $\frac{3}{8}$ or $\frac{7}{8}$ in. for large pipes. A turnbuckle with locknuts provides a means for adjusting the length. The rod ends in the turnbuckle are upset to give the same strength at the rest of the thread as in the full section of the rod, and the whole forms a strong, sightly hanger suitable for nearly any location where minimum cost is not considered a matter of first importance.

A large percentage of the pipes in use at the present time are suspended from overhead beams, and Figs. 4 to 12 show a variety of clamps intended for this purpose. These are mostly designed to be made of steel castings or forgings. On lines subject to shocks, it is useless to attempt the determination of hanger dimensions by calculations of the dead weight to be carried. Only good judgment qualified by experience is of any use in this case, and about the only rule to be followed is the one that says, "When in doubt, make it stronger."

Fig. 10 is commonly made as shown at *A*. There is less stress upon both the pin and the clamps if made as shown at *B*. Fig. 13 represents a hanger on T-rails used for supporting heavy pipes in a tunnel with smaller pipes hung beneath them. In Fig. 14 a pipe is supported with an adjustable hanger by grooves formed in a concrete beam. The strength of the groove was found by experiment to be far in excess of that of the clamps, which were designed of ample proportions for the service required.

Large vertical pipes are usually supported from the bottom by means of a properly constructed special fitting provided with a base for resting upon a suitable foundation, preferably of masonry. Smaller ones may be suspended from above by rods connecting to a split collar placed beneath a convenient pair of flanges. Sometimes a vertical line is supported about midway of its length by a fitting made of a bracket form and bolted to the wall.



Courtesy *American Machinist*

FIGS. 1 to 14. ILLUSTRATING VARIOUS TYPES OF INTERIOR PIPE HANGERS

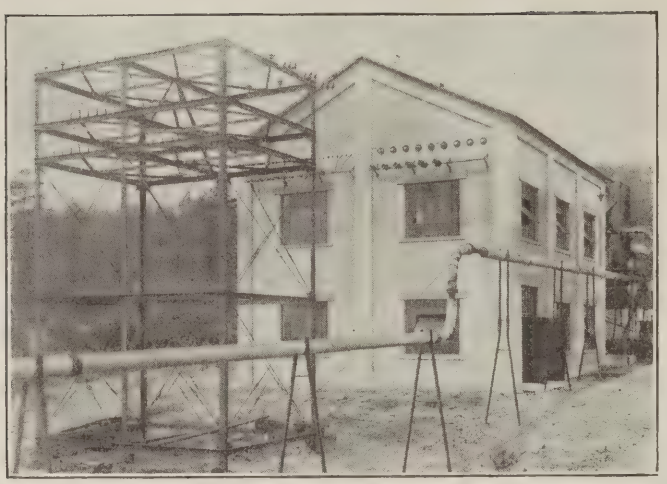


FIG. 1. SUBSTATION AT TAMAQUA COLLIERY

Modern Substations of Large Anthracite Distribution System

THE electrical equipment of some of the larger anthracite mining companies of Pennsylvania is the finishing touch to a development which has taken years to bring to its modern high state of efficiency. A number of the large companies in the anthracite field are committed, to a greater or less degree, to an electrical policy. Prominent among these is the Lehigh Coal and Navigation Co., whose main collieries are operating in the Panther Creek Valley, which is an eastern extension of the southern region of the anthracite field. Here, in a section 1½ by 10 miles in area, is installed an 11,000-volt distribution system which includes 23 substations.

Among the larger substations is the one at the Tamaqua colliery, shown in Fig. 1, which is typical of all the substations of this class. These buildings are among the finest in the anthracite coal region—the most modern in construction as regard building and equipment. They are built of hollow tile, cemented over, inside and out; concrete is used for foundations and floors, and fireproof construction is further secured by the use of red asbestos protected metal roofing, made by the Aspromet Co., of Pittsburgh, Penn. The smaller substations are made with a wood frame covered with Hyrib outside and cement inside to keep down the fire risk.

The electrical development of the Lehigh Coal and Navigation Co. as regards distribution and substations is of the indoor type. As current is distributed at 11,000 volts, nothing would seem to be saved or gained by putting in expensive outdoor equipment, such as switches, transformers and so on. What would be saved in buildings would be expended on equipment of the outdoor class. On the other hand, in high voltages, G. M. Kennedy, electrical engineer of the company, advises that money be invested in outdoor equipment rather than in buildings.

Electrical power is generated at the Hauto power station—a 25,000-kw. installation located in the adjoining valley to the north of the Panther Creek. There are 11,000-volt tie lines connecting the main Hauto plant with the substations. These lines are used in case of failure of any of the main transmission lines from Hauto and were not installed as tie lines, but were the original transmission lines from the old power house, which has been abandoned. Rather than discontinue these old lines it was found that with little expense they could be converted into tie lines which would connect the various substations with the power supply. The substations were built by the company, and all equipment was installed by the company's engineers. The iron work connected with the substations and lines was made at the Lansford shops of the company. The main transmission lines were owned by the Lehigh Navigation Electric Co. —the original power plant holding company—but now they have been taken over by the Lehigh Coal and Navigation Company.

The 11,000-volt transmission system to the various plants is shown in Fig. 2. This illustration was not taken from a scale drawing and merely shows the approximate relation of the more important substations to each other and to the Hauto power house. There are 23 substations in the Panther Creek Valley and four in the valley to the north. Some of the main substations and the horsepower of each are as follows: Lansford, 4200; Greenwood, 3240; Nesquehoning, 3160; Tamaqua, 2312; Hauto washery, 1100 and the North End pumping station, 700.

The type of larger substation is illustrated in Fig. 1; in which is shown a distributing tower and the wire connections to the building. The prominent steam pipe line shown in the illustration will have a limited life, for it supplies steam to an engine driving a fan which adjoins and is almost hidden by the substation; the fan will shortly be electrically driven and the steam line will be removed.

There are two 11,000-volt, three-phase and 25-cycle incoming lines from the Hauto plant to the substation; both lines are kept active supplying power to the bus, but in case of either line going out of service for any cause the entire load is carried on the other line. Each

of these lines is tested often enough to insure that both are capable of carrying current and are equipped with electrolytic, or aluminum cell, lightning arresters of Westinghouse manufacture. These arresters have disconnecting switches for the purpose of disconnecting the power to the arresters to enable making any repair or inspection of the arresters.

Continuing with the description of the course of the current through a substation, the process and equipment at substation No. 14, or Tamaqua, is typical and will be noted as an illustration. Here the lines pass through disconnecting apparatus and choke coils to oil circuit breakers and thence through disconnecting apparatus to 11,000-volt busbars. These busbars are composed of

Equipment is installed for a future bank of three (500 kv.-a. each) transformers, 11,000 to 2300 volts. Also a bank of three transformers, the required capacity of which is not definitely decided upon as yet. The equipment is also installed for an outgoing line from this bus to furnish power to outlying points at Tamaqua or other collieries in the vicinity. Connected at the end of this bus through disconnecting switches and proper fuses are two potential transformers (11,000 to 110 volts) for supplying potential to all voltmeters, wattmeters and power factor indicators in the substation.

The 2300-volt transformers mentioned above are used to furnish power to the 1200-hp. water hoist and also to the 375-hp. tender hoist. This is done by running

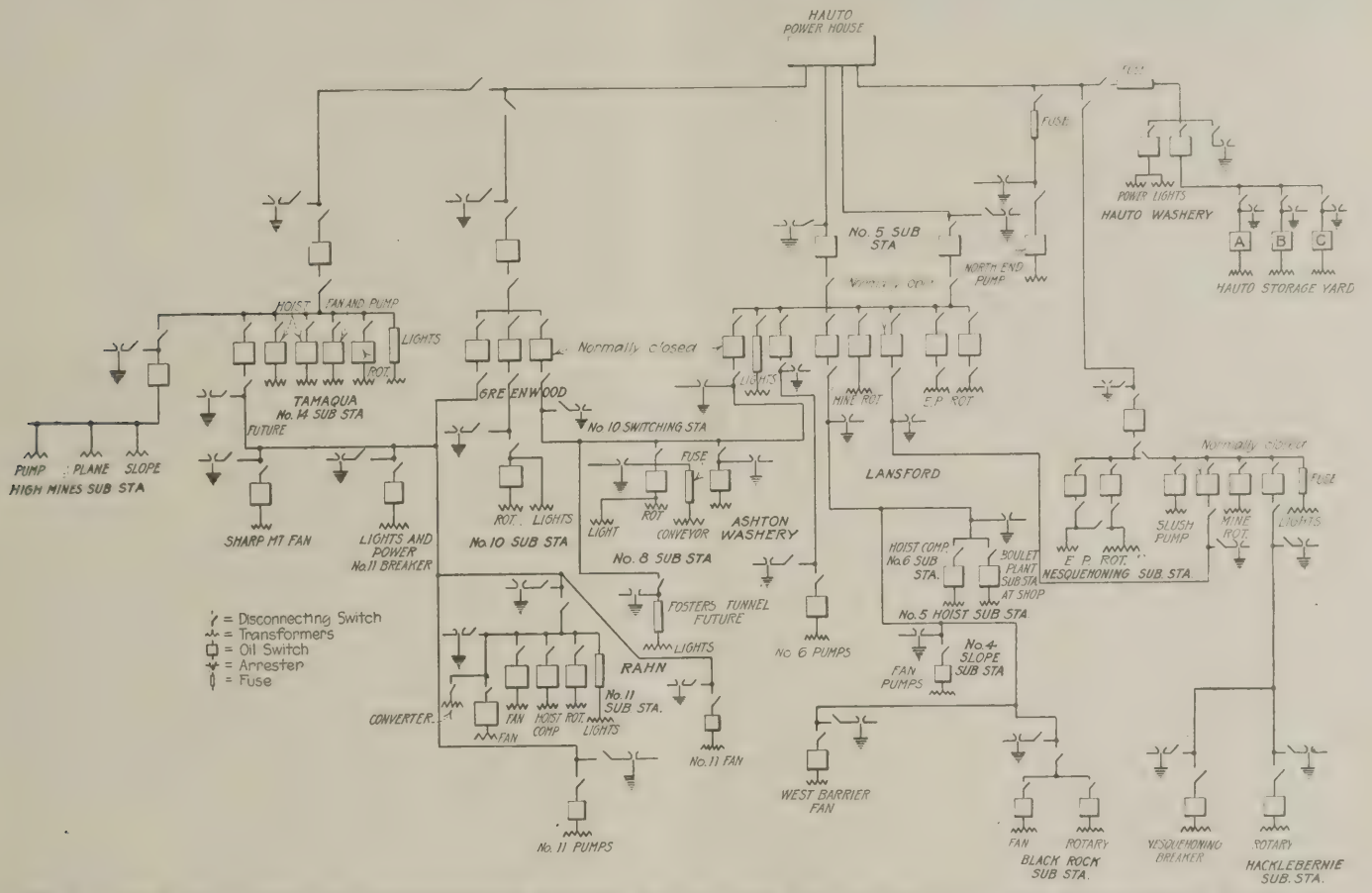


FIG. 2. PLAN OF 11,000-VOLT DISTRIBUTION SYSTEM FOR PLANTS OF LEHIGH COAL AND NAVIGATION COMPANY

copper tubing with an outside diameter of $\frac{15}{16}$ in. and an inside diameter of $\frac{11}{16}$ in. There are two sets of disconnecting switches, so that power can be cut off both sides of the oil circuit breakers to permit of making repairs and inspection. These incoming lines are equipped with necessary current transformers (Fig. 3), which are used in connection with the trip coils of oil circuit breakers and the instruments (ammeters and wattmeters) mounted on the switchboard. In the bus between the two incoming line connections and connections for feeders are mounted the current transformers used in connection with watthour-meters which measure the power delivered to the substation. From this bus are supplied, through the disconnecting switches and oil circuit breakers, a bank of three (500 kv.-a. each) oil-cooled transformers, 11,000 to 2300 volts, and a bank of three (110 kv.-a. each) oil-cooled transformers, 11,000 to 172 volts, all the transformers being of Allis-Chalmers manufacture.

secondary or 2300-volt lines from the transformers through suitable disconnecting switches and oil circuit breakers to a 2300-volt bus, from which taps are taken through disconnecting switches and oil circuit breakers to the lines, which extend to the hoists. Each hoist has its independent line and equipment.

The 172-volt transformers (noted above) are used to supply the alternating-current power to the rotary converter (Fig. 4). This is done by extending taps from transformers through disconnecting switches to three-pole, double-throw knife-switches, to the converter. The direct current is taken from the converter through a single-throw, single-pole knife-switch to a suitable carbon break circuit breaker to a 275-volt bus. From this bus a tap is taken through a carbon break circuit breaker to necessary switches to a feeder which extends down the shaft to furnish power to the haulage system, car hauls, transformers and so on.

The switchboard, which was furnished by the West-

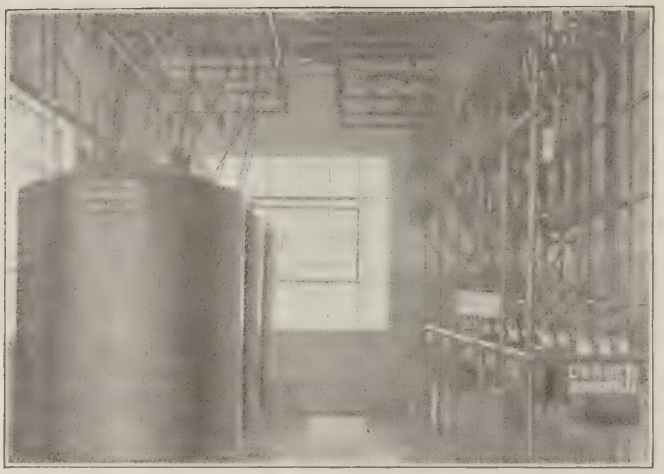


FIG. 3. THE TRANSFORMERS AND MODERN WIRING ARRANGEMENTS AT TAMAQUA SUBSTATION

inghouse Electric and Manufacturing Co., is made up in two sections—one of ten panels and the other of nine panels respectively. The nine-panel board is used to control panels Nos. 1 and 2, the two incoming lines; panels Nos. 3 and 4, the present bank of kilovolt-ampere transformers, 11,000-volt side and future bank of 500 kv.-a.; panels Nos. 5 and 6, control 2300-volt side of transformers; panel No. 7, controls power to water hoist; panel No. 8, controls power supply to a future coal hoist; and panel No. 9, controls power to the present tender hoist. There is a panel at the end of this nine-panel board which was installed by the power company, on which is mounted all metering equipment for measuring the power supplied to the substation.

The ten-panel switchboard is used to control panels Nos. 1 and 2, control 11,000-volt side of present rotary converter transformers and also future converter transformers; panel No. 3, controls the future high-tension side of 440-volt transformers; panels Nos. 4 and 5, to control future 440-volt equipment; panels Nos. 5 and 6, to control the 172-volt side of present and future rotary transformers as well as the alternating-current side of converters; panels Nos. 7 and 8, to control the direct-current side of present and future converters; and panels Nos. 9 and 10, to control the present direct-current feeder with the possibility of an additional feeder being installed at some future time.

In these substations, the copper tubing and pipe-frame mounting of equipment permit of open construction whereby everything is accessible. It is only the low-tension wires which run in fiber conduits in the floor. The electrical machinery and apparatus were furnished by the leading manufacturers in these lines.

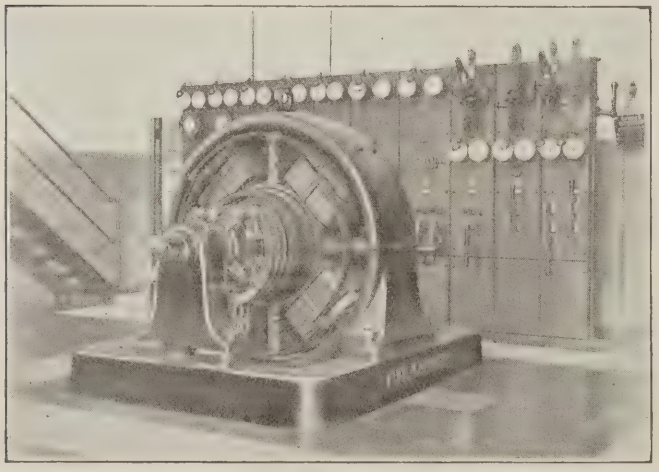


FIG. 4. ROTARY CONVERTER AND SWITCHBOARD AT TAMAQUA SUBSTATION

Direct-current rotary converters are used for supplying power for mine haulage, which includes 95 miles of trolley wire and 88 locomotives of various types and sizes. Alternating current is supplied to mine fans, pumps, hoists, air compressors and breaker machinery. Every breaker, pumping station, individual fan and hoist is metered so that information is obtainable as to the amount of power consumed by each individual class of equipment. All meters are read monthly and a close check is kept on the way power is used in haulage, pumping, ventilation and in the breakers. Thus the cost of power per ton of coal is distributed among the various items entering into the expense of production.

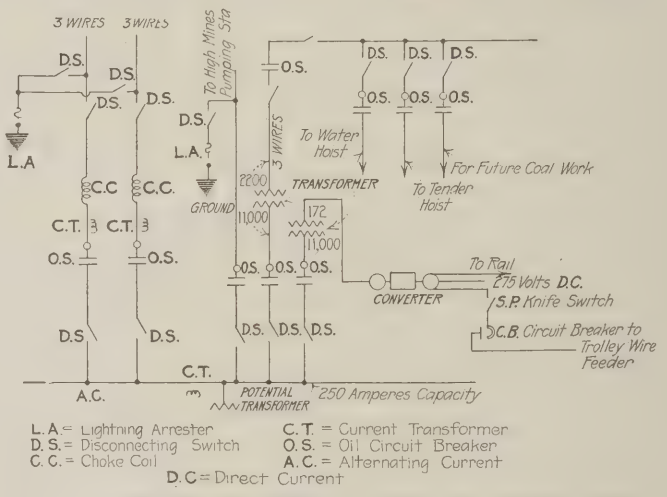


FIG. 5. WIRING DIAGRAM AT TAMAQUA SUBSTATION

When sufficient data have been secured to make the information reliable for reference under every condition likely to be met with in operation, valuable standards will be established. Leakage due to many causes encountered in practice then will be the more readily detected.

Gives $300,000 for Engineering Research

Ambrose Swasey, of Cleveland, Ohio, has recently given the Engineering Foundation an additional $100,000 for the endowment of engineering research. In 1915 he gave $200,000 for this purpose, so that his total gifts are now $300,000. Mr. Swasey's original gift made possible the establishment of the Engineering Foundation by the United Engineering Society, representing the American Society of Civil Engineers, American Institute of Mining Engineers, American Society of Mechanical Engineers and American Institute of Electrical Engineers.

Mr. Swasey is a past-president of the American Society of Mechanical Engineers and is well known as a designer and builder of large telescopes, other optical instruments and fine machine tools. His gifts have been inspired by his conviction as to the necessity for research in engineering sciences, in connection with the war, and in keeping the United States of America in the forefront of the nations in industrial development in the new peace era.

Research and Progress in Byproduct Coking in Great Britain—I

By J. B. C. KERSHAW
Colwyn Bay, Liverpool, England

SYNOPSIS—*The series of articles of which this is the first deals particularly with conditions in Great Britain. Much progress has been made, chiefly in heat control, but also in the recovery of various byproducts. Costs of byproduct recovery have likewise been somewhat reduced.*

AUG. 4, 1918, marked the entry of the European war upon its fifth year, and with no prospect of an early decision the demand for war materials and stores of all kinds is increasing month by month. Especially is this true in the case of explosives. For as the world struggle continues, the urgent call of the army and navy authorities in all countries engaged is for more and yet more explosives.

In an article published in *Coal Age* for Nov. 24, 1917, I gave a diagram showing the various products obtained in the byproduct coking industry, and the connection of this industry with the manufacture of explosives. Figures were also given showing the expansion of byproduct coking in the United Kingdom, in the years 1907 to 1915, the increase of the byproduct coke production during this period being from 18 to 50 per cent. of the total amount produced. The enormous demand for benzol and toluol for explosives manufacture has of course accelerated the movement in favor of byproduct coking both in the United States and the United Kingdom, and it is probable that over 60 per cent. of the coal coked in the latter country is now treated in byproduct ovens.

As regards America, the latest reliable figures show that the capacity of the byproduct coke ovens has doubled in the last three years, and that the output of light oils has increased from 7,500,000 gal. in 1914 to between 40,000,000 and 60,000,000 gal. in 1918, with a corresponding increase in the yield of toluol. The number of byproduct recovery ovens has increased from 6500 in 1915 to 12,000 in 1918 (when all the present building contracts are completed), and the carbonizing capacity of these ovens, which was 24,000,000 tons of coal per annum in 1915, is now said to be 60,000,000 tons.

In view of these striking figures proving the remarkably rapid growth of the byproduct coking industry, it is thought that some notes upon the recent work and progress in the United Kingdom may prove of value to American readers. American practice no doubt is ahead of English in the size of units and plants, in the use of mixed fuels, and in the higher temperatures employed in carbonization. On the other hand, English practice is superior to American in the completeness and more scientific control of the recovery processes. Coke-oven managers in each country therefore have something to learn from "over the water."

In the present series of articles the following subjects will be dealt with: Modern theories of the carbonization process; the path of the coke-oven gases; modern coking practice in the United Kingdom and a comparison of early and modern practice; tar distillation plant and its problems; benzol recovery and distillation plant; the utilization of waste gases from coke-ovens; the future development of the industry.

A paper read last year before the Western Section of the newly formed British Coke-Oven Managers' Association by D. V. Hollingsworth discussed at considerable length the results of the latest research work upon the constitution and composition of coal, and the occurrences in coke-ovens during carbonization. Since coking practice in the past, both in Britain and America, has suffered from being founded entirely upon empirical rules and principles, the paper is worth the attention of all coke-oven managers and engineers.

Summarizing the research work carried out in recent years in the United Kingdom by Aitkin, Bedson, Lomax and Wheeler, the author stated that:

> The microscopic work of Lomax, of Pendlebury, and Aitkin, of Glasgow, has clearly shown that the substance of coal may be divided into three main parts: (a) An opaque black substance (probably granular or amorphous). (b) A yellow or reddish substance (soluble in turpentine). (c) An earthy substance, like umber. These different parts are clearly distinguishable when coals are cut into very thin sections.
>
> Professor Bedson, of Newcastle, has demonstrated that it is possible to divide coals into three parts by the use of different solvents. It has been found that one portion of coal is completely insoluble in pyridine; another portion is soluble in pyridine, but not in chloroform: while a third portion is soluble in both pyridine and chloroform. It is considered that the substance insoluble in pyridine represents stable humic matter, produced through the destruction of the cellulose portion of vegetation, and that the part soluble in both pyridine and chloroform is of a resinous nature, and results from the decay of the natural resin, well known to exist in living vegetation.
>
> The report of the Home Office on "Coal-Dust Explosions" contains Wheeler's results of experiments on heating coal in various ways, whereby it is shown that coal contains at least two different classes of organic compounds, namely: (a) A part which breaks up at between 400 deg. and 700 deg. C., and yields principally paraffin hydrocarbons, but little hydrogen; and (b) a part which requires a temperature of above 700 deg. C. to effect its decomposition, and yields principally hydrogen.
>
> It would therefore seem that there is a definite connection between the results of these experimenters, which together establish the opinion that coal is composed of at least two different types of substances. Further, it has been established that it is the resinous portion of coal which produces its caking or fusing properties, because on carbonization it first breaks up to a pitchy residue, which causes the particles of true coke to become agglomerated together. This resinous matter is easily oxidized by exposure to air, and when oxidized the coal will no longer produce an adhesive coke.

The author then discussed the effects of heat upon coal, and pointed out that the rapid changes which occur

in the coke ovens are somewhat analogous to the slow changes which Nature has produced in the past, during the conversion of dead and decaying vegetation into coal.

It must not be supposed that under the influence of heat coal breaks down straight away to the products which are drawn from the oven. Intermediate products of different degrees of complexity are formed, which suffer further decomposition, or maybe themselves react with each other to form new compounds. Nor must it be inferred that there is any accident about the formation of these substances. Without doubt the reactions occurring in the oven during carbonization of coal are all in accordance with well-known laws, and it should be the duty of those in charge of such processes to learn what these laws are, in order the better to control them.

The influence of the iron impurities present in coal upon the coking results was next dealt with, and the reason for the advantages gained by the removal of pyrites and the addition of lime to the fuel were scientifically explained. The effects of increased temperature upon the yields of gas, light oils and pitch, and of moisture upon the yield of ammonia, were also examined, and the figures contained in Tables I and II were given to illustrate this portion of the paper.

TABLE I. INFLUENCE OF TEMPERATURE UPON YIELDS OF GAS, LIGHT OILS AND PITCH (HOLLINGSWORTH)

Temperature, Deg. C.	Gas Made, Cu.Ft. per Ton	Light Oils from Tar, per Cent	Pitch from Tar, per Cent.
500	6,600	19.67	28.89
600	7,200	16.51	33.80
700	8,900	8.20	41.80
900	10,162	0.445	64.08

TABLE II. INFLUENCE OF TEMPERATURE UPON YIELD OF AMMONIA (HOLLINGSWORTH)

Temperature, Deg. C.	Nitrogen in Coke	Nitrogen as Ammonia	Nitrogen in Gas	Nitogen in Tar, Etc.
600	72.4	10.6	5.13	11.87
700	70.1	19.6	7.98	2.32
800	65.2	21.7	9.43	3.67
900	62.1	20.8	15.61	1.49

The paper concludes with some practical suggestions, and as these represent a combination of advanced English theory and practice, they may well be summarized:

1. The sulphur and ash in the fuel charged should be reduced to the lowest possible percentage, by careful picking and scientific control of the washing plant.

2. The moisture permitted to remain in the coal, after washing, should be as near 9 per cent. as possible.

3. The temperatures of the ovens should be raised or lowered *en masse*, and not individually; tampering with the heats as between one shift and another should not be permitted, and the effect of darkness in rendering more conspicuous the heat of the flues should be discounted.

4. The damper should not be adjusted by anyone save the plant manager, and the two extremes of damper position should be avoided. A too high damper means "loss" of heat in the chimney; a too low damper "smothering" the heat in the flues. The lowest damper position consistent with a clear atmosphere in the flues is the one to be aimed at, and a sufficiently well spread-out flame to prevent local heating of the ovens should be obtained.

5. The ovens should be filled with even level charges, and there should be no "humps" on the bench side of the compressed charge. A "make up" car of slack should never be omitted, as the vacant space caused by the falling of the front end of the cake leads to thermal decomposition of the evolved gases.

6. The ovens should be discharged in regular order, and to insure this regularity a chart should be devised allowing the maximum time between the discharge of adjacent ovens.

As regards the speed of the removal of the gaseous products, the author stated that this was one of the most important features of good management, and one that ought always to be under perfect control. He recommended therefore:

1. Regular and proper cooling of the gases, whereby the exhausters have a uniform bulk of gas to deal with.

2. Keeping thoroughly clean the ascension pipes and mains, and especially the valves. This last is insured by the use of a chart, indicating when valves were last dismantled and cleaned.

3. The use of properly acting main governors.

4. Proper leveling of the charge to prevent back pressure.

5. Keeping such a vacuum in the mains as will leave only slight pressure on the oven when at its maximum output.

Finally, he urged that for the more efficient and scientific control of the coking process some means of measuring the volume and testing the thermal value of the evolved gas was necessary; and for this purpose he recommended the installation of meters and recording gas calorimeters. With this combination of apparatus, the coke-oven manager would be warned at once when any departure from normal working had occurred, and he could then take whatever steps were necessary to restore the conditions that had been temporarily upset.

Another contribution to the theory of carbonization that is worthy the attention of American coke-oven managers is an article by G. E. Foxwell, which appeared in *The Gas World* of Dec. 1. 1917. In this the author cites experiments carried out by himself to prove that in coke ovens the path of travel of the evolved gases is not, as generally assumed, up the interior or center of the mass of half-coked fuel, but is up the outside of the charge. The gases therefore must come into intimate contact with the heated coke and with the walls of the oven; and as it is proved that heated brickwork has a catalytic action upon gases, and is therefore more effective in producing decomposition than radiant heat, the greater number of secondary reactions will occur in this outer area of the oven. The following paragraphs contain the gist of this important article:

The actual temperature at which a coal decomposes—that is, at which the primary products of distillation are evolved—is probably nearly the same (within narrow limits) for all coals and in all ovens. Differences in yield due to varying oven temperatures are simply caused by the different temperatures at which the gaseous products are "fixed." This "fixing" consists essentially in setting up a condition of equilibrium between the various gases present, and is brought about by contact with the red-hot coke and oven walls. There is probably an optimum temperature for the formation of each particular byproduct, and it is only by a careful experimental study of the reactions taking place in the coke oven that any real light can be thrown on the matter.

These considerations open the way to a further wide field for research. The writer has shown that the products of distillation come in contact with the oven walls, and that hence the temperature to which they are subjected is under control. It has been mentioned that heated firebrick exerts a catalytic influence on the gases evolved. It follows, therefore, that if found advantageous the catalytic influence

may also be brought under control. Thus there may be found to be a radical difference between the products formed and yields obtained when the walls are made of silica bricks, as compared with those obtained with fire-clay bricks. Again, lime-bound silica bricks may give results which differ from clay-bound silica bricks. Bauxite, magnesite, etc., are all worthy of trial. Further, by treating the bricks with small quantities of the rarer oxides, metals, etc., the ammonia yield may be increased and the character of the tar modified.

It may also be noted that this has an influence on the salt problem, for since most of the gases come in contact with the wall of the coke oven, practically the whole of the salt volatilized during the coking of the coal will also come in contact with the walls. On this theory it is readily understandable why such a relatively small amount of salt is able to cause so much corrosion.

Modern Coking Practice in England, and a Comparison of Modern and Early Methods

The coke-oven byproduct plant erected at Marley Hill, County Durham, for John Bowes & Co. is typical of the modern English coking plant, and may therefore be described before contrasting modern with early methods. The plant is supplied with coal from the surrounding collieries in a fine state of subdivision (95 per cent. of the deliveries passing through a ½-in. screen and 60 per cent. through a ¼-in. screen) and containing 15 per cent. dirt.

The coal as received is first passed through a Blackett washery, by which the dirt content is reduced to about 3 per cent., and the washed and drained coal is then compressed and charged into the ovens in the usual manner. The coke produced is of average quality and contains about 8 per cent. ash. The gas is conveyed from the ovens by cast-iron pipes and is passed through air and water coolers, and the tar removed before passing through the exhausters.

The compression it here receives raises the temperature, and the gas is passed through another cooling tower before reaching the scrubbers which remove ammonia and benzol. A portion of the scrubbed gas is of course used for heating the ovens, but the surplus gas and waste heat is employed to generate steam, which is used in the coking and byproduct plants and also for operating a 600-kw. turbo-generator, by aid of which all the mechanical work of the coking and recovery plant is carried out.

The ammoniacal liquor obtained from the first scrubbers is used to produce gray sulphate of ammonia by the Wilton process, or to produce a concentrated ammonia liquor of any desired strength by the Diamond process. The benzol recovered from the gas by the usual method of washing with creosote oil is treated in the special distillation portion of the recovery plant, and separated into 90 per cent. benzol, 90 per cent. toluol and 90 per cent. solvent naphtha.

The naphthalene is conveyed to the tar distillery and is treated with the tar produced from the coking plant in four pot-type tar stills, in order to separate the naphtha, creosote, naphthalene and anthracene from the residue of pitch. A sulphuric acid plant of the Moritz type is now being erected in order to complete this well-equipped byproduct coke-oven plant.

W. Diamond, who is the manager of this plant, is also chairman of the Northern Section of the Coke-Oven Managers' Association, and in a paper read before a recent meeting of the members he contrasted early and modern methods of coking in this district. The tar produced in gas manufacture 25 years ago, from the same coals used today, was quite different in character, both physically and chemically, being more fluid and richer in naphtha and phenols, while the pitch did not contain so much free carbon.

Today, the tar produced by the higher heats generally used consists chiefly of naphthalene, with a little anthracene oil and pitch. The higher temperatures also lead to some decomposition or cracking of the benzol and other light oils before they leave the retorts or ovens. Comparing the yields of ammonia, he had not noted so much difference between the results of the past and present. The coke produced, however, by the lower temperatures used for carbonizing in the past, was much larger in size, was tougher, and produced considerably less breeze. Summarizing these results we have the following contrast:

> To sum up all these results, we produced in the first case a coke having better physical properties, consequently we produced more benzol, more tar, and the same proportion of ammonia, but one-sixth less volume of gas. In order to produce the same quantities of these, our oven installations would require to be one-third larger. This would mean a considerably increased capital charge, while the only profit to compensate us would be on the benzol, tar and ammonia.
>
> There is one other drawback to low-temperature distillation, and that is in the quality of the benzol produced. It is common knowledge that when coal is distilled with lower temperatures large yields have been found and classified as benzols, but have turned out to contain considerable quantities of paraffins—so much so, that for some purposes the paraffins have spoiled the toluol to a certain extent, by making it most difficult, and not at all profitable, to manipulate chemically.

Another authority upon English coke-oven practice, G. Blake Walker, has recently contributed a paper to the Institute of Civil Engineers upon "Recent Developments in Byproduct Coking," which is worth attention. The author states that since his paper of 1900, a complete revolution has occurred in English coking practice and that no ovens of the beehive type are now being built. The three most noticeable improvements in modern plants are: (1) Better distribution and heating of the combustible gases, so as to insure a more equal temperature in all parts of the oven walls. (2) Separate supply of air for combustion to all the numerous burners. (3) "Direct" recovery of sulphate of ammonia.

After referring to the use of the surplus gas for various heat and power purposes, and to the great importance of the benzol, tar and ammonia since the war had cut off our supplies of German dyes, drugs and fertilizers, the author pointed out that the objects to which all recent improvements are directed are the following: (1) More intense and better equalization of heat in all parts of the oven walls, in order to burn off the charge more quickly and uniformly. (2) Equalization of the pressure of the gas between the ovens and the heating flues. (3) Reduction in the time of coking, whereby a larger output of surplus gas, coke and byproducts is obtained from a given number of ovens, and reduction in the cost of coke making, etc. (4) Good means of inspection of the heating flues. (5) Facility of regulation. (6) Increased yield of ammonia and benzol. (7) Reduction of quantity of gas required for heating the ovens, by the use of regenerators.

The paper closes with an analysis and comparison of the costs of operating the direct, semi-direct and indirect processes of ammonia and benzol recovery, based on figures given in recent contributions by Christopher and Heck. Although these figures are drawn from entirely different sources and relate, the first set to English, and the second set to German practice, they show fairly concordant results which may be summarized as follows:

COMPARATIVE COST OF AMMONIA AND BENZOL RECOVERY BY VARIOUS SYSTEMS, IN PER CENT.

	Old System	Semi-Direct System	Direct System
English results	157	108	100
German results	131	114	100

The direct system of recovery is therefore far more economical than the old indirect or semi-direct system, but, as the author points out, the costs will differ in nearly every case, owing to local circumstances, the efficiency of operation of the plant, and the proportion of gas being treated.

(To be continued)

Diamond Drilling Near Chemainus, B. C.

New coal-mine development of an important character has commenced on Vancouver Island, British Columbia. The measures known to exist on the East Coast near the town of Chemainus are being explored by means of diamond drill, and those in the best position to hazard a forecast do not hesitate to predict that the results will be satisfactory as far as the quality and quantity of the coal, the existence of which is to be definitely established, is concerned. H. W. Treat, of Seattle, Wash., is the party best known in connection with these steps to develop this latent natural resource, but, according to newspaper statements and common report, he has behind him the capital of the Samuel Hill interests of the United States. If this is so it is generally believed that the coal industry of this section is likely, in the near future, to experience a very material growth.

The drills in question are being sunk near the foreshore at Chemainus, at which point Mr. Treat has secured some Provincial leases and options on some Crown Granted Lands. Incidentally, Mr. Treat, whose energies have been devoted to the Island for some months, has obtained options on other coal-bearing lands of the district. But in this particular section the drilling is being pushed forward expeditiously under the supervision of John Hamilton, who had charge of similar work for the Granby Consolidated Mining and Smelting Co. when that company was opening its coal mines at Cassidy's, Vancouver Island. The prospects for the establishment of another large colliery in this part of British Columbia, therefore, are bright, and residents are looking forward to it with gratification.

An account of what led up to the present situation is interesting. When the Esquimault & Nanaimo Railway Co. obtained its land grant as a subsidy for the construction of the road, the Dominion Government, besides giving it all the mineral rights within the limits of the belt with the exception of that of gold and silver, also gave it the right to mine "in and under the seas." The Government, however, was doubtful, apparently, as to whether it had the power to extend any such exclusive privilege to any company or individual. For that reason, the qualification was inserted that this applied only if Parliament had the authority necessary under the British North America Act.

This was the position when Mr. Treat and his associates cast their eyes on the East Coast foreshores of Vancouver Island and visualized the immense deposits of coal which lay beneath the protected waters of its bays and estuaries. With the demand for coal the world over increasing, and the price soaring, it was decided that the point as to whether these rights were open or whether they were the exclusive property of any one company by virtue of Act of Parliament should be brought to an issue. As was anticipated, no doubt, the plans of Mr. Treat had not proceeded far before legal proceedings were instituted, and since then, up to a short time ago, the matter has been before the courts of the land.

The result, as may be judged by the fact that development operations are proceeding, was that the position that the Esquimault & Nanaimo Railway Co. cannot claim exclusive foreshore privileges has been upheld, although it is not improbable that the litigation will be carried as far as the Privy Council, as the dispute is one of the highest importance, involving title, if the opinion of geologists is to be given any credence, to considerable coal deposits. It is possible to get some idea of the coal wealth of the foreshores of the east coast of Vancouver Island, from Cowichan Bay to Nanaimo, a distance of between forty and fifty miles, and even further north, by contemplating the property of the Canadian Western Fuel Co. at Nanaimo, and its production. This company's chief output comes from No. 1 Mine, and its workings are under water. It acquired title to this, before the railway company got its land grant, from the Hudson's Bay Co., which, of course, was the pioneer in the opening up of Western Canada, as it was in the exploitation of the natural wealth of the whole of the Dominion of Canada.

Ventilation After Mine Explosion

In the event of the ventilating fan or appliances having been injured, wrecked, or destroyed by the force of an explosion immediate attention should be given to the repairs necessary for reëstablishing the ventilating current. In a drift or slope mine, advantage should be taken of any natural ventilation that has become established. In a shaft mine advantage should be taken of any natural ventilation in exploring on the intake current, especially on ladders and stairways in any shaft through which such natural ventilation is supplying fresh air. Men may be found alive on the stairways. To aid natural ventilation or to establish a current of air in the absence of such ventilation, a spray of water may be directed down one of the shafts to cool the air and cause the shaft to become an intake. On the upcast air compartment a steam jet may be installed to heat the air. The jet should always be placed in the compartment of the shaft in which there are steam pipes, as the heat from the pipes will assist in warming the air and help to make an uptake current.—*Rescue and Recovery Operations in Mines.*

Increasing Coal Mine Efficiency—IV

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SYNOPSIS—*This article is devoted to the efficient electrification of a coal mine using purchased power. In many cases, aside from securing current at a less cost per unit than that for which it can be generated, purchasing current has the advantage of putting its cost visibly on the cost sheet. Care exercised in changing over from one source of energy to the other is care well spent, as many economies can usually be made.*

WHILE central station power is not available at the present time in many coal fields except through increasing the demands on stations already connected up, there are other coal fields where there is a considerable surplus of capacity. In either case I believe that the following description will be of some value. It may offer suggestions to mines now fairly well equipped. It should certainly prove timely to operations that are increasing their equipment or electrifying new developments.

Considerably over half of the coal produced today is mined with the aid of purchased power. Take the Pocahontas fields of West Virginia, for example. The Appalachian Power Co. began to cover this field with its transmission system in 1911. Today half of the coal of the field is mined with power from this source: another 20 per cent. is mined with power generated in the central station of the United States Coal and Coke Co.



FIG. 25. TYPE OF TRANSFORMER STRUCTURE EMPLOYED



FIG. 26. ROTARY CONVERTER IN UNDERGROUND SUBSTATION

The remaining 30 per cent. is mined with the aid of isolated plants, nearly all of which were installed prior to the development of the system of the Appalachian Power Company.

The considerations in favor of purchased as against manufactured power may be briefly stated as follows: The elimination of the supervision necessary to properly operate and maintain a power station; elimination of skilled and semi-skilled labor, such as engineers and firemen, and the conservation of fuel attendant upon purchased power. A series of tests in the Pocahontas coal field (and these tests represent a pretty fair average) show that 11.6 lb. of coal are consumed for each kilowatt-hour generated. A central station making power in that field will operate at about 2½ lb. of coal per kilowatt-hour. A saving of approximately 9 lb. of coal for each kilowatt-hour used, or an average of 9.1 lb. of coal for each ton mined is thus possible.

In the anthracite fields of Pennsylvania, the estimate of coal consumed per kilowatt-hour is 16 to 17 lb. In this case, and for the purpose of the estimate, steam used for fan drive, pumps, etc., has been converted into the electrical unit. In fact, it is estimated in the anthracite field that a production of 90,000,000 tons of coal represents at least 9 000,000 tons of coal burned to produce power for this tonnage output. Central station electrification of this field would mean a saving of approximately 8,000,000 tons as now required in the production of energy for mining.

A summary of comparison made in the Pocahontas coal field shows 3 kw.-hr. consumed per ton of coal produced for purchased power and 5.8 kw.-hr. consumption per ton for manufactured power. This saving is the result of the elimination of line losses through placing the converting stations at the load center, by utilizing two-speed fan motors and by the practice of economy which invariably follows where the direct relationship between power consumption and monthly cost can be observed.

With purchased power it is possible to use alternating current motors for nearly all stationary-motor

work. These motors are extremely reliable, and they require little or no attention except occasional oiling of the bearings. They represent the ideal stationary motor for the mine, being as nearly foolproof in construction as it is possible to build. As a rule purchased power is less costly than manufactured power. This, however, is not always the case. There are numerous varying factors governing this consideration.

Before going into a description of a specific installation it should be stated that it was the intention of the mine owner, the engineer and of the power company to spare no reasonable expense in order to make this installation efficient. I will first give a general description of the layout of the plant before purchasing power, and then show just what methods were adopted for the use of purchased energy.

The main power plant consisted of two 150-kw., 275-volt, direct-current General Electric generators direct connected to Harrisburg slide valve engines. From the main power plant distributing lines were run out at 250 volts direct current, to supply the mine, fan, tipple, pumps, shops, lights and miscellaneous power used. The greatest distance from the power plant to the back of the lease was approximately 3 miles. This necessitated the use of heavy copper extending into the mine 2½ miles. Even then the voltage on the 250-volt circuit well back in the mine was as low as 150 volts with heavy pulling.

The fan was located at the drift mouth, 1500 yd. from the main power plant and was supplied over a 2/0 circuit. The voltage delivered at the fan motor was as low as 200 when the load was pulling heavy. The fan was driven by a 75-kw. Westinghouse direct-current generator running as a motor.

The tipple was driven by ten motors aggregating 335 hp., varying in size from 75 hp. to 7½ hp. and controlled from three different points on different landings. As all of this apparatus was operated by one man it was necessary for him to go from place to place in starting up the tipple and to climb up and down many steps. All wiring was of the open type run on knobs and through tubes, while in many cases it lay on steel girders. Tests were made on each motor separately in order to see if any power demand could be eliminated. While these tests showed that in several cases machines were over-horsepowered, still it was deemed advisable on account of the cold weather conditions not to change

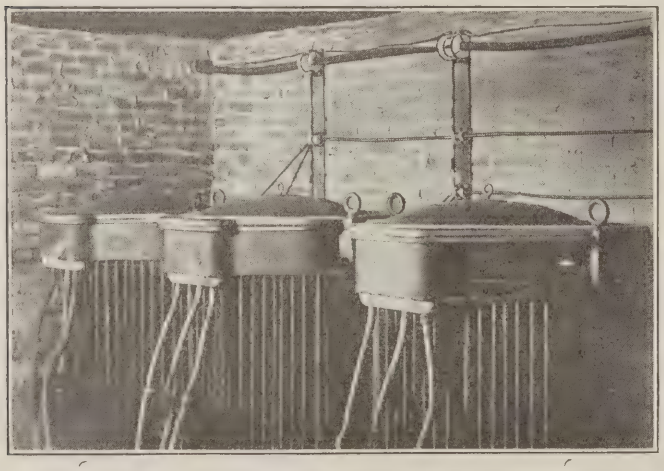


FIG. 27. TRANSFORMERS EMPLOYED UNDERGROUND

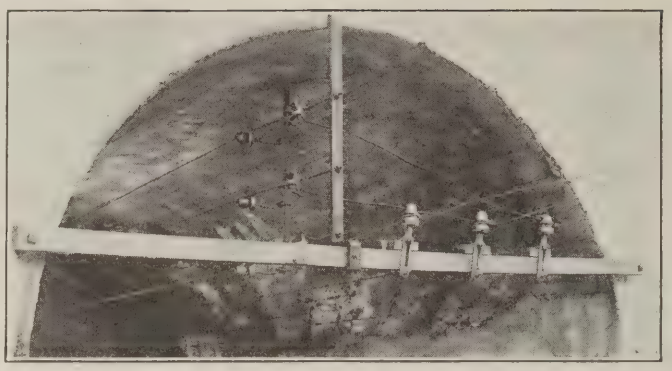


FIG. 28. METHOD OF SUSPENDING ELECTRIC LINE IN THE AIR COURSE

any of the sizes of the motors. The lowest potential recorded during this test was 200 volts. The tipple was fed by two 4/0 circuits.

The deep well pump was driven by a 10-hp., 250-volt, direct-current motor and was supplied from the circuit feeding the tipple, being about 100 ft. therefrom. The speed of this motor was varied by means of resistance, and in this way it was possible to pump just enough water to meet the requirements, without continually overflowing the tanks.

The machine shop was driven by a 10-hp., 250-volt, direct-current motor driving line shafting from which the various machines such as air compressor, lathe, drill press, boring machine and the like, were driven.

The lights were fed from a three-wire circuit, controlled by three single-pole knife switches, using the middle wire as a common return for the two outside wires, and maintaining a day and night circuit. Thus, by pulling one of the outside switches, the night circuit could be killed, or, vice versa, the day circuit could be switched on. All miscellaneous power such as refrigerator, motor for store, general manager's house meat choppers, etc., were supplied from the day circuit.

New Equipment for Purchased Power

I will now give a brief description of the general layout adopted. As shown at the beginning, the losses were considerable by the time the current reached to the most remote point in the mine from the main power plant. In order to keep the losses at a minimum, it was decided that two substations should be installed, one in the existing power plant and one inside the mine. A description of each is given separately under "Outside Substation" and "Inside Substation," later on in this article. In order to meet the situation most effectively it was decided to adopt two different voltages—that is, to install two banks of transformers. The type of transformer structures used is shown in Fig. 25. In describing the transformer stations I will designate them as bank No. 1 and bank No. 2.

Bank No. 1 consists of three, 100-kv.-a. 13,200/440-volt transformers located approximately 50 ft. from the tipple. From the secondary buses of these transformers a three-phase, 440-volt line runs to a main feeder panel in the tipple, and three of the two-circuit 4/0 feeder wires leading from the main power plant to the tipple were converted into a three-phase, 440-volt circuit leading to the outside substation located in the main power plant. The current is measured on the secondary side of the transformers, the coal company having a check

meter installed, as well as a meter on tipple circuit and pump, outside substation and lights and shop, thereby giving a correct proportion of the power chargeable to each installation.

Bank No. 2 consists of three 75 kv.-a., 13,200/2300-volt transformers located at the drift mouth. From the secondary buses of these transformers a 2300-volt, three-phase line runs into the fanhouse, tapping a three-phase bus, from which a circuit is fed through 2300-volt disconnecting switches to the fan and through 2300-volt disconnecting switches and a 2300-volt time-limit, overload, no-voltage release oil switch to the line running to the inside substation. The current is measured from buses in the fanhouse, the coal company having a check meter, as well as a meter on the fan circuit.

Outside Substation—The outside substation consists of a 150-kw., 250-volt, direct-current, six-phase, 1200-r.p.m., Westinghouse rotary converter with three single-phase transformers from 440 to rotary voltage, and a switchboard containing all necessary starting and control apparatus, also one automatic reclosing direct-current circuit breaker, thereby eliminating a constant attendant in the substation. In addition to the direct-current feeder for the mine circuit, there is a separate direct-current feeder for the larry circuit and boom hoist located in the tipple and controlled through circuit breakers and single-pole knife switches. A direct-current meter was installed on the larry circuit showing the kilowatt-hour consumption of the larry.

Description of Inside Substation

Inside Substation—Before describing the electrical apparatus for the inside substation, I should like to give a brief description of the location and character of the room built to house the necessary apparatus. After having selected the space for this substation, which was in a breakthrough between air course and main entry, it was necessary to remove a considerable amount of coal and slate in order to get sufficient space for the installation.

The apparatus is installed with a view to being able to move any part without interfering with any other. For instance, it is possible to move the rotary, switchboard or any of the transformers without conflicting with either of the other two. The walls are built of brick, being as thick as the width of a brick on the side walls and the length of a brick on end walls. Next to the main entry a double door of sufficient size was installed to enable removal or replacement of any of the apparatus, and a single door opens into the breakthrough leading into the air course. By means of ventilators located in both doors, it is possible to regulate the amount of air flowing, and in this way the substation is kept cool at all times. From the roof the slate was taken down as far as the sandstone top, and left in this condition. This has thus far given satisfaction, and from all appearances will continue to do so.

The apparatus for this substation consists of a 150-kw., 250-volt, direct-current, six-phase, 1200-r.p.m., General Electric rotary converter, with three single-phase transformers stepping the voltage down from 2300 to rotary voltage and a switchboard containing all necessary starting and control apparatus, also one automatic reclosing direct-current circuit breaker. The inside substation apparatus is shown in Figs. 26 and 27.

When it was decided to install this substation in the mine, estimates were made in order to ascertain if it would be more feasible to put a borehole down through the mountain or run a line through the air course. It was finally decided to adopt the latter. Accordingly a three-phase, 2300-volt line was constructed and run through the air course. The type of construction is shown in Fig. 28. Some anxiety was felt as to how this line would hold up on account of slate falls, but a careful inspection of the air course was made and all loose slate or any that was thought likely to fall was taken down.

This line has been in operation now practically a year and there have been only two interruptions; and these were not of a serious nature. The oil switch located in the fanhouse kicked out, but when closed again the line showed clear. It is therefore believed that small pieces of slate fell, causing a momentary short-circuit. The

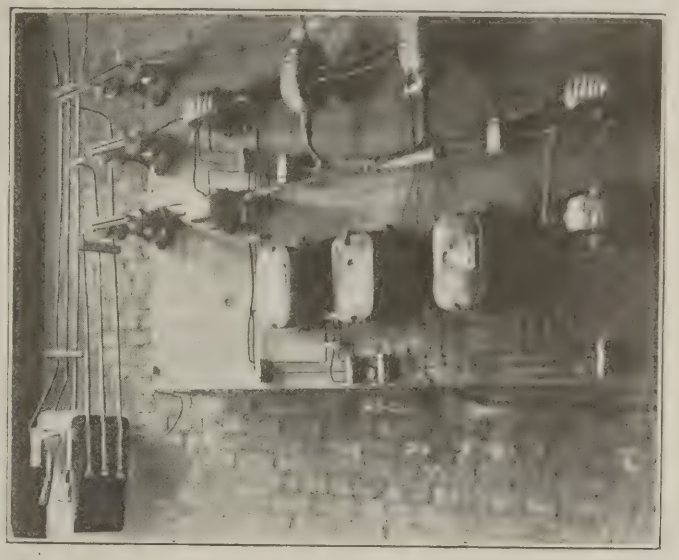


FIG. 29. OIL AND DISCONNECTING SWITCHES IN THE FAN HOUSE

oil switch located in the fanhouse, with disconnecting switches and other apparatus, is shown in Fig. 29.

In place of the 75-kw. generator operating the fan a 100-hp., two-speed, 2300-volt Allis-Chalmers induction motor was installed together with a starting compensator, pole-changing switch, and two sets of overload and no voltage releases, these being of the two-coil type, one to operate on high speed and one to operate on low speed, thereby guaranteeing safety from overloads on both operations. As stated before, there is a separate meter on the fan circuit showing the exact kilowatt-hours chargeable to ventilation.

Special attention is called to the method of control adopted for the tipple. This is shown in Fig. 30. The operator, a one-armed man, has all of his control apparatus located at one central point and arranged so that he can start each machine in its proper order. All wires for the tipple motors were figured and installed of sufficient capacity so that the total drop from the secondary buses of the transformers to the motor would not exceed 5 per cent. All wiring was run in conduit with proper condulets installed on each outlet. Practically all motors were of the slip-ring type, thereby taking care of the heavy starting load, which was a source of nuisance with the direct-current motors, especially in cold weather.

A 10-hp., 440-volt, two-speed induction motor was installed to handle the pump load, thereby enabling a two-speed operation in order to meet the condition, as desired, for this service. A separate meter was installed on this circuit in order to obtain the amount of power chargeable to water supply. A 10-hp., 440-volt induction motor was installed in the shop, driving line shafting to which all operating machines were connected.

The three-wire, 250-volt, direct-current circuit was converted into a three-phase, 440-volt circuit, the two outside legs of this circuit being controlled through circuit breakers and the middle leg through a single-pole knife switch. From this three-phase circuit leading out of the substation 440/110-volt transformers were installed to take care of the lighting and miscellaneous power. These transformers were so located that no secondary lines from the transformers would exceed 500 ft. in length using No. 8 wire for secondaries. There are two single-phase meters installed back of the switchboard on the three-phase, 440-volt circuit for measuring the kilowatt-hours chargeable to lights aud miscellaneous power.

The accompanying figures for purchased power are based on actual records up to June of 1918. The figures for manufactured power are based on 1914 records, allowing for the increase of costs, as incident to present conditions. These figures show a reduction in power cost; also, a reduction in kilowatt-hours consumed. The mine fan, due to the delay in arrival of certain control parts, has never been operated at half speed.

Certain special considerations incident to the application of purchased power arise and require determination. Among these is the question of selection of motor-generator set or rotary converter. Within the last five or six years the 60-cycle rotary converter has been brought to a state of construction perfection where it is one of the most satisfactory and reliable pieces of

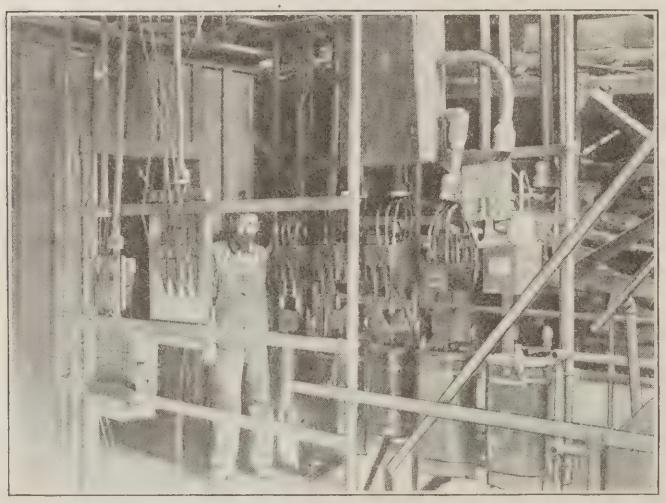


FIG. 30. GROUPED CONTROL APPARATUS IN THE TIPPLE

conversion equipment that can be obtained. This is true whether the case in question is one of operating a single-unit substation, the parallel operation of units in the same substation, or of parallel operation of two or more substations located at different points.

The rotary converter will carry a remarkably heavy overload without flashing. In fact it will readily carry from 100 to 200 per cent. overload on peaks of short duration such as are characteristic of the mine load. Moreover, the operating efficiency is much greater than that of the motor-generator set. Difference in efficiency becomes more pronounced when considered with respect to the low load factor which is characteristic of the mine load. Fig. 31 is designed to compare the efficiency of a 200-kw. motor-generator set with that of a 200-kw. rotary and of a 150-kw. rotary. This particular com-

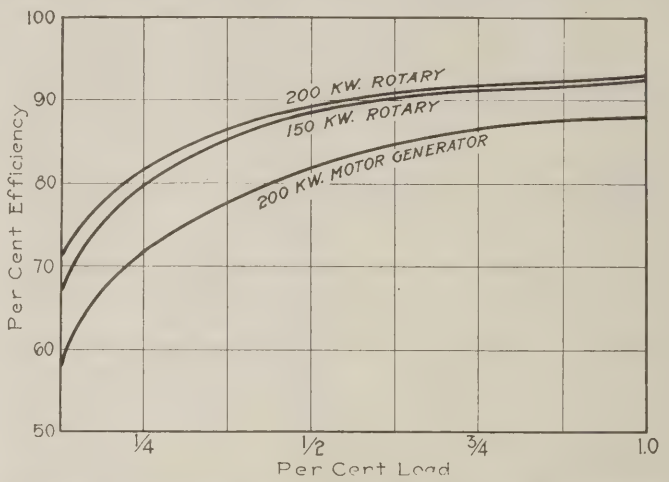


FIG. 31. COMPARATIVE EFFICIENCIES OF TWO ROTARIES AND MOTOR GENERATOR

parison was made for a mine which was using a motor-generator set, but increasing its substation capacity.

Based on the monthly output of the motor-generator set over a period of five months, it was determined that by the installation of a rotary converter and assuming a power cost of 1c. per kw.-hr., the 200-kw. rotary, if substituted, would save $628 per year. The changeover was made in the case referred to, although the motor-generator set had at the time been in opera-

MANUFACTURED POWER (COST)

Power Consumption, 859,209 Kw.-Hr.	Tons Mined, 215,457
Coal 2761 tons @ $2.40	$6,526.40
Engine repairs	807.00
Generator repairs	36.34
Boiler repairs	530.00
Sundry tools	79.74
Supplies from store	58.10
Cost for ash disposal	109.32
Fire insurance and workmen's compensation	420.20
Firemen and engineers	5,047.00
Repairs—labor	518.29
Total	$14,457.39
Superintendence	2,000.00
Depreciation	844.12
Total	$17,301.51
Cost per kw.-hr	$0.02013
Kw.-hr. per ton mined	4
Cost per ton mined	$0.08052

PURCHASED POWER (COST)

Tons mined	233,460
Purchased power (822,660 kw.-hr.)	$9,876.00
Repairs to substations	196.56
Supplies from store	19.92
Substation attendant	282.00
Fire insurance and workmen's compensation	125.28
Superintendence	2,160.00
Depreciation	844.08
Total	$13,503.84
Cost per kw.-hr	$0.01641
Kw.-hr. per ton mined	2.84
Cost per ton mined	$0.05660

tion through a period of about two years only. The results have been as anticipated.

Rotaries of the same rating as the motor-generator sets replaced have shown themselves to be of relatively greater capacity. Likewise they have shown equally as great reliability in service. I do not recommend the rotary under all circumstances; however, where the system from which the supply of power is obtained is a modern one, there is little or no exception.

(*To be concluded*)

Who's Who In Coal Mining

Charles E. Stuart

Efficiency is a product of spirit, mind and matter. While James B. Neale masters the spiritual forces of efficiency and production, he puts the two latter in the hands of his lieutenant, Charles E. Stuart, who, before his work is done, will give the operators many new ideas as to how they may avoid waste of effort and current, and who concurrently will deliver again preachments they have heard before, but which they have contrived to forget and let slide in the press of business.

Mine operators are of many types. Some having been bookkeepers are interested in the accounting department of the industry, others having been lawyers are absorbed in the legal matters connected with it, others having been salesmen regard coal as something



CHARLES E. STUART

to sell, others being practical men think of coal as something to be hustled. Charles Edward Stuart, member of the Production Committee, regards it as a material to be cut, hauled and handled mechanically and on the economic cutting, hauling and handling of it he has expended much constructive thought.

This view of the industry he is pressing on the operator. A mine owner without a mechanical bent will overlook the mechanical needs of his plant. When asked if he is losing power, he is likely to reply that what he does know is that a pump is needed in Fourth Right. He is apt to think he wants more plant when he needs merely to run what plant he has more efficiently. He evades his mechanical problems because he does not understand them and because they are not his hobby.

Mr. Stuart is on the committee to bring the mind of the operator who is not mechanically inclined gently but steadily back to those problems he has persistently and instinctively evaded. And Mr. Stuart, as our readers know from his articles on "Increasing Coal Mine Efficiency," now running in *Coal Age*, understands just where the operator without mechanical instincts is prone to slip up—or down.

Charles E. Stuart was born at Alexandria, Va., on Aug. 29, 1881, the son of Charles Edward and Ruth Yeaton Stuart. His father and maternal grandfather were both legal lights, the first being a judge in his home state, and the second, Gabriel Max DuVal, being a justice of the Supreme Court.

With all his inherited leaning toward the law, which appears somewhat in his general appearance, Mr. Stuart struck out on a new path and took engineering as his profession. He attended the Virginia Military Institute, graduating in 1901. He then took a student course with the Westinghouse Electric and Manufacturing Co., receiving from them a degree as Electrical Engineer and an experience such as only work in an electrical plant can afford. He stayed with the Westinghouse concern till 1911, charge of one of the sales offices having been committed to him. It was his work for several years to introduce Westinghouse equipment into mines in an area extending from West Virginia to Alabama.

After this extensive experience, in which he became well acquainted with mine machinery, the coal seams and the men operating both, he became leading partner of Stuart, James & Cooke, consulting engineers, and took an active part in the installation of coal-mining, steel and other industrial plants.

When Mark W. Potter, chairman of the Carolina, Clinchfield & Ohio R. R., sought some one to study coal- and freight-handling facilities and the coal-handling arrangements of ocean-going vessels, it was Mr. Stuart who was chosen as his representative, his investigations taking him to Europe.

The war converted Mr. Stuart into a government administrator. He gave up his consulting work to take charge of the Power Section, and later became a member of the Production Committee. In the great period of reconstruction which doubtless will soon confront us, Mr. Stuart will take a leading place. The plans of the after-war period will make previous plans look amazingly crude. We are going to need consulting engineers who can visualize for capital a new order, who can catch a glimpse of a more finely adjusted industrial commonwealth where waste and inefficiency will be banned, A man relatively young and with vision, Mr. Stuart will be among those who will start us on this new path of progress.

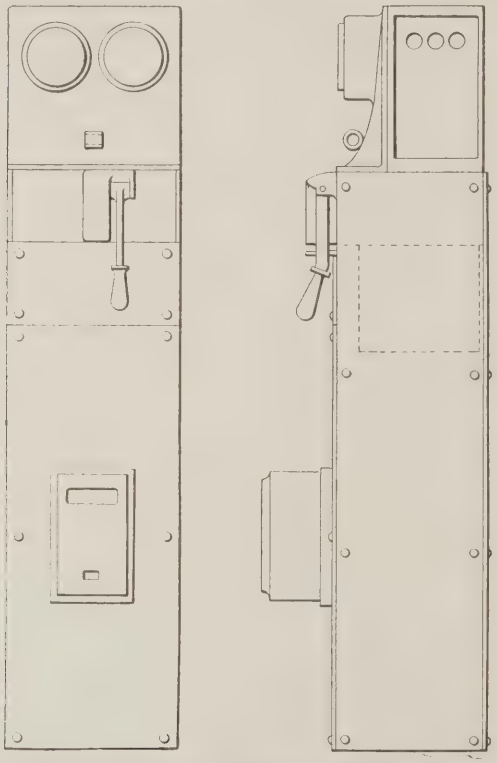
Deeper Mining in Years To Come

Deeper mining becomes necessary as upper anthracite coal beds become exhausted. Water constantly has to be removed from the mines and the quantity reaches, is some collieries, as much as 25 tons of water for each ton of coal mined, increasing as lower beds are worked. As mining proceeds, year after year, the deeper and thinner seams must be relied upon, necessitating the removal of larger quantities of rock and refuse to get at the coal. Also mining at greater depths naturally requires more expensive ventilation, and as the mine grows in extent the underground transportation becomes more and more expensive.

NEW APPARATUS AND EQUIPMENT

Safety-First Induction-Motor Pedestals

In most industrial operations safety and efficiency are so related that an improvement in one usually effects an improvement in the other. More and better work is produced when working conditions are pleasant and healthful, and comparative freedom from liability to occupational or accident disability exists. In connection with the requirements of safety the panel shown in the accompanying illustration is of considerable interest. It is adapted particularly to the control of alternating-



FRONT AND SIDE VIEWS OF PEDESTALS

current feeder or motor circuits in capacities up to the rating of 300 amp. and 2500 volts.

The unit consists of a Type FK-20 oil circuit breaker mounted on a pedestal constructed of steel plates and angle iron, the former holding the latter in position and serving as mountings for the apparatus in the interior of the pedestal. The compartment immediately beneath the breaker and surrounded by the steel plates is used for mounting the potential and current transformers. The space above the switch serves as a housing for the disconnecting switch, and also provides a location for either voltmeter or ammeter or both when desirable. Other instruments such as watthour meters, etc., may be mounted on the sheet-steel front of the panel. The back of the pedestal is also a steel plate, removable to allow access to the interior.

The voltmeter and ammeter are mounted on a cast base above the breaker, and with the front edges of the instruments flush with the casting. Back of the instruments in the interior of the housing are spring contacts which make contact with the instrument studs, so that after removing the holding screws the instruments can be taken from their support without disconnecting the leads. When the instruments are replaced, the connections to them are made automatically. The instrument resistances are mounted behind the instruments.

The watthour meter is mounted on the lower front of the pedestal. The studs run through insulating bushings to the interior where they are connected to the leads from the current and potential transformers, which are mounted on strap-iron supports connecting the angle-iron uprights. The regular drilling of the supports permits mounting either one or two current and potential transformers.

The FK-20 oil circuit breaker is operated in the usual manner by an iron handle from the front. Automatic protection is obtained by two series overload coils provided with dashpot time-limit trip. The oil circuit breaker can be operated only when the disconnecting switch is closed.

The disconnecting switch is operated from the front of the pedestal by a removable handle so interlocked with the oil circuit breaker that the disconnecting switch can be operated only when the breaker is open.

The breaker can thus be cut out of service at any time when open, and can be inspected or repaired without danger. The oil tank cannot be taken off the breaker nor can the cover over the disconnecting switch be removed unless this switch is open.

The disconnecting switch and the oil circuit breaker can both be locked open by removing the disconnecting switch handle. This handle can be removed or attached only when the disconnecting switch is open.

It is impossible to get at the live parts of the apparatus until portions of either the back or the front of the pedestal have been removed.

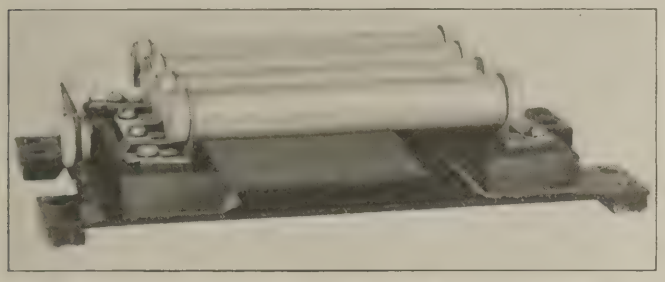
The panels occupy small space and are easy to install. Pedestal-type units are designed for single or group mounting and have a large bus compartment just above the disconnecting switch and inside the cast-iron housing. Connections run either to top or bottom of the pedestal, but as a rule the leads enter from the bottom as this is generally the more convenient arrangement. After being put in place the pedestals are secured by bolting to the floor.

Enameled Resistance Units for Current Regulation

Enameled resistance units for regulating current have been developed in various forms and sizes by the General Electric Co., of Schenectady, N. Y. Some of the applications to which these units have been put are railway and fire-alarm signals, fractional horsepower motors and locomotive headlights. They are also used extensively in series with relay, contactor and circuit-

breaker coils on panels and switchboards. They will be found particularly applicable in mines and similar places where a great amount of dampness and moisture is present. These units are unique in their ability to withstand unusually high temperatures as well as sudden changes in temperature from one extreme to the other.

The resistance wire or conductor is wound either upon a steel body coated with a special refractory



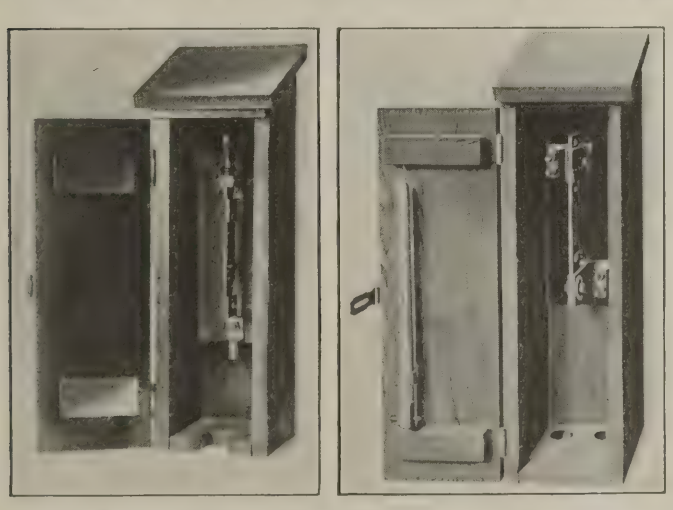
ENAMELED RESISTANCE UNITS

enamel or paint and high heat-resisting silicate compound developed to withstand sudden extreme temperature changes without cracking or weakening or in any way being injured. The steel body is preferred for extreme lengths where strength for a long span is required and is especially serviceable where the unit might be subjected to severe vibration or shock.

The refractory silicate body is used for most of the ordinary types of resistance. The compound employed is far superior to porcelain or any equivalent ceramic products which are easily cracked or weakened mechanically by repeated and extreme temperature fluctuations.

New Type of Line Switch

The accompanying illustration shows two types of line section switches of different capacities. The 750-volt switch is the one used for low voltages. It is provided with a wooden box so designed that when the switch is opened the handle drops into a slot in the



LINE SWITCHES AND THEIR INCLOSING BOXES

bottom of the box. This allows the door of the box to be closed and locked, thus making closure of the switch by unauthorized persons impossible. At the same time this exposes no live parts.

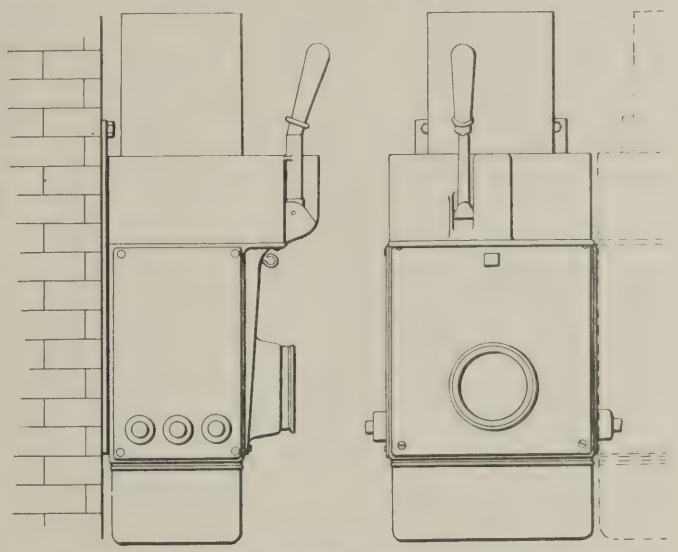
The other switch is a heavy-type service switch inclosed in a wooden box which can be locked. This switch is opened and closed by an insulated hook stick which is separate from the switch. Suitable attachments inside of the box hold the hook stick when not in use.

The smaller of these Westinghouse line switches are for potentials up to 750 volts and capacities of 200, 400 and 600 amp. The heavy switches are for voltages up to 1500 and capacities up to 1200 amperes.

Wall-Type Switching Unit

The wall-type switching unit here shown is manufactured by the General Electric Co. It is intended for the control of alternating-current circuits up to 300 amp. and 2500 volts. The unit consists of an industrial type oil circuit breaker with a space above which serves as a housing for a disconnecting switch, current and potential transformers and also provides a location for either voltmeter or ammeter, or both when desirable.

Following along the lines of safety, the disconnecting switch is interlocked, mechanically, with the oil circuit



FRONT AND SIDE VIEWS OF SWITCHING UNITS

breaker so that the switch cannot be opened when the breaker is closed, nor can the breaker be closed while the disconnecting switch is open. A key projecting through the front of the panel is used to operate the disconnecting switch. This key can be removed when the switch is open, and carried by the operator, who then is assured that no one will close the switch while he is working on either the line or apparatus on the circuit controlled by this unit. The interior of the switch compartment is inaccessible while the switch is closed, and the oil tank cannot be removed while the disconnecting switch or oil circuit breaker is alive.

These switching units are particularly adapted to the control of circuits feeding banks of transformers and motors, in places where it is desirable to mount the motor control appliances on walls or pillars. The units are self-contained and may be considered as "safety first" in every particular.

Wall-type units are designed for single or group mounting and have a large bus compartment just above the disconnecting switch and inside the cast-iron housing. Conduit connection with the unit can be made from above, below or from either side.

Paul Breathing Apparatus

The development of self-contained oxygen breathing apparatus has been coincident with the rapid growth of our industrial life. As mine entries have been extended and have penetrated to greater depths, the problem of rescue work has become one of vital interest. Strangely enough, however, it was not until 1907 that this important branch of the mining industry was taken cognizance of by the Government, in which year appropriations were granted by Congress to the technologic branch of the Geological Survey to purchase rescue apparatus and train men in its use.

Prior to this date two large mining companies, one in the anthracite field and one a metal-mining company in the West, had installed rescue apparatus on trial, recognizing the need of such equipment provided, of course, that it possessed the proper elements of safety and efficiency. All forms of apparatus of this nature purchased by the mining industry in 1907 and thereafter until the outbreak of the great European war in 1914 were of foreign manufacture.

Nevertheless, the United States was not lacking in a proper and careful consideration of this important subject, and experts in this line were giving thought to the subject, having in view not only the perfection of the then existing forms of breathing apparatus, but the desirability of establishing the industry in this country on a firm footing, independent of the uncertainties of importing conditions.

When in 1907 Dr. Holmes, the "father" of the present United States Bureau of Mines (then the technologic branch of the Geological Survey), selected his lieutenants, who were later to become experts in their respective fields, he chose James W. Paul to take charge of the mine rescue and lighting division and Clarence Hall to take charge of the explosives division. Both of these men, who have since become well known in the mining industry, were by training and experience particularly qualified for the work which they undertook. Mr. Paul, a graduate in mining engineering from the University of West Virginia, who later amplified his training at Columbia University in New York City, was selected to organize the mining department of the State of West Virginia. This department grew under his direction for 12 years, after which he gave up the work to devote his energies to governmental investigation work and particularly to the use and development of oxygen breathing apparatus.

Mr. Paul's work since then is too well known to call for more than the briefest outline here. It is sufficient to say that he has attended and taken direct charge of the rescue work at probably more mine disasters and fires than any other person. He has made two trips to Europe in behalf of the United States Government to investigate resuscitation and study rescue methods abroad. And finally, he has given extended thought to the apparatus under actual working conditions with a view to improving the design. The findings of this research appear in Technical Paper No. 82 of the United States Bureau of Mines, in the preparation of which Mr. Paul had the benefit of the advice of one of the leading physiologists of the country—Dr. Yandell Henderson of the Yale Medical School.

During the period while Mr. Paul was not connected with the work of the Bureau of Mines, and while he was affiliated with Mr. Hall, who had previously left the bureau's service, he took out patents on the details of construction of an oxygen breathing apparatus which incorporated the results of the thought which he alone was able to give to this subject. This apparatus, which bears Mr. Paul's name, is now for the first time ready for the inspection and use of the mining industry. It is another indication of the dominance which the United States is rapidly acquiring in the field of applied science.

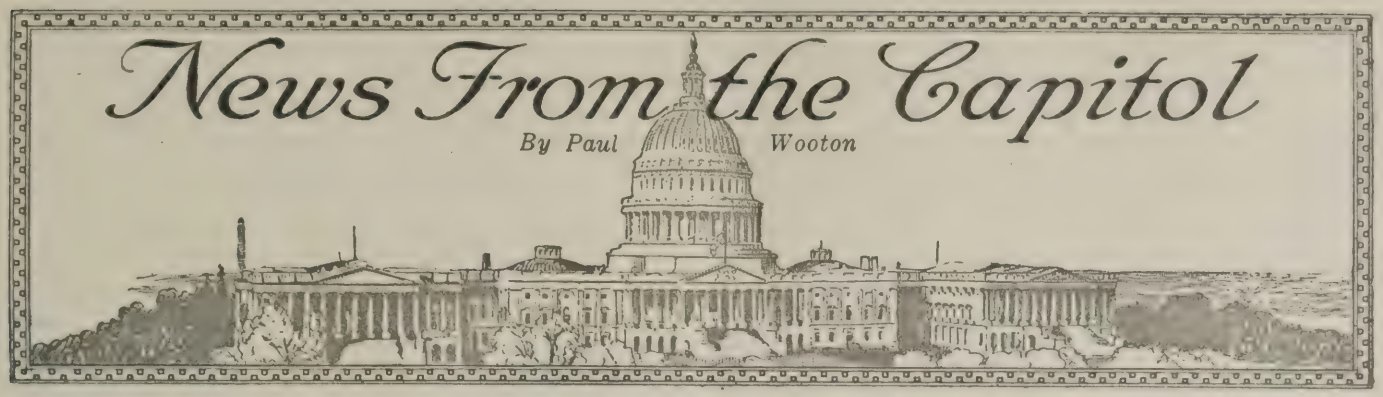
The Paul breathing apparatus, it is needless to say, has incorporated in its construction the requirements as set forth by Mr. Paul in Technical Paper No. 82. One of the highly essential and interesting features of this apparatus is the combination of the self-adjusting oxygen feed valve with the low pressure oxygen control valve in the intake of the circulatory system. Thus the operator during periods of violent exertion not only obtains from the apparatus all of the purified cool air that he can use, but a pressure well in excess of one centimeter of water column is maintained throughout the entire circulatory system.

A natural circulation is used in the Paul apparatus. The respired air passes direct from the mouth of the wearer to the regenerator, thence through the cooler and returns to the fresh-air bag, which is suspended on the chest of the wearer. Ample conduits throughout the system insure a minimum of resistance. The oxygen is fed directly into the bag as rapidly as required, and while there is always plenty to meet the most violent exertions of the wearer, it is at the same time conserved when he walks, works slowly or rests. The regenerator, or carbon-dioxide absorbing device, is of new construction and efficiently purifies the respired air to such an extent that during the full working period of a single charge, which varies from 3 to 12 hours depending upon the violence of the operator's exertion, not more than 1 per cent. of carbon dioxide ever passes into the inspired air conduits.

The Paul apparatus is well balanced. It fits the operator snugly and is easily and quickly adjusted. The conduits are carried at the left side of the wearer in a projected position, so that the right side and shoulders are entirely free for carrying forward the work in hand. Freedom of head movement is attained by amply long flexible tubes connecting the mouthpiece with the headgear and respiration chamber. The back part is hung low and is protected against damage by a metal cover. By means of a body strap the back part is held snugly against the body even while the operator is bending low.

The simplicity of construction of the apparatus with the few working parts provides an important element of safety. The pressure gage is carried in a pocket on the left shoulder and may be conveniently consulted. It is calibrated in atmospheres.

The mining industry of this country may justly feel gratified to know that American brains have accomplished so satisfactory a result as appears to have been attained in the new Paul breathing apparatus, and as it is to be manufactured exclusively in this country the uncertainties of importing conditions will not stand in the way of assuring the users of prompt delivery of the apparatus and parts.



Mines Producing Poor Coal Shut Down

The United States Fuel Administration during the week ended Oct. 28 issued orders to 13 coal mines prohibiting them from either shipping or mining any coal, making a total of 99 mines closed since the Administration inaugurated its clean-coal program. These orders were issued following reports from inspectors of the Administration which showed that either the coal from the mine was of such poor quality as to be useless, or the producers were not properly preparing the coal by cleaning it before shipment.

In the case of poor preparation by the operators, where the coal was found to be dirty and not usable, the companies were prohibited from shipping their output. The names of the operators affected by the orders are as follows: Kronnenwetter Coal Co., Benzinger Coal Co., M. Schieler & Son, Clemens Haberger, Erich Coal Co., Star Coal and Clay Co., Joseph A. Fritz, George Wolf, all of St. Marys, Penn.; McCullough Coal Co., Shanklin Coal Co., of Brockwayville, Penn.; the Liberty Coal Mining Co., of Madera, Penn.; J. H. Steele & Co., Kersey, Penn., and Walter Seidy, Black Lick, Penn.

Following the general policy of the Administration in not permitting any more than is possible of poor quality coal to be placed upon the market, the inspectors reported also 19 mines who were working veins with poor quality of coal in them, and these mines have been ordered to suspend operations from that portion of the mine. It has been the custom of the operators to mix this coal coming from poor quality veins with the coal from the veins of better quality, which does not conform to the policies of the Fuel Administration.

Offer of Coal to Holland Hurts Germany

Gratifying results of the international situation from the offer of the United States to supply Holland 100,000 tons of coal per month, if she requires it, already are in evidence according to information received by Harry A. Garfield, United States Fuel Administrator. Although all this coal may not actually be required, and possibly none of it will be called for, it has furnished an effective lever for the Dutch in their relations with the Germans.

Both Switzerland and Holland, it was stated, have been in vital need of coal, which at times the Entente Powers could not supply. When negotiations were afoot with Switzerland, the French, although already distressed for coal, united with the English in an offer of a far greater supply than that made at present by the United States to Holland. With this support the Swiss were immediately relieved from much German pressure and were able to negotiate with a free hand. They finally got most of their coal on a satisfactory basis from the Germans, and the French were actually called upon to furnish but little.

The plight of Holland was much worse, and the exports from Holland to Germany were considered of such moment that an offer of coal was made through the War Trade Board. Information reaching the Fuel Administration was that the Dutch, no longer afraid of being frozen this winter, are stiffening up in their negotiations, and our armies and the French in Northern France and Belgium are receiving supplies of fat which they need. The offer also has considerably affected German prestige, according to reports received, the Germans having insisted in their negotiations that America was utterly unable to furnish this coal.

Fuel Administration Engineer to Confer on Use of Illinois and Indiana Soft Coal

To further the educational campaign in Illinois, Indiana, Ohio, Michigan and Wisconsin, and to confer with the state administrators and local fuel officials on the use of Indiana and Illinois bituminous coal for domestic purposes, instead of anthracite and Pocahontas coal as heretofore, Thomas C. Mahady, domestic fuel engineer of the United States Fuel Administration, started Oct. 29 on a ten days' trip through those states. Meetings will be held at Chicago, Columbus, Milwaukee, Indianapolis and Detroit, and the best and most efficient means of using Indiana and Illinois soft coal in kitchen ranges and converting base-burner stoves to soft-coal heaters, with the most economic use of fuel, will be discussed.

Besides the change from anthracite to bituminous coal in the five states named, Mr. Mahady will confer with fuel officials on the problems of the distribution of local coal under the new zone system and the necessity for the extensive use of Indiana and Illinois bituminous. The conservation of water is another subject that will be discussed in the several gatherings of fuel officials.

The plan of the mayor of Highland Park, a suburb of Chicago, will be made the subject of an investigation by Mr. Mahady while at the latter place. When the order went out from the Fuel Administration at Washington that Indiana and Illinois soft coal must be used largely in place of anthracite, the mayor of Highland Park called in competent engineers and with their aid

worked out a plan to make every stove and heating apparatus quickly and cheaply adaptable for use of soft coal. Volunteer committees were then formed, printed instructions issued to every householder and personal instructions offered wherever it was necessary. Shortly thereafter the mayor sent out word that "Highland Park will use no anthracite or Pocahontas and everyone will be comfortable."

The success of the campaign, though purely local, attracted the attention of the Fuel Administration officials and Domestic Fuel Engineer Mahady was instructed to investigate it and make a report as to its practicability and possible use in other sections.

New Fuel Administrator for Virginia

R. H. Angell, of Roanoke, Va., has been appointed by Fuel Administrator Garfield to be Federal Fuel Administrator for Virginia, in the place of H. F. Byrd, who has entered the military service. Mr. Angell, who is a well-known banker and business man of Roanoke, was at the time of his appointment local fuel administrator at Roanoke.

No Eastern Coal for Western South America

The War Trade Board has been requested to stop issuing licenses for the export of eastern coal to the west coast of South America. The request is based on a desire to have the west coast of South America supplied with coal from the western states of the United States, leaving the high grade eastern coal for its important war uses.

Clubs May Use Certain Kinds of Coal

The United States Fuel Administration has issued an order authorizing each state fuel administrator to give country clubs the necessary permits to receive and burn, during the winter, bituminous or steam anthracite, whenever, in his opinion, there is a surplus of such fuel for this purpose. The authorization further states that under no condition should any country club be permitted to use domestic sizes of anthracite coal, either for cooking or heating purposes.

Coal Zone Permit Bureau Now Consolidated With Bureau of Statistics

The Coal Zone Permit Bureau of the Fuel Administration has been consolidated with the Bureau of Statistics. Wayne P. Ellis, the assistant director of the Bureau of Statistics, has been placed in charge of the permit activity, which will be known now as the Coal Zone Permit Section of the Bureau of Statistics. C. E. Lesher is the chief of the Bureau of Statistics. C. B. Nichols, who formerly had charge of the Coal Zone Permit Bureau, resigned to assist C. C. Marvel in by-product coke distribution.

Large Saving of Fuel in Merchant Marine

Due to the investigations of economies in combustion, which have been conducted for a number of years by Henry Kreisinger, of the Bureau of Mines, an important saving of fuel in the new merchant marine has been effected. Certain recommendations changing the design of the furnace of the boilers which are destined to run the emergency fleet make it possible for six tons of coal to do the work which formerly required seven. This accomplishment is heralded as the outcome of purely investigatory work which, when applied in practice, has shown immediate results.

New Prices for Alabama Coal

New prices have been authorized for coal mined by the West Helena Coal Co. in Alabama, as follows: run-of-mine, $3; prepared sizes, $3.30; slack or screenings, $2.65. Prices for coal mined by the Warrior Pratt Coal Co. have been fixed as follows: run-of-mine, $2.25; prepared sizes, $2.50; slack or screenings, $2. In each case, forty-five cents may be added if the terms of the Washington wage agreement are met.

Surplus Coal at the Mines

A surplus of coal at practically all mines west of Pittsburgh has been reported to the National Coal Association. While exact figures are not available, it is known that the surplus tonnage is very large. The condition is attributable largely to the possibility of an early peace. As long as an early peace is a possibility it is expected that certain classes of manufacturers will not keep their storage at the maximum limit. If, on the other hand, Germany should decline to accept the terms of the allied armistice, it is expected that the surplus will fade out very promptly.

Another influence which has contributed to the surplus is the exceptionally favorable weather which has prevailed throughout the country for the past month and more. November of last year was ushered in with unusually cold, bad weather which interfered very greatly with transportation.

No Soft Coal Shortage in New England

Continuance of good weather has made possible maximum deliveries of coal to New England where the storage is now sufficiently large to preclude any probability of a shortage in that section this winter. Some difficulty is being experienced with anthracite, but that is said to be due more to inequality of distribution than to shortage. There is still a very marked shortage of navy coal. Owing to the very strict inspection, upon which the Navy insists, a portion of the coal which was included in the estimates for the Navy requirements are not passing the test.

From incomplete statistics showing the coal saving made possible by the skip-stop method of operating street cars, the Fuel Administration estimates that a 10 per cent. saving of fuel is resulting.

Due to the successful results which have been obtained by the methods employed by James B. Neale in stimulating coal production, a similar plan is to be carried out with regard to coke. The work is to be under the direct supervision of W. S. Blauvelt.

The Fuel Administration announces that manufacturers of incandescent electric light bulbs, by agreeing to limit the production of lights having carbon filaments and substituting them with the more efficient metallic filament types, have made possible a saving of one million tons of coal annually.

THE LABOR SITUATION

General Labor Review

At last, Oct. 31, the final action by Fuel Administrator Garfield has put the new schedule for the anthracite region into operation. Just as legislation is passed by one House in Congress, approved by another House, signed by the President and interpreted by the local Federal Court and the Supreme Court, so now wage schedules are made by a commission of operators, miners and fuel administrators, approved by the conference of National Labor-Adjusting Agencies, signed by Dr. H. A. Garfield, the Federal Fuel Administrator, and interpreted by the courts of mine workers and foremen, of labor leaders and managers, by the Anthracite Conciliation Board or by the umpire of that board. The process is complicated in a degree, but that is necessary and therefore excusable.

The Fuel Administration in its Oct. 31 bulletin says as follows: Wages in various mines are not identical to the cent, and an absolute interpretation of the scale in dollars and cents as to every mine worker is therefore impossible. A memorandum was submitted to the Conference of National Labor Adjusting Agencies, as being fairly typical of the general situation. In some instances the wage increase received will be materially less, and in some instances materially more, than the tabulation shown below:

WAGES OF EMPLOYEES WORKING OUTSIDE THE MINE

Occupation	Base, Cents per Hour		Adjustment, Cents per Hour	Rate, Cents per Hour	
Blacksmith	.32	.35	.25	.57	.60
Carpenter	.32	.35	.25	.57	.60
Shaft engineers	.36	.40	.25	.61	.65
Firemen	.23	.28	.25	.48	.53
Machinery repairmen	.30	.32	.25	.55	.57
Laborers	.195	.235	.225	.42	.46

WAGES OF EMPLOYEES WORKING INSIDE THE MINE

	Base	Adjustment	Rate
Contract miners*	$5.63 per day	$1.00 per day	$6.63 per day
Contract laborers	26c. @ 40c., per hour	30 per cent. plus $1	$3.70 @ $5.16 per day
Consideration miners	40c. @ 45c., per hour	25 per cent., plus $1	$5 @ $5.50 per day
Company mines	32c. @ 35c. per hour	25c. per hour	57c. @ 60c. per hour
Inside laborers	26c. @ 29c. per hour	25c. per hour	51c. @ 54c. per hour

* Average per start, Aug. 18.

It may be added that the base mentioned is not the scale of Nov. 17, 1917, but the scale of May 5, 1916.

The increase, even before it was finally granted, awakened what might fairly be called the cupidity of the bituminous miners. The basis for the increase was the larger wages of the bituminous mine workers. It was acknowledged that there was a differential between the two wage scales which, under present conditions at least, was inexplicable. So the anthracite mine workers' wages were advanced. Now the bituminous miners assert that they should receive an equal advance. They have presented their demand to the labor-adjusting boards and to the Fuel Administrator. It has not been met with disdain; it has been met with sorrow. Patriotic men find it hard to conceive how any men proclaiming themselves patriots can, without having any basis for complaint, present at this time a demand for more wages.

The bituminous mine workers on Nov. 1 presented their protest to President Wilson saying that Dr. Garfield's refusal was arbitrary, autocratic and unfair. The telegram states that they (the bituminous mine workers) deeply resent the treatment accorded the spokesmen of the miners of the United States by the Federal Fuel Administrator Garfield.

In central Pennsylvania the mine workers have been greatly worked up over the fact that their tonnage has fallen because of the epidemic. Approximately 10,000 patriotic mine workers went into the mines on Sunday, Oct. 27 and loaded about 50,000 tons. The influenza has had a bad effect throughout the United States. In the week ending Oct. 26 only 11,215,000 tons of bituminous coal were mined, which is a decrease of 309,000 tons from the week before. The production of anthracite dropped to 1,714,000 tons, a fall of 17 per cent. from the output in the same week in the year before. Influenza is reducing production in Iowa, Missouri, eastern Arkansas, Oklahoma and Texas.

To return to the affairs of central Pennsylvania, an effort to increase production by promising a big banquet to the Westmoreland County mine which makes the greatest average increase in its coal production during November is worthy of record. The competition will be limited to those mines which produce 10,000 or more tons per month.

It is probable that the mine winning the dinner will also land the service flag for one month. This flag is to be awarded each month to the mine making the greatest actual increase in its output. A mine which wins and holds the flag during a series of months will be awarded permanent possession of the honor banner at the close of the coal-production campaign.

Chickasaw Averages $189.02 Per Worker

At the Allegheny River Mining Co.'s mine at Chickasaw, in Armstrong County, there are 205 names on the payroll. Every person on that roll has a Fourth Liberty Bond and the total subscription is $38,500 or $189.02 per person and about $1000 for every boy in France, for the town has furnished 39 valiant sons to the service. This is a splendid record of patriotic effort. As the quota through the United States, exclusive of New York, is $46.66 per person, earner and nonearner alike, it is clear that the record of the earners of the Chickasaw mines is high enough to place the whole village in a position of having done its full share.

From Williamson, W. Va., comes a remarkable report of performance regarding H. L. Witt, an employee of the Chattaroy Coal Co. Writing to us, O. O. Milby, the manager, says that he is very proud of Witt's record and feels it is worthy of publication. It certainly is. Witt, who is 35 years old, loaded, since Jan. 1, up to and including Oct. 23, 3164 two-ton cars or approximately 6828 tons of coal. He has purchased $4500 worth of Liberty Bonds, $100 in War Savings Stamps and he has contributed "very liberally to the Red Cross and other charities; the exact sum," says Mr. Milby, "we do not know." Mr. Witt is a ready and willing worker, very seldom missing a day when he is able to work.

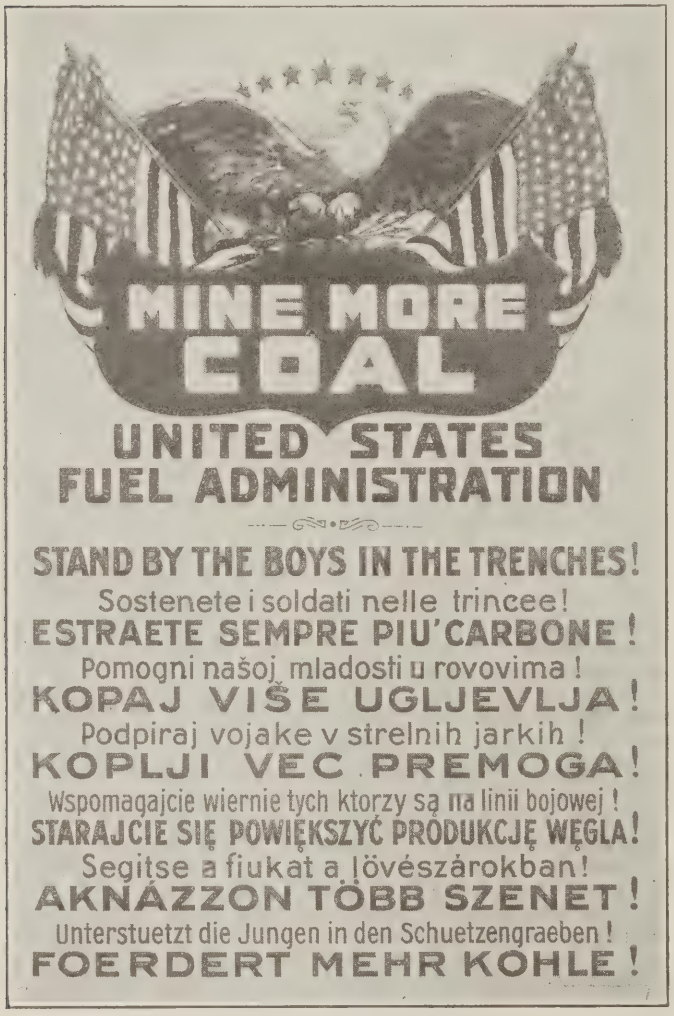
The miners in the Illinois fields adjacent to St. Louis have probably lost no time because of the influenza, for if there had been no epidemic the mines might have been shut down for lack of demand. The operators believe that the disease served to limit the output when a limit was advantageous.

In the Springfield district, the output of which goes mainly to the north and northwest, production of the 18 mines in the vicinity of Springfield and of the greater number of mines in the district is getting back to normal. A week ago three of the Springfield mines were closed, principally on account of the influenza. These were the Chicago-Springfield, the Woodside and the Jones & Adams. Now all of these are working. There is still some shortage of men, but probably that shortage will not exceed 300 men, and the resulting curtailment of production will not exceed 1800 tons a day.

David Wilson, member of the Miners' Executive Board in the Belleville District, says that the Baltimore & Ohio RR. and the Louisville & Nashville RR. have not been able to supply enough cars for the mines in their territory. Wilson and other leaders among the miners also complain

that repairs and machinery defects cause frequent shutdowns. The operators, on the other hand, say that the men are irregular in their work, and exhibit their payrolls to prove it. They say that the greatest loss in production is due to the failure of the railroads to furnish cars and that the next greatest loss is due to the laying off of the men to "blow in" their big earnings. At some of the mines the men, in order to escape the charge of laying off, ask for their time and quit and when they have spent their money they return to work. Because of the shortage of labor the operators have to put up with the practice.

The miners' organization of Belleville, Ill., has subscribed for $150,000 of Liberty Bonds. This is a part of the $500,000 which is to be subscribed by the state organization.



Many mine washhouses have been closed in order to prevent a spread of influenza. Special efforts are being made by Director Drake of the State Department of Health to prevent the occurrence of such conditions in the Illinois mines as have existed recently in those of Kentucky. Special representatives of the State and United States health organizations have been sent into all of the mining centers. A strict quarantine has been established at Roseclair. Reports are that the disease is subsiding in the northern part of the state. There has been some increase in the disease in the central and southern portions.

In Vancouver Island an excellent principle for some time in force in eastern British Columbia does not appear to have been operative. That principle was to increase wages with changes in the cost of living. As the prices of commodities rose the mine workers of Vancouver Island found themselves progressively impoverished, and they demanded an increase of $1 a day. With an inadequate inquiry, but with a desire to satisfy an inequity recognized as existing in the old contract, J. D. Bulger, Dominion fair-wage officer, and Nichol Thompson, British Columbia adviser to the Fuel Controller of the Dominion of Canada, offered an increase of 75c. per ton, which was accepted.

The final arrangements were made Oct. 24. The mine workers wanted an immediate readjustment, but the operators opposed this, saying that the increase in wages should go into force concurrently with a rise in price and that could not be arranged with the Fuel Controller till Nov. 1. The latter, therefore, was the date adopted.

Vancouver is to get a sliding scale of wages to accord with costs of living. Next January the first adjustment will be arranged but not made. The increase in wage will not go into effect till February. Meanwhile the public will know what to expect and will make arrangements accordingly. Every three months a commission consisting of the fair-wage officer and representatives of the operators and mine workers will appraise the cost of living, render a decision as to the increased wage which will countervail it and then the new scale will come into force one month thereafter.

After the War

By Josiah Keeley

General Manager, Cabin Creek Consolidated Coal Co.
Kayford, W. Va.

"Making the world safe for democracy" is now one of the world's best-known phrases. "Making democracy a safe thing for the world" is also in the minds of many, but it is an after-the-war consideration. However, we can not too soon begin to draft the policies of the reconstruction that may follow the war.

Two years ago, at least one large coal company expressed itself rather frankly as to the impropriety of a coal journal devoting a whole page, or even more, to "The Labor Situation." Many companies seemed to feel that they could avoid having any labor situation by not admitting publicly that any such thing existed. But during these same two years they have had little else to think about, and some of them have contributed materially to the establishment of the present labor situation.

The more violent labor agitators are fond of representing that labor is being "emancipated," hoping to force on the minds of the public an analogy between the condition of the negro and the status of the workingman. If we are to accept this viewpoint of the labor situation as true even in part, then, for the good of the country, we should seek to avoid some of the mistakes that were made in the freeing of the slaves.

If the Man of Galilee should at the present time preach to us the doctrine, "Render therefore unto Caesar the things that be Caesar's," the public might promptly answer that, if it was consulted, there was not going to be any Caesar. But this much-quoted Biblical doctrine has been held to teach not autocracy specifically, but the acknowledgment of constituted authority, democratic not less than autocratic; and, if this is the right interpretation, what we shall have to determine now or after the war is, what are the things that belong to Caesar.

Of course, there would be no special propriety in taking up space in a coal journal on so general a proposition, if it were not for the fact that the labor situation is a topic of growing importance in mining villages everywhere. Most other industries are located in the cities where they are policed more or less by the civil authorities, but the coal camps are isolated centers with little civil authority in evidence short of the county seats. They are consequently fertile fields for disorder Moreover, small places are so unified in their purposes and sentiments that a non-partisan administration of justice is not attainable; and, even if it were, it would be inadequate to cope with the pressure that a large camp of miners might be able to bring to bear on it.

While the growing strength of organized labor is not necessarily a menace, there are enough uninformed individuals who take the idea of an actual emancipation so literally that there is a question whether the more moderate workmen will be able to set any definite limit to what is a necessary authority, and as to what constitutes a reasonable demand from labor.

Those who express such a fear may be held to overlook the value of the discipline which an organization of indus-

trial workers can exercise when led by men properly vested with authority. But such leaders do not have matters all their own way. However wise they may be, disobedience is prevalent, and violations of contracts go unpunished. However moderate they may be makes little difference, when they are but the mouthpieces of "emancipated" laborers. Such considerations give us pause whenever we begin to show too great a confidence in the powers of control and the ripeness of judgment of the men in charge of the union.

After the war, these leaders will no longer be able to invoke war necessities as they can at the present critical time when our sons' lives are hostages for our good behavior. Every week we find that outbreaks against union orders are quelled only with the greatest difficulty. Whenever some real or fancied advantage is at stake, the loyalty of the mine workers to the nation as a whole is apt to give place to a loyalty to their immediate fellows or to some other "thing which nearer lies."

Some Contracts That We Also Have Scrapped

We are spilling the best blood of America to repudiate the nation which considers an agreement but a scrap of paper. Yet at the same time the unions are, by threatening strikes, tearing up wage contracts, which they themselves, and not their forbears, just as solemnly signed, only a few months ago. In the newly conceived democracy of labor, one hundred per cent. of loyalty to contract is the only thing to differentiate America from Russia. It matters not how loyal the organizations are if they lack responsibility. The English Dissenters, the French Jacobins, the Roman Plebeans, and the Russian Bolsheviki all had some good leaders, but not all of them were able to subdue the spirit which their magic had raised.

Why should we not devote space to our labor situation? It is a dangerous case when such a fear weighs on the public that it shrinks from discussing it. We all know that labor can out-vote and out-fight capital if ever it makes common cause against it and forgets for a while the services that an oppressed, but rightly regulated, capital can perform for the working man.

The present war is far from being a "rich man's war." It brings nothing to rich men but the opportunity for sacrifice and service. It is even more costly to the rich than to the working man, and it offers opportunities to labor which labor has not been slow to recognize. And certain kinds of labor feel that the advantages the war affords have not been cashed in as yet. The ultimate reckoning it feels will be completed only—"after the war."

"After the War" Will the Sky Be the Limit?

"Mother" Jones is touring the coal fields urging the production of coal and the buying of Liberty Bonds, but after every appeal she points to the goal to be reached "after the war." Germany's toast, "To the day," and Madam Defarge's laconic salutation to her Jacobin hosts, were never more significant than this labor slogan of "After the War." Not necessarily a challenge, not necessarily sinister, but embodying potentialities for a national calamity if not guided by sympathetic hands.

The extraordinary wartime wages, now enjoyed, appear to many labor enthusiasts as a direct victory secured by labor as a result of its presenting to capital an unbroken front. Not knowing exactly the things that are Caesar's, and having no way of telling just what the limit might be as to shortness of hours and size of wages, the national tendency is to make the sky the limit and let Caesar look out for himself. Since the Government, a hazy sort of something at Washington, has put forth a restraining but kindly hand and said, "Not now," why, of course, *after the war* must be the time.

With the publicity that has been given to production cost, and with a government selling price, there will not be much excuse if labor does not know what the operator is getting out of the coal business the next time an agreement for a wage scale is sought. The public will be informed, too, so the only question to be settled in the after-the-war working agreement is how much of the joint product of labor and capital rightfully belongs to each. The public has been assured repeatedly that after the war labor will get its "full share." Until that time comes and the demands are made we shall not know whether labor realizes that there is a just limit to its demands or harbors an insane vision of confiscation.

It seems that from the beginning there has been a groping for a better condition for labor. The early Christians looked for an earthly kingdom in which fishermen should rule over the Roman Caesar, and, in anticipation, questioned the payment of their taxes. From the beginning of the coal industry, the discipline of the coal companies, in many cases, has been the only check on the life of the coal camps, the company being so closely identified with the civil authorities that little distinction was made.

When the civil authorities went into a camp for an offender against the civil law, some company official was called on for assistance; and, if any witnesses were necessary, the company furnished them. Under such conditions, disloyalty to the employer was practically disloyalty to Caesar. While in some instances this identity of company and state might have been sought for, in most cases it came about naturally from the very nature of things, those possessing anything to lose controlling the custodians of the law in the isolated camps.

It has been impossible to fight Kaiserism abroad without some introspection at home, and it is perhaps natural that the minds of labor turn to their old enemy, capital, and hang on it all the iniquities of Kaiserism.

Operator Was Formerly Leader of His Men

Less than a score of years ago the political strength of most of the big labor-employing industries consisted in their ability to deliver votes. They did not necessarily use any sinister influence, because the men accepted the leadership of their employers. With the coming of labor organizations, votes are bid for in another way, and the only political strength left to capital is to use its money, when it has any, in issuing circulars and arranging political meetings.

After the war, the coal companies may face their employees somewhat in the role of a discredited Kaiser. They will have imputed to them their old-time faults, for which they are not entirely responsible, and they will be credited with many new sins, which will be grouped under the generally detested head of Kaiserism. On the other hand, labor will stand "emancipated" with a country's blessing on it for its loyalty in the great war. Its treasury will be full of money; its membership will be largely increased, and its spirit will be rendered as militant as the spirits of the sons of labor who will then have returned from destroying Kaiserism abroad.

United under the leadership of men, who, for the period of the war, have helped to advise our government; armed with votes and with governmental sanction; and, finally, having a definite time set for getting its share—namely, after the war—what may not eventuate if some attempt is not made to meet the difficulty by the education of everyone to the true course of action.

Settle Neither by Force Nor by Cunning

In all probability this vision is more or less fanciful, but that it may assume such an attitude should never be overlooked. Probably many of the wiser heads among the mine workers would do their best to prevent any such situation, but it is unquestionably in the minds of enough of the radicals to give it at least a beginning.

An abundance of labor after the war may have a steadying effect, but the attitude of both the operator and the labor leaders upon approaching the conference will largely determine the ultimate outcome.

If collective bargaining is to be the coming method of determining wages, then it ought not to be a question of one side wringing concessions out of the other, and going back to constitutents to say, "We got the best we could." As long as a wage scale is to be determined by the amount of pressure which one side can bring on the other, so long will there be an incentive to organize the sides in such a way as will make democracy unsafe for the world.

EDITORIALS

Let Us Be Liberal Hosts to Our Men

THE war is not over. What is more, we do not know when it will end. But if it were over, entirely over tomorrow, the money of America would have to be poured out nevertheless for war-camp activity. For with war there is idealism and there are duties. There will be no letting down in the presence of national enemies. Never for a moment will we forget that we are Americans, to serve, to suffer and to sacrifice, till the hostile flags arrayed against us are lowered and until that to which we have set our hand is fully accomplished.

When peace returns and the work of the soldier comes to an end, we will have a host of men abroad in foreign cities with little or nothing to give them amusement and comforts. Then will we need the organization and recreational equipment that will take the place of the war as a stimulus to our men.

The best and wealthiest of us at times need a little welfare work. The rich man looks for a club where good fellows meet for healthful social intercourse, or he hunts him a friend in the city he visits. Our boys in France, Italy, Great Britain, Russia and Siberia have no clubs or friends to take care of them in their leisure moments except those supplied by these war activities' funds, which from Nov. 11 to Nov. 18 are going to appeal to us for $170,500,000.

They are going to get every dollar of that sum, that they may make good hosts to our men. Let it never be said that we, the people of America, were not generous entertainers to our nation's defenders. If we fail of this duty not only will we find the morale of the service destroyed, but we shall weaken the bond that makes the nation one. It is because the nation has been such a generous host to its boys that they have been so willing to pour out their lives and their efforts so unsparingly in its service.

We need Americanism not only for the foreigner, but for the native born. We need that it shall be deep in the heart of us all, and in no way can the unity and the spirit of the nation be more truly assured than by our hearty acceptation of the opportunity of acting as the gracious hosts of our valiant defenders.

General Pershing has said that every hut adds ten men to a quota of one hundred for, largely by reason of the war fund activities, no war has ever been fought with as clean and well conducted an army as America has sent to the Old World. But that which has made these men fight like lions and conduct themselves so admirably will serve to make them in peace and on their return the great nationalizing force of the nation. These men, on coming back to America will, by their ideals and their youthful enthusiasms, vitalize all our institutions. Let them come back filled with the conviction that we were worthy of their sacrifices and that we did not forget our duty to them even when the war appeared to be approaching, or had reached, an end. Here's to our guests, the Boys of the U. S. A.! May they, who have given so much for us, never be able to say that we begrudged to them a little entertainment and a few of the comforts of home.

After the War

EVERY one will be interested in the thoughtful remarks of Mr. Keeley appearing in the "Labor Situation" under the head "After the War." Mr. Keeley is a man of such broad mind that we regret that he has taken to "sounding a warning," a thing so contrary to our national characteristics. Mr. Keeley can see no harm and much gain in facing the facts. That is a part of the right attitude, but not the whole. There should be another ingredient in the dish—no less an ingredient than a flavoring of American optimism, the condiment that makes the bitterest of viands palatable and even nutritious.

After the war there is going to be no radical reconstruction, nor are we going to have years of uncertainty such as marked the period after the Civil War. The soldiers are not coming home to fight but to build. The workingmen and the nation's planners are going to have a broader vision. It is true a number are crying "After the War," but with most of us it means not strife, but reconciliation; not disorder, but the reknitting of scattered families.

The biggest of all reconstruction is a reconstructed spirit, a sense of unity and friendliness, a kindly knowledge of each other as of one flesh and blood, little better and little worse than one another.

The difference between bad labor men and good labor men is largely between men who know the labor movement but little and those who know it well. The rabid man once brought into touch with the employer soon realizes that the man he painted so black is merely another man much like himself, and he loses a spirit of rebellion and becomes almost a coöperator. That is why these veterans of unionism are usually disliked by the rank and file after a few years of service. They have learned to know and respect capital and have begun to realize that with all its faults capital is at least as clean as labor.

Labor has not in general learned that lesson, and it punishes those who have. In consequence the workingmen continually bring new men forward, men unlearned in the labor movement. As fast as they are honored with office they begin to learn the truth, and they cannot then be even goaded to follow policies they once led others in advocating.

Even Mother Jones is becoming less militant as the opposition to her action lessens. She is growing more tolerant as the result of the tolerance that is shown her. Doubtless she never was without a certain degree of those good qualities we associate with "woman." The

violent are not without tenderer sentiments. They could not appeal to the hearts of others unless their own hearts had something of the human quality. All of us have heard from the lips of labor agitators at some time the acknowledgment of their two-fold disillusionment—how they have lost faith in the vision of a workingman commonwealth in which every man is upright and loyal and how they have been disabused of their old belief that greed and a lack of human qualities were the distinguishing traits of the employer.

But if the labor leaders can be brought to a better understanding, why rest content with converting *them?* Why not stop raising this crop of uninstructed leaders? Why not educate all the men into the true labor situation? Let the miner learn the whole truth and see just what the operator is facing, how profits are usually only made by hours of watching and every kind of mincing economy. Let him understand the operator's difficulties, and above all let him know the operator, as much as may be, as a personal friend. It can be done, for it has been done already.

Above all, let us remember that the miner is not a problem—he is a person. A cheerful, undoubting optimism will win the miner to a reasonable state of mind. If he is given an opportunity to earn such wages as seem quite common in the bituminous region, surely he will remain content. The wage earners who have received little or no increase in wage since the war began, and there are not a few of them, call on the miner not to demand a further increase in the price of coal. Those whose earnings have fallen steadily in purchasing power are disposed to protest bitterly at a spirit of profiteering which demands of the public ever more and more.

Some one must buy what the miners have for sale, and if the price is boosted without limit other workers will be unable to secure for themselves a livelihood. The wage of the miner is paid by the sweat of workingmen, the larger the wage the more heavy the sweat. Our prayer to the miner is that in seeking the best for himself and his family he remember to be fair to those who are not engaged in mining work, or in such work as has been endowed like mining by the war.

In all of this no reference is made to the anthracite settlement. The anthracite daymen do not get an unreasonable wage and the anthracite contract miner has not received any undue advance. But the bituminous mine workers are receiving magnificent wages and should be content with them. The workingmen of America are little disposed to pay them more.

Relation of the Operator to Health

INQUIRY as to the attitude of other journals to health brought the reply: "We do not mention such things in our journal. We leave that to boards of health. It is a doctor's business to take care of the ailments of the people and not the business of the employer; so we do not think it within our scope to consider the etiology of disease."

It is not necessary to argue this question. It is so clearly refuted by the present conditions. The doctors who compose our health boards are rushed to death. Their work is with the dying. They have no time for preventive methods except an occasional word said when in the home of a grievously sick person. Somebody else must take up the burden of prevention; others must proclaim the gospel of cleanliness and isolation. Otherwise production will fall.

Influenza has nothing to do with mining—except to stop it. The disease is spread in the social life of the people rather than in their industrial life. It is not in the mine or the street, but in the house, that the evil is done. Judging from the experience in New York where free assembly has been little interfered with, there is no advantage in keeping people from congregating. The only action of the Board of Health of the City of New York has been to keep children out of the theaters and to try to avoid crowding in transportation. As for the last, the effort has been an entire failure; the crowding is worse than ever, but nevertheless the influenza germs do not seem to take advantage of that fact. The epidemic in New York City, despite the crowding of that metropolis, is less severe than in most sections of the country.

The poster this week calls attention somewhat unpleasantly to the evils and dangers of the home. Isolation of each individual is the lesson which the poster tells. It cannot tell it as well as it could be told in public meeting, were such meetings allowed. It should be announced again and again, that individuals should keep such germs as they have acquired and not pass them on to one another. As far as may be, every person should be isolated from his neighbor.

In our editorials emphasis has been laid on the carriage of disease using such vehicles as the towel, the apron, the knife and fork and the pencil, but there is no purpose in denying that influenza can also be readily communicated from person to person through the breath. With what celerity and at how great a distance can a man who has been chewing garlic or peanuts make himself felt! If odors can thus be projected into the atmosphere, what possibilities must exist as to the projection of germs. Your garlic-eating foreigner is an ever-present exemplar of infectious disease. If only the influenza germ were of a character that it would assail our olfactory nerves like garlic, we would gain some knowledge of its universal presence and make adequate provision against it.

Reason for House Scarcity

WHEN BOYS leave for the front or for the munition works they do not take with them their fathers, mothers, brothers and sisters. These relatives still remain, and the reduced family takes the same housing equipment as of old. A bedroom, perhaps, is idle, but no one comes to occupy it. However, as the result, the mine is now short a man, and another man is hired. He is quite apt to be a man of family, and unlike the boy who goes to camp, he brings his family with him. Thus merely by labor turnover the efficiency of housing is decreased. The blocks of houses cannot care for as many as they did.

Again, the boarding-houses have largely been depleted of their men. Some ten or twelve unmarried employees may be found living in a single building. When these men are replaced in the mine, it is likely to be by ten or twelve or more older men, who, being older, achieve less and, being married occupy more houses. This is another of the causes of house shortage.



Influenza is not the only disease which is spread by the nose and mouth. There are several others, and, if they are to be avoided, we must beware of other lips and of anything that other lips have touched or rendered foul.

DISCUSSION BY READERS

Hindrances to Coal Production

Letter No. 5—While I do not believe that, as a rule, the average coal miner is a drunk or a sot, yet observation shows that many tons of coal are being lost daily by reason of the fact that many miners and men working in and around the mines lose several days a month, in order to satisfy their desire or thirst for drink. It goes without saying that the majority of these men would be in their places regularly if there were no saloons or places where they could buy liquor.

Living here, on the border of a wet state, one cannot fail to be impressed with the fact that the sale of liquor and the booze habit among miners are most important factors in the hindrance of the production of coal. Train after train brings men from the various coal fields to the nearest wet towns, and it is only natural to assume that the majority of these men are workers in and around the coal mines.

Leaving the mine, they go in quest of drink for which they squander their money. But that is not the worst, and before returning home they are leached by men and women who make their living by many nefarious vocations and are always found in the vicinity of saloons.

IDLE TALES OF RECORD PRODUCTIONS

It is no uncommon thing, today, to listen to the tale of wonderful production records, which are seldom based on fact, however, but are the dreams of a brain robbed of its power of lucid reasoning while under the influence of "John Barleycorn." If all of the coal represented by these claims was loaded into mine cars and dumped into railroad cars for shipment there would be no coal shortage in this country.

While I am not, personally, a prohibitionist, I have seen too often the dread effects of the booze habit, and have yet to observe anything but trouble, sorrow and disease in various degrees, from the slight headache of the "morning after," to the murder committed by a whiskey-crazed man and which invariably brings serious consequences to his entire family and deepest sorrow to those bereaved, to say nothing of the expense imposed on the state and municipality where the deed occurred.

Practically, the only excuse for the manufacture and sale of intoxicating drink is the revenue derived from the business, which I am glad to say is on the decline. Being a nation founded on the government by the people and for the people, it seems to me that a failure to stamp out this evil will be a detriment to the many. The few people who are engaged in the business of making and selling liquor reap their profits at the expense of homes and sorrowing women and helpless children, who are deprived of their rightful support. The country, moreover, is deprived of tons of coal, which is badly needed, at the present time, in support of the army of sturdy fighters we have sent overseas.

Let us strive, then, to make our mines greater producers, by installing better machinery where needed and encouraging our men to turn a cold shoulder to old "John Barleycorn" and, if possible, run him out of the country.

OBSERVER.

Huntington, W. Va.

Americanizing the Foreigner

Letter No. 6—Referring to the letter of "Experience," which appeared in *Coal Age*, Aug. 8, p. 286, regarding the assumed hopelessness of educating the foreigner and causing him to adopt American ideals and customs, permit me to challenge the remarks contained in that letter and others that have followed.

For the past four years I have devoted my entire time to community work in coal camps, and have had many dealings with people who have come from other countries. These people are naturally suspicious of strangers, and in many cases their suspicions are well founded, but when they are convinced that you come to them as a friend, their response is most gratifying.



FIG. 1. A MODEL SLAVISH MINER'S HOME

Once you win their confidence, they place in you the same implicit trust that we find in children. Many times, one is almost overwhelmed by the magnitude of their trust. More than once, when some one has been sick and the doctor has changed the medicine a member of the family has come to me wanting me to taste and smell the new medicine before they gave it.

One instance that touched me deeply was that of a Slavish woman who had a two-year-old child who was club footed. The doctor had tried in vain to have the mother send the child to a hospital and have the trouble corrected. I became interested in the case and persuaded the mother to take the child to an orthopedic specialist, who also urged her to send the boy to the hospital and have his feet straightened.

The mother listened to the doctor and then turned to me and said, "I no send my baby for this doctor.

What you say, I better send my baby?" I told her that she should send him. With a look of trust in her eyes that I shall never forget she said, "All right, if you say, I send my baby. I send him, but for no one else, just for you."

The child had to be taken three hundred miles from home and remained there five months. During that time I corresponded with the doctor and kept the mother advised of the child's condition. Her faith all through was most implicit; and I shall never forget the gratitude of the whole family when I brought the little fellow home. His feet were straight and the family was extremely proud of him, because he had learned to speak English very well for a small child.

If space permitted me to tell of all my experiences I could give instance after instance that would show the confidence and gratitude of these friends who have come from across the waters. One Italian woman whom I assisted through a long siege of sickness and need, showed her gratitude by presenting me with the only thing of value that they had in the house. It had been the gift of a priest and was highly prized by the whole family. I tried to persuade them to give me something of less value but found that I could not refuse the gift without deeply wounding the feelings of all. The mother, with tears in her eyes said, "You do everything for me; I give you only my best."

I am sending a recent photo (Fig. 1) of the home of one of our Slavish families. It is not claimed that all foreign homes are as well kept as this one, but many of them are. I chose this one as an illustration, because the woman was thirty-two years of age before she left the old country, and, the older people are, the harder it is for them to change their habits of living.



FIG. 2. LIVING ROOM AND BEDROOM IN THE SAME SLAVISH HOME

In Fig. 2 is shown the living room and the bedroom of the same house. These pictures were all taken about 9:30 one Monday morning. The woman did not know that I was coming or would take the pictures and the



FIG. 3. (1) FOREIGN CHILDREN WITH LIBERTY BONDS.
(2) CLEAN-UP DAY IN CAMP
(3) GIVING DENTAL INSTRUCTIONS
(4) COMMUNITY BAND AT PRIMERO, COLO.

house was not staged for the occasion. I asked her not to change a thing and she continued her washing while I took the pictures, which speak for themselves and show that, in her fifteen years of residence in this country, many American ideas have been adopted. It is quite a step in advance when foreign-born people discontinue raising vegetables in the front yard and make a lawn and plant flowers.

As a rule the beds of the foreign people are very clean. If you have occasion to visit a home where there is sickness you will usually find the bedding spotless, and the sheets and pillowcases trimmed with hand-made lace. I do not claim that this is always the case; but it is true in the majority of their homes. There is a well known American type of family that is far less particular than the average foreign woman.

Since the war started, we have found these people very ready to respond to every call made upon them. Their donations to the Red Cross, Y. M. C. A. and other war organizations, their subscriptions to Liberty Bonds and War Savings and Thrift Stamps have been most generous, and show that they have a real interest in their adopted country.

Community Work Conducted by the Colorado Fuel & Iron Co.

During the last four years I have had charge of girls' summer camps. Over four hundred girls have attended these camps, and over sixty per cent. of them came from foreign families. It has been remarkable how quickly these girls avail themselves of every opportunity offered them and the improvement they make is very rapid. They do not want to appear different from the American girl, and are ever on the alert to imitate them. They are always ready to help, in work or play, and have what we consider a good camp spirit.

In Fig. 3 is shown a group of children, only one of whom is American. These children own over $1200 worth of thrift stamps and war-saving stamps. One child alone whose mother is German and father Italian has filled three books with these stamps and has now started on her fourth book.

In the next picture is shown another group of foreign children who have collected the pile of rubbish shown, from their yards and the street, in an effort to clean up the camp on what was known as "clean-up day."

In the third picture is shown the dental nurse of the Colorado Fuel & Iron Co. instructing a class of six children—two Americans and four foreign—in the proper care of their teeth. Notice the likeness of dress in the foreign and American children.

In the fourth picture is shown the community band of the Colorado Fuel & Iron Co., at Primero, Colo. Many of the band members are foreigners by birth. The company does all in its power to encourage every department of community work and much success is attending its efforts.

Let me say, in closing, that I do not wish to create the impression that community work among foreigners is always easy and that one meets with no difficulties. At times, I become discouraged and wonder if it is worth while. But, in every walk of life, the things that are worth doing require perseverance and the ability to overcome obstacles.

Habits that have been long formed are hard to change, and we must not expect people coming from other countries to immediately forsake all their customs and habits of living. The process will be slow and gradual; but in time we shall reap the harvest if we faint not. The spirit with which one goes into this work and the amount of tact he or she possesses, together with the ability to read human nature are the determining factors that govern the degree of success a worker attains in this service.

Miriam C. Dawley,
Community Secretary, Colorado Fuel & Iron Co.
Primero, Colo.

Reminiscences of a Life-Long Friend

I was deeply interested in reading the obituary notice of W. J. Murray, vice-president and general manager of the Victor-American Fuel Co., which appeared in *Coal Age*, Oct. 3, p. 643, and beg to add a few words recalling a friendship the memory of which forms some of my pleasantest recollections.

Mr. Murray's death occurred while I was away on a trip in the northwest where I had little opportunity to see the daily papers. The notice of his demise published in *Coal Age* is the first intimation I have had of the sad event, which brings to me a flood of memories.

It so happened that I was resident engineer at Sopris, Colo., when Mr. Murray entered the service of the Colorado Fuel Co., of which J. C. Osgood was president. The company had leased and was operating the Smith anthracite mine, up the mountain, 4 miles from Crested Butte. There I wintered 1887-8, going to Sopris in the spring of 1888, to take charge of the construction of a permanent tipple and coke ovens that the company were to build at that place.

The superintendent at Sopris, whose name I do not recall, had formerly had charge at the Crested Butte mine where Murray was firebossing, and in that way had formed his acquaintance. Later, as the Sopris mine developed, Murray was made mine foreman at Sopris. That was in the summer of 1888 (not 1887 as stated in the obituary mentioned). A few months after Murray arrived, the superintendent took sick and died.

Rapid Advancement of a Self-Made Man

The new tipple was now finished and Mr. Murray was appointed superintendent of the Sopris mine. I recall, now, the rapid development that took place, and how the output soon reached 1200 tons a day, which was then considered an enormous showing.

Murray was working very hard at that time to achieve an education; and I suppose, because I helped him a little in certain ways, he became quite attached to me and I to him, owing to the characteristics you have so vividly described. If I remember correctly he had had little or no opportunity of attending school when a boy and I think it was not until after he was married that he could write his name. I believe he gave credit to his wife for inspiring him to take up some studies, and he worked at them hard. At the time when I first knew him, he was quite a student of mining literature.

I recall a rather amusing episode, which he often related with considerable glee, of how he arrived in

this country, at Baltimore, as a green countryman. On coming off the steamer, he saw for the first time a large and able bodied negress who so amazed him that he stopped and stared open-mouthed at her until she gave him such a slap on the jaw that it knocked him over. Like nearly all old country miners he had, in his youth used liquor freely. As many know, it was a custom for men to drink Saturday and beat their wives.

As I stated before, Mr. Murray had become a fireboss at Crested Butte and evidently a very efficient one, as that was a very gaseous mine. At one time, I think he had been drinking and was discharged. A bad gas explosion occurred some days later, which struck home to him and he made a resolution not to drink liquor in excess again, and so far as my knowledge goes he kept his resolution faithfully. As he was considered a most able man, the old Colorado Coal and Iron Co. reëngaged him as fireboss and subsequently he went to Sopris.

The Test That Comes to the Superintendent

Murray's first trial came soon after his appointment as mine superintendent, at Sopris. There was a strike that threatened to be bad. From the company's standpoint, it was unjustifiable. It was thought to have been started by the "Molly McGuires." One of the episodes occurred when Murray, resenting an insult from a foreign miner, leaped on him, in the office; the miner shot at him but missed and Murray knocked him out. It was a rough and ready part of the country at that time.

I was thrown very closely in touch with Murray, not only during my regular connection with the Osgood interests, in Colorado, but subsequently when I visited New Mexico and Colorado, on consulting work. He was one of the squarest, true-blue men I have ever met and it is a sad thought to me that I will not see him when I go west, as formerly.

George S. Rice,
Chief Mining Engineer, Bureau of Mines.
Washington, D. C.

Cost Accounting in Mine Haulage

Letter No. 1—In connection with the discussion of the proper accounting of supplies and materials used in the mine, and the excellent letter on that subject, by J. Kenvin, which appeared in *Coal Age*, Oct. 17, p. 754, permit me to suggest that a like consideration of the costs of maintaining and operating mine haulage systems would prove equally interesting and helpful.

We read a lot about haulage systems and haulage costs, but we seldom see a mine haulage system fully analyzed and the cost of its operation fully described. I fear that oftentimes charges are made against the haulage account that logically belong elsewhere.

It is much the same as with a manufacturer or merchant who has no regularly laid out system of accounts, but charges a certain expense to one account, one month, day or week, and the the next time it appears in another column. As a result, the manufacturer or merchant never really knows the unit cost of his product or the turnover of the goods.

Again, the various items, in mine haulage, are considered in a different light by different operators, or I should say, bookkeepers, and a burden is thrown on some divisions that should be borne by other activities.

For example, take the question of what power is consumed in the main line haulage, extending from the different gathering points to the tipple or shaft bottom. Some companies simply guess that a certain percentage of their power is consumed in that service, and the assumed percentage may be low or high.

Others try to approximate this charge or cost of hauling the coal from the gathering stations to the shaft bottom or tipple, by estimating on the rated consumption of the motors. That method, at best, is a wild guess, as no account is taken of the line and feeder losses and the return losses are a forgotten item.

Some companies have realized the tremendous losses occurring in the return, and are attempting to bond the rails which will assuredly save a great deal of money and help to keep the coal moving much more steadily. But the vast majority of companies have no definite idea as to the several items of cost.

It is possible to figure the cost of charging storage-battery locomotives, and the cost of repairing them and trolley locomotives; but how many keep an accurate record of the labor, material and other sundry charges that go to make up the total upkeep cost?

The wages of the motormen are easily computed and charged, but few companies indeed actually charge to their haulage account the upkeep of cars, track and locomotives, cost of lubricant and the oilers' wages. When all these are combined properly, the charge assumes a very pretentious size and is one that is vitally associated with the cost of production.

Haulage Charges Properly Classified

Haulage charges should be divided into gathering and main-haulageway service. One can be excessive, carrying the burden of the other. Both, however, should be very vital to every man who is producing coal, and yet how many have even a slight knowledge of these respective costs? A searching investigation, would, I am afraid, disclose a woeful lack of definite knowledge, and no industry can properly function or produce adequate returns unless every expense item is known and, what is more important, really appreciated.

A good system of haulage accounts, it must be admitted, will not remove the losses due to the stalling of motors by trips of stiffly running, plain-bearing mine cars; or the excessive labor due to bad tracks, or rails that are too light, broken wheels or axles, which cause wrecks; but the right kind of accounting system will enable the progressive operator to save many petty losses, as well as major ones; and the knowledge to be gained by a study of a chart of haulage costs is almost beyond imagination.

I must confess to being greatly at sea, after hearing many ideas as to what should comprise legitimate haulage costs; and I sometimes believe that there cannot be a perfect or universal system, because the conditions are so different in every mine in respect to mileage, grades, etc.

There are, unquestionably, some sound rules that have been subjected to the rigid examination of men who know what they are doing; and some sheets or cards have been designed to cover the subject fully, with necessary report blanks for subordinates to use when submitting their reports; but who has ever seen them published? Very few of us, I am sure. This is a subject

that can and should be discussed, in the columns of *Coal Age*, by superintendents, electrical engineers, and last but not least, by the auditors of our companies.

Auditors have a vast fund of information that would be helpful to many. Their knowledge and experience, coupled with the knowledge and experience of the actual operating officials, who are face to face with these problems, day in and day out, would make very interesting reading and fulfill a long felt want in coal mining literature.

I have written at such great length, because this subject is one of the most vital with which the coal industry has to contend; and a thorough knowledge of all of the conditions and circumstances that affect it would very largely tend to put the company on a better basis.

————, W. Va. PROGRESSIVE.

The Miner and Safety

Letter No. 2—I was pleased to read the excellent letter of M. H. G., *Coal Age*, Oct. 10, p. 707, in which he illustrates in a vivid manner the little regard that the practical miner has for his own safety and describes how such a one "passes up" things that are really dangerous, depending on his mining experience to carry him through safely. I was glad to see that the writer of the letter agreed with my suggestion that it is the experienced miner who is the most frequent victim of serious accident. In many cases, the practical miner resents being told what he must do to make his place safe and, as a result of his independence and disregard of instructions given him by the foreman, he is often fatally injured.

The safety of miners is a most important topic, and anyone who is interested in the work of coal mining should concentrate his thoughts upon what relates to safety, as much as he does upon the production of coal. As we all know, accidents are unavoidable in many cases. However, a large proportion of the accidents due to falls of coal and rock, at the face, can be avoided by the constant and close inspection of each working place by the foreman and obedience to his instructions on the part of the miner. The main point, for a person who has charge of men, is to familiarize himself with each and every cause of accident and then drive them home by impressing them on each man working under him. Foresight on the part of the foreman and the miner, is one of the chief elements relating to safety.

Contempt of the Experienced Miner for Safety

It would be amusing, if it were not for the serious results that follow, to pass along a gangway where probably 20 or 30 miners are working, and listen to the remarks of the practical miner regarding another who has less experience but who exercises more care to keep himself safe. One hears the remark, "Yes, John is a pea-coal miner; he's a big greeny." But, going into John's place, you find him hard at work, with a good prop standing near him, which he has just set to give better support to the roof above him. Unlike the practical miner who ridiculed him, John is willing to listen to instructions and obeys them promptly.

Ask the practical miner to sound his roof, and his answer is, "It's as safe as if you were outside." On close inspection, however, the foreman discovers a small crack, which justifies his suspicion aroused by the looks of the place. Yet, sounding the roof with the pick gives no indications of its being unsafe, and you have to insist on the man stopping work and setting a post with a good cap crossing the crack in the roof at right angles. A few more cuts taken from the face prove that the foreman's foresight saved the miner.

Causes of Accidents That Should Be Avoided

Let me refer, here, to a few conditions that lead to accidents. For example, obeying the instructions of the foreman, a practical miner reluctantly sets a post in the center of his place. A little later, the post is discharged by a blast, and the miner, on returning to the face, starts to load his coal and neglects to reset the post, until he thinks the foreman will be around again. But, before that time, the unfortunate is caught by the fall of the loose slab.

The places that are usually the hardest to keep safe are those where the roof is a slab formation, and the slate falls in pieces from 6 to 10 in. in thickness. Such a formation is what is known to the miner as "a rider." I have watched men of many years' experience work under such top for a distance of 6 or 8 ft. without attempting to protect themselves.

Told to stop work and take the piece down, the miner invariably replies, "I just tried it and can't get it down." You answer, "Well, try it again." To satisfy you, he prods the piece a little, but makes no great effort to loosen it. A little assistance of the foreman and the slate falls with a heavy crash. Notwithstanding the fact that you have saved the man from possible death, he grumbles that you have dirtied his loose coal, stating that it will take some time to clean it, which is his only excuse for taking the chance he did.

Foreman Insists and Saves Miner

Just recently, I visited a miner's chamber and found that he had taken two cuts from the face, which left a piece of rock 8 in. thick, 5 ft. wide and 9 ft. long, unsupported above where he was working. My request that he should sound the roof brought the reply, "Oh, it's all right; I will pull the piece down when I take the next cut." The foreman insists, "No, try it now, get your drill." The result was that the piece fell heavily on the first touch or pull. Questioned as to whether he had tried it before, the man replied, "Yes, and it was all right." That man had 12 years of mining experience and, had he been caught, the foreman or assistant whose duty it was to inspect his place would have been held responsible for the accident.

Another condition requiring close inspection is where the miners are required to set their posts from 4 to 6 ft. apart, along the face. The practical miner is prone to be careless and will often advance more than this distance, without setting any temporary supports. In that case, the chances are that he may be caught by a slip in the roof that does not appear until too late and the fall takes place, catching the miner.

Let us hope that the discussion of these questions in *Coal Age* will make the practical miner more careful for his own safety. Practical experience is the most essential element in the safe mining of coal; but the miner must coöperate with his foreman.

Kingston, Penn. LEWIS R. THOMAS.

INQUIRIES OF GENERAL INTEREST

Reversing an Electric Motor

Some trouble with the electric generators at our mines recently started a dispute between the mine electrician and myself as to whether reversing the leads on the switchboard at the power house would reverse the direction of the motor on the locomotive in the mine. The power appeared to be traveling in the rails instead of on the trolley wire, which seemed to be the return. The electrician claimed that changing the switchboard leads at the power house would change the direction of the current in the circuit and reverse the motor in the mine, while I held that it was necessary to use the reversing switch on the machine, which would change the flow in the field in order to reverse the motor. Kindly settle our dispute by explaining fully what is required to reverse a motor in a mine.

East Millsboro, Penn. ASSISTANT FOREMAN.

An arrangement that would permit the power to travel on the rail and the current return over the trolley wire is unusual and poor. In order to make

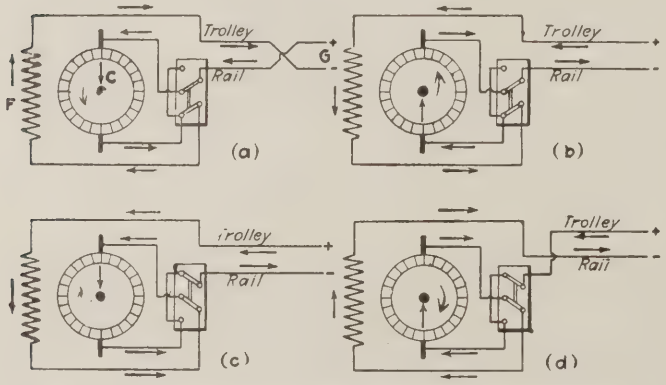


FIG. 1. ILLUSTRATING REVERSING A MINE MOTOR

the situation clear, we have drawn Fig. 1, showing four arrangements, *a*, *b*, *c*, *d*, which we will explain.

The first arrangement (*a*) shows the original condition described in the inquiry, where the power is traveling on the rail and the current returning by the trolley wire. The letters in this figure apply to all the figures alike; *G* indicates the leads at the switchboard of the generator in the power house, the positive lead being the power line and the negative one the return; *C* is the commutator of the armature, *F* the field and *S* the reversing switch of the motor. Observe carefully the direction of the current passing through the armature and the field, as indicated by the arrows.

The second arrangement (*b*) shows the change that takes place when the current is reversed at the power house. The power is now traveling on the trolley line, as it should, and the rail is the return. Observe that the position of the reversing switch on the locomotive has not been changed. Changing the leads at the power house has changed the direction of the current throughout the entire circuit, including the flow through the armature of the motor and the flux in the field; but the direction of the rotation of the armature, as indicated by the arrows, is the same as before.

The reason the motor is not reversed is that the flow through the armature and the flux in the field have both been changed, and counteract each other. In order to change the direction of rotation of the armature it is necessary to change the direction of either the flow of current through the armature or the flux in the field, but not both.

In the third arrangement (*c*), the current from the generator follows the trolley line and passes through the field of the motor before reaching the reversing switch on the locomotive. This switch is now reversed, which changes the direction of the flow of current through the armature only, and causes it to revolve in the opposite direction from its previous rotation. Notice, however, that the flux in the field remains unchanged.

The fourth arrangement (*d*) is drawn simply to show a different connection from that just described. Here, the power passes from the trolley line directly to the reversing switch of the locomotive and through the armature, before reaching the field, which has the effect of altering the flux in the field, while the flow of current through the armature is the same as that in the second case. This also reverses the rotation of the motor, as indicated by the small arrow.

Reference to Fig. 2 will make clear the fact that changing both the direction of flow in the armature and the flux in the field will not alter the direction of motion, or reverse the motor. In the figure, the thumb and first two fingers indicate respectively the direction of rotation of the armature, direction of the flux or lines of force generated in the field and direction of the current in the armature, the left hand being used.

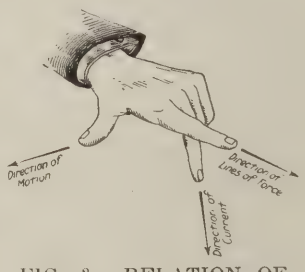


FIG. 2. RELATION OF THREE FACTORS IN ELECTRICITY

Now, it is clear that if the hand be turned about the thumb as an axis, through an angle of 180 deg., both the direction of current in the armature and the flux in the field will be changed, while the direction of rotation remains the same. On the other hand, let the hand be turned about either of the fingers as an axis, through 180 deg., so that either the flow of current through the armature or the lines of force in the field is changed, but not both, and the effect is to change the direction of rotation, as indicated by the thumb.

The right hand is used when it is desired to illustrate this principle in reference to a generator in which the construction is identical with that of a motor but the conditions of operation are reversed.

EXAMINATION QUESTIONS

Miscellaneous Questions

(Answered by Request)

Ques.—What are the effects of unequal expansion and contraction in a boiler?

Ans.—Unequal expansion or contraction in the boiler plate causes an excessive strain to be thrown on certain parts, which may cause rupture by the shearing of rivets or open the seams in the boiler plates. At times, bulging or buckling of a plate may result from the undue strain thrown on that part of the boiler.

Ques.—What care should be taken of boilers to secure the best results?

Ans.—Steam boilers should be thoroughly cleaned, at regular intervals, and all sediment and scale removed. Where the feedwater contains sediment, the boiler should be blown off regularly, at sufficiently short intervals to prevent the accumulation of the sediment in the bottom of the boiler. The smoke flues should also be cleaned regularly and kept free from deposits of soot. All parts of the boiler should be inspected at frequent intervals. The boiler should be fired in a proper manner and the water level never allowed to fall too low and expose the fire plates to injury through overheating. The feedwater should be heated before being admitted to the boiler.

Ques.—How would you fire a boiler to get the best results from it and from the coal used?

Ans.—Best results are obtained when firing is performed by what is known as the "coking method." In this method, the fresh coal is piled up on the front half of the bed and allowed to become well ignited before it is spread over the remaining surface of the fire. By this means, the gases are distilled from the fresh coal and pass back over the fire. In this way, a more even regular heat is maintained in the furnace than when the fresh coal is spread over the entire surface of the bed, which would dampen the fire and reduce the temperature in the furnace. In the coking method, the gases distilled from the fresh coal at the front of the furnace, meeting with the hot air that rises through the bed of coal, are burned and maintain a high temperature in the furnace.

Ques.—State generally what is meant by expansive working and condensing, as applied to steam engines.

Ans.—The steam works expansively in the cylinder of an engine when the valve cuts off the supply of steam before the stroke is finished. The expansion of the steam remaining in the cylinder then performs the work, during the remainder of the stroke. This is known as working the steam "expansively."

A steam engine may be either noncondensing or condensing. In the former case, the engine exhausts into the atmosphere, and the movement of the piston is then opposed by the atmospheric pressure. In a condensing engine, on the other hand, the exhaust steam passes into a condenser where it is condensed and produces more or less of a vacuum, whereby the back pressure on the piston is reduced during the return stroke.

Ques.—The piston speed of an engine is 600 ft. per min.; what is the length of the stroke if the engine is running at 150 r.p.m.?

Ans.—In this case, the piston travels $600 \div 150 = 4$ ft. during each revolution of the engine; and, since the engine makes two strokes each revolution, the length of the stroke is 2 feet.

Ques.—The diameter of an engine cylinder is 10 in., the length of stroke, 15 in. The engine makes 250 r.p.m., and the mean effective pressure is 40 lb. per sq. in. What is the horsepower developed?

Ans.—The sectional area of the cylinder, in this case, is $0.7854 \times 10^2 = 78.54$ sq.in. At a speed of 250 r.p.m., the engine makes 500 strokes per min., 15 in. or 1.25 ft. long. The horsepower developed in the cylinder is,

$$H = \frac{plan}{33{,}000} = \frac{40 \times 1.25 \times 78.54 \times 500}{33{,}000} = 59\tfrac{1}{2}\ hp.$$

Ques.—What thickness of boiler plate would be required for a boiler carrying 100 lb. pressure, the diameter of the boiler being 6 feet?

Ans.—Estimating the safe tensile strength of the boiler plate at 10,000 lb. per sq. in., the required thickness of the shell, for a diameter of 6 ft., to withstand a boiler pressure of 100 lb. per sq.in. may be calculated by the formula,

$$t = \frac{pd}{2S} = \frac{100(6 \times 12)}{2 \times 10{,}000} = 0.36,\ say\ \tfrac{3}{8}\ in.$$

Ques.—How much water is evaporated per hour per horsepower, under ordinary conditions?

Ans.—In steam-boiler practice, the horsepower of a boiler is given as the evaporation of 30 lb. of water per hour from a feedwater temperature of 100 deg. F. into steam at 70 lb. gage pressure; or, in other words, 1 boiler horsepower is equivalent to $34\frac{1}{2}$ units of evaporation, which means the evaporation of $34\frac{1}{2}$ lb. of water per hour, from and at 212 deg. F.

Ques.—What is the temperature of steam in a boiler when the pressure is 100 lb. per square inch?

Ans.—The temperature of steam varies with the absolute pressure in the boiler, and must be taken from steam tables. For a gage pressure of 100 lb. per sq.in., at sea level, which corresponds to an absolute pressure of, say 115 lb. per sq.in., the temperature of the steam, as taken from the steam tables, is 337.86 deg. F.

Ques.—At what speed would you consider it desirable to hoist men in a shaft?

Ans.—The speed of hoisting men in a shaft will depend chiefly on the depth of shaft and the kind and quality of the hoisting equipment. For a depth not exceeding 100 yd., men should not be hoisted at a greater speed than 20 ft. a sec. In deeper shafts, with uptodate equipment, the speed of hoisting may reach 40 or even 50 ft. per sec., depending on the depth of the shaft, and the capability of the hoisting engineer.

COAL AND COKE NEWS

Harrisburg, Penn.

Work has been started by the Workmen's Compensation Board to put into effect plans made for the rehabilitation of men crippled or otherwise injured in industry, with a view of returning them to active work. Announcement was made on Oct. 31 by Harry A. Mackey, chairman of the board, that a personal canvass has been started of every compensation award made in recent years to find what progress toward restoration has been made by recipients of compensation. Recommendations will be made to the next Legislature by the board that at least three hospitals equipped for rehabilitation work be constructed and maintained under state auspices, one in Harrisburg, one in Pittsburgh, to take care of the bituminous field, and one somewhere in the anthracite region.

Uniontown, Penn.

Mines, coke plants and railroads have been affected by the epidemic, but the railroad situation cuts more deeply into production than the lack of labor in the mines and ovens. The traffic congestion caused by short crews reached its crest during the week, but was not cleared until the region spent an entire day in idleness and a week of reduced effort. The fuel administration records shows a total car shortage for the week of 1143, the most serious car shortage since last winter.

The total coal output of the Connellsville region for the week ended Oct. 26 is placed at 686,152 tons, of which 451,635 tons was manufactured into 301,090 tons of coke and 234,517 tons was shipped to byproduct and other industries.

Warren S. Blauvelt, coke director for the Fuel Administration, this week sounded a slogan of "Quality First" in the fuel campaign in a stirring statement issued to operators and producers of the Connellsville coke region. Mr. Blauvelt declared that inasmuch as the campaign was being waged to increase the production of iron and steel for war needs, quality must be all the more emphasized, contending that "any sacrifice of quality of coke to quantity in order to get a greater quantity will absolutely defeat this purpose." He declared that an increased production of 5 per cent. if accompanied by even a slight depreciation of quality due to excessive ash, poor structure, large percentage of fines and dirt might easily lead to a 10 per cent. increased consumption of coke per ton of pig iron and a decrease of 20 per cent. in blast furnace output.

Charleston, W. Va.

The mines of the Fairmont district are partly out of commission and production has fallen far behind. While the influenza is to some extent responsible for curtailed production, yet the operators of the district charge that the B. & O. is making no effort to supply the district with cars and that the car deficiency is now over 7000. The daily production loss is running as high as 35,000 and 45,000 tons. On last Saturday (Oct. 26) alone there were 4894 men without work and a number of the mines were shut down. Instead of getting 1400 cars a day needed for all the mines, not more than half that number of cars have been furnished recently. For the last three days of last week there were only 2263 cars furnished the district—on Thursday 965, Friday 598 and Saturday 700.

Overcoming many obstacles, the Tug River and Pocahontas district mines have managed to keep production almost up to the high point reached the latter part of September. In other words, the shipment of coal is now hovering around 465,000 tons weekly. Up to and including Oct. 25 the total shipments from the Pocahontas and Tug River districts had reached 1,407,950 tons. As the quota the two districts had expected to reach in October was 2,000,000 tons, it is hardly likely the month's quota will reach that figure, since the daily shipments are in the neghborhood of 65,000 tons only; but it is believed that had not the influenza disarranged all plans, it would have been a record-breaking production month.

Even with influenza making its appearance at many new points in the Kanawha district the mines of that district in the aggregate had a much larger output for the week ending Oct. 26 than they had during the preceding week. A better supply of cars is responsible for the increase, influenza among C. & O. trainmen having abated to some extent. The increase in output amounted to 32,000 tons, the total production for the week ending Oct. 26 being 180,363 tons as against 148,000 tons for the week ending Oct. 19. Total hours worked reached 5478. There was a shortage measured in hours of 185, due to an inadequate car supply, and a shortage of 1331 hours for which inadequate man power was responsible.

Production took an upward trend in the Winding Gulf region during the week ending Oct. 26, an excellent car supply making this possible in part, the Virginian Ry. keeping a constant stream of empties flowing into the district.

To the surprise of many there was an increased output in the New River and Winding Gulf districts last week, the increase amounting to 12,648 tons for the two districts, or in gross tons, 4562 in the Gulf district and 6711 in the New River district. This was surprising because of the prevalence of influenza in both districts, affecting in some instances 50 per cent. of the men and their families. A car shortage on the C. & O. resulted from influenza among the trainmen.

Birmingham, Ala.

Every coal company in the Birmingham district reports more or less deflection in production by reason of the influenza epidemic. Not only is the coal output being disturbed and greatly lowered, but coke manufacture, iron-making and oven operations at steel plants, machine shops and foundries are being affected. For the week ending Oct. 19, coal production in Alabama was 323,310 tons, the lowest since the Government has been checking up the work. It is expected that when the Federal figures for the week are published, the output will be still lower than that of the week previous.

A. H. Carpenter, well known in coal circles, has been appointed assistant to Production Manager H. C. Sellheimer. He will keep watch on the coke production, and will endeavor to bring about increased output at the ovens with a cleaner run of coke. It is intended to organize the forces as in the coal department, so that labor will understand the need for patriotic efforts and loyalty to the Government in striving for an increased production. There is need for every ton of coal and coke that can be manufactured for many years to come, experts say, whether or not the war ends speedily.

While the influenza epidemic hit the railroads as much as it did other corporations, the reports of the past week as to transportation business are good. Of course, the mining sections showed a considerable falling off in shipments, but these will pick up as soon as the disease has been checked.

Transportation on the Warrior River is progressing steadily enough, much bunker coal being shipped to Mobile and New Orleans, where there is an increasing demand for this kind of fuel. The trade is handicapped, however, by the lack of barges.

Victoria, B. C.

Canada's winter coal supply is receiving close attention at the hands of the Canadian Fuel Administration, at Ottawa, Ont., and it is believed that as a result of organization and of well-disseminated and educative propaganda the people of the Dominion will get through the cold months without undue hardship.

For the purpose of facilitating the equal distribution of anthracite coal in Canada during the winter a further order-in-council has been passed by the Dominion government at the instance of Fuel Controller C. A. Magrath. The regulations contained in this order are designed to prevent disproportionate deliveries of anthracite to large consumers at times when the householder cannot be supplied, the fuel controller being given the right to prohibit entirely, or to limit in any manner he may deem advisable, the use of anthracite coal in any building. This does not apply to private houses using less than 40 tons of coal annually. This law will be enforced through the fuel administrators of the various districts or, in the event of there being no such official, direct from Ottawa by the fuel controller. Infractions of the ruling may be punished by heavy penalties.

A complete list of the Provincial Fuel Administrators follows: Prince Edward Island—J. A. Macdonald, Carrigan, P. E. I. Nova Scotia—R. H. MacKay, New Glasgow, N. S. New Brunswick—Dr. James H. Frink, St. John, N. B. Quebec—H. M. Marler, Standard Building, Montreal, P. Q. Ontario—R. Home Smith, Harbour Commissioners' Building, Toronto, Ont. Manitoba—J. A. Macdonald, Winnipeg, Man. Saskatchewan—T. M. Molloy, Regina, Sask. Alberta—John T. Stirling, Edmonton, Alta. British Columbia—N. Thompson, Vancouver, B. C.

PENNSYLVANIA

Anthracite

Wilkes-Barre—W. S. Sprague, of this place, has submitted to the Department of Mines of Pennsylvania for its approval a sample of a specially treated paper for brattice use. It is claimed that this paper will not burn and is being successfully used in a number of mines.

Minooka—The Lackawanna Coal Co. has placed a force of men at work making repairs to St. Joseph's Hall here, which was recently quite badly damaged as a result of mine settlings. When the repairs are completed and the heating plant is put in condition the building will be used as an emergency hospital for miners and their families.

St. Clair—Cheap fuel for a century to come is in prospect for the Reading Ry. as a result of experiments successfully completed recently on the run between St. Clair and Philadelphia. Locomotive 1717 was fired for a series of runs with a mixture of culm and bituminous, in the proportion of 65 per cent. for the latter and 35 per cent. of anthracite culm. The combination worked so well, it is stated, that steam pressure of 210 lb. was maintained for the entire run. The locomotive was equipped with an automatic stoker, and the officials, to carry the test still further, will now try the mixture hand-shoveled into the engine firebox.

Bituminous

Somerset—H. L. Sellers, of Confluence, has leased and is operating the mine near Draketown.

Savan—A new mine is being opened on the Lowry farm here by Frank Lowry. The coal will be dumped over the new tipple of Lowther & Davis.

Homer City—A switch connection has been made by the Pennsylvania R. R. with the siding of the Myvan Coal Co. just south of Horner City. The new company has purchased about 100 acres of the Upper Freeport coal and it is reported will develop it at once. No construction work, outside of the siding connection, has been started as yet.

Indiana—The Two Lick Coal Co. has abandoned the sinking of its shaft on the property near Indiana until after the war, owing to the scarcity of labor. The shaft was sunk about 50 ft. and had about 16 ft. to go to the coal when abandoned. The new operation was to supply the commercial and domestic coal for Indiana which is now hauled from Yellow Creek and shipped in by rail.

WEST VIRGINIA

Logan—On Nov. 4 the MacBeth Coal Co. began shipping coal from its plant on Rum Creek in the Logan field. The company will take coal from the Eagle Seam, having a 5-ft. vein in which to operate.

Clay—So hard were the mines of the Elkland Coal Mining Co. at Clay hit by the influenza that not enough physically able men were left to man the mines, and consequently the mines were shut down entirely.

Bluefield—A new tipple has recently been put up by the Camella Red Ash Coal Co. at Drill. The same company has also erected a number of houses for miners and a store building. L. G. Little is in charge of operations as superintendent.

Bluefield—Within the last few months the Banner Raven Coal Corporation, with a plant at Drill, has not only put up a new tipple but has also erected 53 dwellings for miners and a clubhouse. It is also adding to the number of miners' dwellings built.

Bluefield—A siding is being laid by the Garden Coal Co., at Drill, to its new permanent tipple. Though the company, of which C. W. Steele is general manager, began shipping coal last February, it was not until recently that the permanent tipple was completed.

Olcott—Construction work on the plant of the Newcourt Coal Co., near here, in the Coal River field, is nearing completion. Coal will be taken from both the Black Band seam and the No. 2 Gas seam. Preliminary work at the company's plant is in charge of W. J. Newenham.

OHIO

Oreton—L. D. Binyon and James Hogan two brick men of Chicago, are developing a stripping operation at Oreton on the Hocking Valley Ry., in Vinton County. A track is being built and a contract has been awarded for a steam shovel with a capacity of 400 tons daily. A part of the coal will be sold through the Columbus Fire Brick Co., Columbus.

INDIANA

Clinton—An explosion in the Vermilion Coal Co.'s mine, northwest of Clinton, seriously burned James Hinkle and James McQueen, shotfirers. It is believed, however, that both men will recover.

KENTUCKY

Madisonville—The St. Bernard Mining Co. is well along with the construction of its new power plant, which will cost more than a half million to complete, and which will furnish power and light for eight mines and a number of towns. The plant will be at Loch Mary, near Earlington, and will supply power to the Fox Run, St. Charles, South Diamond, Shamrock, Luten and Victoria mines, serving two or more mines at some of these points. The miners' homes will be taken care of and light furnished for residences in the towns named.

ILLINOIS

Benton—The new coal washer of the United States Fuel Co. at the Middlefork mine was tested out a few days ago in the presence of all of the company officials from Chicago. It cost $500,000 and is said to be the largest in the world.

Carlinville—Coal was struck in Mine No. 3 of the Standard Oil Co., at Schoper, seven miles east of here, recently, at a depth of 315 ft., 74 working days after the work began. This is said to be a record. The first load of coal was brought to the surface the next day.

Pinckneyville—The body of Joseph Neising, who was drowned in the Gordon mine 39 years ago, was recovered from the mine on Oct. 26, in comparatively good condition, and the funeral was held next day, and was attended by his five children. Neising was drowned Jan. 5, 1880, when Beaucoup Creek overflowed and flooded the mine. All the miners but Neising escaped. No attempt was made until recently to pump it out. When the water was removed Neising's body was found near the air shaft. The cold water had preserved it.

Belleville—A standing shot at Eldnar mine Monday, Oct. 28, caused a fire which was only extinguished after an all day fight.

Miners employed at the Richland, Wilderman and St. Clair mines, on the Illinois Central R. R., have petitioned the Federal Railroad Administration for a train to carry them to and from their work. They say that unless transportation is provided they will have to seek work in other mines.

A coal company which leaves an open keg of powder in a shed is responsible if a pair of meddlesome boys find it and set it off, according to a decision in the Belleville Circuit Court. The Egyptian Coal Mining Co. of Marissa, Ill., was required to pay $1750 for the death of one of the boys and $2000 for injuries to the other.

COLORADO

Trinidad—William Caddell, who with Henry Carlson, of Walsenburg, was part owner of the Hezron mine in Huerfano County, was instantly killed on Oct. 21 by an explosion of gas. Five others were injured, two perhaps fatally. The mine was a former Colorado Fuel and Iron property and was leased by Caddell and Carlson.

Foreign News

Victoria, B. C.—When Hon. Martin Burrell, Minister of Mines in the Dominion government, was in British Columbia recently a delegation of Vancouver Island residents waited on him with regard to the interests of settlers interested in the coal rights of the island. They wanted some statement from the minister as to whether, should the British Columbia government reënact the Settlers' Rights Act of 1917, the Federal authorities would refrain from disallowing it again. Mr. Burrell could make no definite statement but assured his petitioners that he appreciated the importance of the matter from the viewpoint of the settlers, involving as it did title to a considerable proportion of the coal resources of Vancouver Island. He agreed that all those interested were entitled to the fullest hearing by the Dominion government should the matter come up for reconsideration. The Settlers' Rights Act, it may be explained, gave the settlers within the Esquimalt & Nanaimo Ry. belt a specified period in which to make claim to the coal rights within the limits of their property, they then being granted title to the coal, if able to substantiate their claims. The coal areas in question, or at least most of them, now are owned by the Canadian Collieries (D) Ltd.

Personals

George Love, formerly with the Jefferson and Clearfield Coal and Iron Co. at Ernest, Penn., has been made mine foreman of one of the mines of the Coal Run Mining Co. at McIntyre, Penn.

J. H. Schroeder, formerly secretary of the Rutledge & Taylor Coal Co., of Chicago, Ill., has resigned his position with that company, effective Nov. 1, and has accepted the positions of treasurer of the Mason Coal Co., and assistant treasurer of Nokomis Coal Co., with offices at 1380 Old Colony Building, Chicago, Ill.

C. L. Huntzinger, recently connected with the Robins Conveying Belt Co., has accepted the position of mining engineer with the Valier Coal Co., Valier, Franklin County, Illinois. Mr. Huntzinger has developed a method of mining whereby it is expected that the recovery of coal in that district will be largely increased.

Charles G. DuBois has been elected vice president of the Western Electric Co., Inc., of New York, N. Y. Mr. DuBois entered the employ of the company in 1891 at its New York office and occupied successively the positions of chief clerk, secretary and supervisor of branch houses. Mr. DuBois is 48 years of age and was graduated from Dartmouth College in 1891. He resides in Englewood, N. J.

Walter McNichol, of Scranton, Penn., formerly state senator and one of the supervising inspectors of the State Department of Labor and Industry, was on Oct. 29 appointed as chief of the Bureau of Inspection and ex-officio acting commissioner of Labor and Industry during the absence in military service of Col. John Price Jackson. Mr. McNichol succeeds Lew R. Palmer, of Pittsburgh, who has retired.

Obituary

W. J. McIninch, superintendent of the Knoxdale mines of the Loash Coal Co., died Oct. 18 from pneumonia, superinduced by influenza. His home was at Knoxdale, Penn.

John H. Williams, of Pittston, Penn., general inside foreman at the Stevens colliery of the Lehigh Valley Coal Co., died on Oct. 29, following an attack of influenza. Only a week before a son of the deceased was claimed by death. Mr. Williams is survived by his widow and four children.

Frank A. Kearns, superintendent of the United States Coal and Coke Co.'s operations at Lynch, Ky., died at Pittsburgh, Penn., following an illness of five days, dating from the time he left Middlesboro to attend the funeral of Superintendent W. W. Harding, of the company, at Pittsburgh. Mr. Kearns was born in East Liverpool, Ohio, and was 31 years of age. He had been in charge at Lynch about a year.

Coming Meetings

American Society of Mechanical Engineers will hold its annual meeting Dec. 3-6 in New York. Secretary, Calvin W. Rice, 29 West 39th Street, New York City.

Coal Mining Institute of America will hold its annual meeting Dec. 4 and 5 in Pittsburgh, Penn. Secretary, H. D. Mason, 911 Chamber of Commerce Building, Pittsburgh, Penn.

American Institute of Electrical Engineers will hold its 343d meeting Nov. 8, at 8:15 p. m., in the Engineering Societies Building, New York City, under the auspices of the industrial and domestic power committee. Secretary, F. L. Hutchinson, 29 West 39th Street, New York City.

Industrial News

Springfield, Ill.—The Chicago, Wilmington & Franklin Coal Co. has been sued by Margaret Furry for $10,000 for damage to her land through the failure of the company to place supports in entries when it took out the coal. She alleges that the surface subsided.

Bluefield, W. Va.—The Sandy Ridge Coal Co., operating at Drill, in Southwestern Virginia, will hereafter conduct its operations under the name of the G. R. Carter Coal Co., with G. R. Carter as general manager. A new tipple has recently been built by the company.

Charleston, W. Va.—Under a modification of the zoning regulations nut and slack coal for steam purposes produced in the Coal River, Guyan Valley and Kenova Thacker districts may be shipped into the Lower Peninsula of Michigan.

Uniontown, Penn.—A deed conveying 63 tracts of the Pittsburgh vein of coal to the Pittsburgh Coal Co. has been placed on record by C. E. Lenhart and others, trustees for I. W. Semans, bankrupt. The tracts are located in West Bethlehem, Smith, Strabane and Amwell townships, Washington County. The consideration named was $766,870.75.

Chicago, Ill.—The Chicago Pneumatic Tool Co. announces the appointment of A. M. Brown as district manager of sales, 1740 Market St., Philadelphia, succeeding G. A. Barden, who remains in Philadelphia as sales representative for the company. For some time past Mr. Brown has been located in the New York offices of the company as assistant manager of the compressor sales division.

Charleston, W. Va.—It is reported that Henry Ford has purchased the properties of the Marmet Coal Mining Co., Kanawha County, and the Otto Marmet mines, Putnam County. It is said the entire output of both operations will be used exclusively for the Detroit and other plants now operated by the Ford company. Controlling interests of both mines were owned by Marmet Brothers, of Cincinnati. The two operations have a daily output of 120 tons.

Toledo, Ohio—Despite the falling off in production in Ohio and West Virginia, due to influenza, activity at the docks at the lower lake ports has been marked. During the week ending Oct. 26 the Toledo & Ohio Central docks loaded 78,000 tons, as compared with 89,000 tons during the previous week. The total for the season is 1,952,000 tons. During the same week the Hocking Valley docks handled 259,572 tons, as compared with 151,780 tons during the previous week, making a total of 4,494,005 tons for the season.

St. Louis, Mo.—Fuel Administrator Crossley and the ten district engineers of the Missouri Fuel Administration had a meeting last Friday at the offices of the St. Louis Fuel Committee and decided upon a basis of classification of the questionnaires sent to industrial concerns last summer. There are to be five classes, based on efficiency and degree of essentiality. Those in the least efficient classes will be given the lowest rank. Those who failed to return the questionnnaires will find themselves without coal if a scarcity occurs.

Uniontown, Penn.—F. E. Markell, of Connellsville, Penn., a minority stockholder, has asked for the appointment of a receiver for the Pennsylvania Fuel Co., with offices in Uniontown. He also asked for an injunction restraining the payment of alleged exorbitant salaries to S. A. Carson, of Greensburg, and G. M. Hochheimer, of Uniontown, whom he charges with a conspiracy "to appropriate to themselves the profits and earnings of the corporation." He claims that for 1917 Carson drew a salary of $14,750 and Hochheimer $22,000 during the same period.

MARKET DEPARTMENT

Weekly Review

No Fears Entertained So Far As Soft Coal Is Concerned—Influenza Still Limits Production —Large Stocks of Soft Coal Reported at Mines—Many Operations Closed for Shipping Dirty Coal—Anthracite Still a Source of Worry—Small Sizes Plentiful.

SO FAR as bituminous coal is concerned, there is no immediate cause for anxiety. True, the ravages of the influenza epidemic in the coal-mining sections continue to limit production, but so large a quantity of soft coal has been accumulated in storage piles that no shortage is feared in any quarter. In fact, a surplus of coal has been reported from practically all mines west of Pittsburgh, this unusual condition being attributable largely to the possibility of an early peace and partly to the exceptionally moderate weather which has prevailed throughout the country for the past month or more. Developments in the war situation change with such rapidity that manufacturers of certain classes of goods will not keep their reserve stocks of coal at the permissible maximum limit. If, however, Germany should decline to accept the terms of the Allies' armistice, it is expected that the surplus now existing will soon disappear.

During the week ended Oct. 26 the output of soft coal is estimated at 11,215,000 net tons as compared with 11,524,000 net tons for the week ended Oct. 19. The downward trend is traceable directly to the influenza epidemic. Indications point, however, to a return of the gratifying tonnages of a month or so ago, as the disease is now on the wane.

With the urgent need for quantity production of soft coal now somewhat ameliorated, the Fuel Administration is again turning its attention to quality. During the week ended Oct. 28 orders were issued to 13 soft coal mines prohibiting them from mining or shipping their product as it was of an inferior quality. This makes a total of 99 mines closed since the Fuel Administration inaugurated its campaign for clean coal.

Anthracite output during the week ended Oct. 26 is estimated at 1,714,000 net tons, which is exactly the same tonnage produced during the week ended Oct. 19, but 339,000 net tons below the output of the corresponding week of 1917. The increase in wages which went into effect in the anthracite mines on Nov. 1 will undoubtedly bring back many of the mine workers who left for other industries because of higher wages. With added man power and no epidemic to contend against, an improvement in output can be expected shortly.

While there exists a scarcity of the domestic sizes of anthracite, there is an abundance of the small coals available. In some instances shippers are reducing their prices in order to dispose of their stocks of rice and smaller coals. Household consumers who have not as yet received their quota of hard coal would do well to look into the possibility of utilizing these small sizes, as it has been demonstrated that they can be successfully burned in household furnaces.

WEEKLY COAL PRODUCTION

The influenza epidemic continued to limit production of bituminous coal during the week of Oct. 26, and preliminary estimates place the output at 2.7 per cent. below the week preceding. The output during the current week (including lignite and coal coked), is estimated at 11,215,000 net tons as compared with 11,524,000 net tons during the week of Oct. 19 and 10,804,000 net tons during the corresponding week of 1917. The average production per working day during the week of Oct. 26 is estimated at 1,869,000 net tons and while lower than the preceding week, estimated at 1,921,000 net tons, exceeded daily production during the week of Oct. 26, 1917, estimated at 1,801,000 net tons, by 3.8 per cent.

The decline in production during the past few weeks now makes necessary an average daily production during the balance of the coal year of 2,047,000 net tons, an increase over the daily requirements of approximately 1.6 per cent. and over the average daily production for the coal year to date (1,988,000 net tons) of 3 per cent.

Production of anthracite during the week ended Oct. 26, estimated at 1,714,000 net tons, is exactly the same tonnage as produced during the week preceding, but fell below the corresponding week of 1917 by 339,000 net tons, or 17 per cent. The daily average during the current week is estimated at 286,000 net tons as compared with 334,000 net tons for the coal year to date and as against 332,000 net tons during the same period of 1917. For the period Apr. 1 to date, the total production is estimated at 59,087,000 net tons as compared with 58,789,000 net tons during 1917 or an increase of 0.5 per cent.

Carriers' reports show a decrease a shipments from all districts during the past week with the exception of the district including Cumberland, Piedmont and Somerset, northeast Kentucky and the smokeless fields of West Virginia, southwest Virginia and the district including Iowa, Texas and the Southwest State. Western Pennsylvania, Ohio and the district including Illinois, Indiana and western Kentucky fell behind the most, while the improvement in the various districts mentioned was slight.

Bituminous coal dumped at lake ports during the week ended Oct. 26 is estimated at 1,036,590 net tons, a decrease compared with the week preceding of 8 per cent. and 5 per cent. compared with the weekly average from July 1 to date. Total bituminous coal dumped at lake ports from Apr. 1 to date now amounts to 26,100,000 net tons.

Production of beehive coke in the United States during the week ended Oct. 26 is estimated at 592,000 net tons, an increase compared with the preceding week of 3 per cent., but a decrease of 2 per cent. compared with the corresponding week of 1917. The average production per working day during the current week is estimated at 99,000 net tons as compared with 95,000 net tons during the week of Oct. 19, and 101,000 net tons during the week of Oct. 26, 1917.

The operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania report production during the week ended Oct. 26 at 352,287 net tons, and the full time operation of their plants at 73.9 per cent. as compared with 75.1 per cent. during the week preceding. Shortage of coke cars caused a loss of full time of 3.8 per cent. and labor shortage of 19.2 per cent. The same operators produced 225,850 net tons of coal.

During the past few weeks, operating conditions in the byproduct industry varied but little, the operators of the country reporting full time operation of their plants at approximately 90 per cent., the limiting factor being reported as necessary repairs to plants. The operators of the country reporting for the week ended Oct. 26, show production of 577,808 net tons, approximately the same tonnage, as produced during the week preceding. Their plants were operated at 90.7 per cent. of their full time and out of a total loss of 9.3 per cent., 6.4 per cent. is attributed to repairs to plants, a slight increase over the preceding week.

Improvement in operating conditions occurred during the week in Kentucky, Massachusetts and New Jersey. In the former two states, it was due to repaired plants and in the latter state to better supply of coal. A decline in production is reported by the operators in Illinois, New York and Pennsylvania, brought about by repairs to plants. Increase in capacity in Pennsylvania during the week is due to the completion of new ovens by the Carnegie Steel Co., at Clairton, Pennsylvania.

BUSINESS OPINIONS

Marshall Field & Co.—Current distribution of dry goods is slightly ahead of the corresponding week of 1917. The volume of road sales for immediate delivery was well in excess of the same period last year. Road sales for future delivery were somewhat heavier. There was a marked falling off in the number of merchants in the market. Collections continue good.

Bradstreet's—Trade has decreased, operations for the future are under leash, and conservation tends to assume a more prominent role. Persistent talk of peace is an unsettling factor; the epidemic of influenza has made for noteworthy inroads on final distribution, has deterred country buyers from visiting the larger centers, and the warmest weather experienced in October for more than a generation has held down buying of fall goods from final purveyors. Despite the evident signs of a debacle among the Central European Powers, manufacturing on governmental account and war preparations in general, except in some shipyards, have not halted, nor is there any disposition to let up on essential activities.

The Iron Age—Munitions contracts were first thought of as most sensitive to the approach of peace, but instead the Shipping Board's action has been the barometer. The steps taken as to shipbuilding in the past week mark the passing of this part of the war program from the wasteful stage, in which haste was the first and last word, toward a basis of economic production. The most efficient yards will be pushed to the utmost, but high-priced operations will not long continue. Some plans for shipyard extensions have been given up; but meanwhile the output of ships will increase. Sentiment in the steel trade as

to coming changes runs all the way from an expectation of depression on the making of peace to a prediction that the need in the transition will be not for Government help in price maintenance but in holding prices down.

Dry Goods Economist—During the week the quotations on raw cotton, both for spot and future delivery, have receded slowly but firmly on the New York Cotton Exchange. Spot cotton dropped 70 points on Monday, 35 points on Tuesday, and 60 points on Wednesday. The highest prices for futures on Wednesday were 29.45 cents for December, and 29.10 cents for January. All other quotations were under 29 cents. Orders for supplies for the new United States Army, that is, for the men now being called to the colors, are being supplemented by calls for additional quantities of various items, presumably with the idea of keeping up the pre-determined reserve. The placing of these orders, which were for a substantial quantity of goods, has had the effect of holding up production of considerable quantities of cotton goods needed for commercial purposes.

American Wool and Cotton Reporter—Acting President Samuel G. Adams of the Boston Wool Trade Association has appointed a committee to draw up some plan to make suggestions to the Government as to the method of handling next year's clip. The larger houses have found that they have been unable to make any reasonable profit, if any, on the basis of 3½ per cent, the amount allowed by the Government, on the wool sold. Some, it is understood, have even operated at a loss. Mixed opinions are heard in regard to the cotton market, price fixing and peace talk. While statements are made that the South is losing money because of the investigation in regard to the price of the commodity, there are others who feel that over-statement has been made and that a reasonable profit will be realized. The opinion is expressed by some that there will be a larger crop than was expected owing to the excellent weather during the latter part of the season.

Atlantic Seaboard

BOSTON

Opinion general that New England requirements for steam coal are now well cared for. Problem to absorb the coal offered. Race between fuel authorities and larger distributors to see who can get to consumers first. More discrimination as to loading is called for, in order to reduce demurrage charges. Recent instances of latter have climbed as high as $3. Buyers alarmed over differential between deliveries by water and those all-rail. Movement via gateways still further reduced. "Free coal" the result of wholesale embargoes. All the railroads comfortably supplied. Increasing disposition on part of large buyers now to accumulate only sparingly. Provincial coal receipts show increase for the present. Anthracite receipts all-rail remain on same level. More cargoes loaded for New England lately than for several weeks. Fuel Administration has issued order to retail coal dealers to furnish broken and pea where egg, stove and chestnut are desired.

Bituminous—There is now a distinct feeling among the trade that requirements throughout this territory for bituminous are now amply provided for. To withdraw more ships would doubtless cause embarrassment, but the fact remains that New England consumers by and large have considerably in excess of four months' supply. Public utilities have been well served, and in every direction there are plants that now have in storage more than regulation are supposed to permit. Arguments are put out to influence consumers to take on coal even more liberally, but even the arrangement reported to have been arranged with Holland for 100,000 tons monthly has failed to make buyers here any more enthusiastic about receiving supplies in any heavier volume.

Even coal with minimum charges, as all-rail delivery from central Pennsylvania, is not the ready sale it was a month ago. The embargoes placed through fuel administration channels have raised havoc with the shipping instructions on file with the mines. And yet new embargoes are being placed from day to day. The idea of the fuel embargo was to insure such better distribution that no plant vitally necessary to the war program should be obliged to shut down from lack of coal while other plants less necessary, were well supplied. Now that every plant the length and breadth of this territory has as much probably as can be used the coming winter, it would seem idle to balk deliveries from mines needing orders to consumers willing to accept coal on the current basis. There will soon be enough deterrent reasons for consumers of their own motion to have shipments suspended. Under present circumstances the coal embargo is obsolescent.

Among the usual distributors in the trade there is much difficulty in placing coal from steamers arriving here. Embargoes have been placed so sweepingly that frequently a shipper has been obliged to parcel out an entire cargo to consignees practically unknown to him, this to the exclusion of regular customers to whom the coal would otherwise have been forwarded on contract.

The whole matter of differentials between water-borne coal and shipments all-rail is to steam-users. All through the season there was a mild sort of pressure among certain of the fuel administration officials to restrict the territory into which all-rail deliveries should be allowed, although more than once the Railroad Administration made authoritative statements that so long as there was no congestion at the New England gateways the matter of car-miles was not important.

Embargoes placed at wholesale have had the effect of forcing something of a tonnage into the open market, particularly from central Pennsylvania, where the embargo has been more often used. Operators who have season contracts with large consumers in this territory find themselves forbidden to make deliveries and in order to place their coal are now being obliged to solicit business from the few consignees who happened to escape the embargo net. There has been a good deal of this coal offering the past ten days. It is a sign of the changing times.

The railroads in New England appear to be comfortably supplied with the exception of the New Haven, which has been repairing and putting into shape several of its larger storage plants. The railroads in this territory have more steam coal on hand than a year ago. One of the smaller roads has nearly five times as much coal as on Nov. 1, 1917.

With all the larger consumers there is an increasing disposition to build up further reserves only very slowly and cautiously. There are many possibilities in the air, and lower marine freights and a reduced price for coal are among them, when it is considered that most of our steam-plants have now on hand coal that will not be used until March or April. Instead of shortage of labor or shortage of cars there may well be next year a shortage of orders.

Among the other receipts of water-borne coal that prove more or less difficult to absorb are certain cargoes of Cape Breton coal that regularly are now seeking a market here. During the spring and summer a certain tonnage of this coal was arranged for through the United States Shipping Board, partly to furnish cargoes for lake-built steamers that were in transit from the St. Lawrence to coastwise ports. Outside that particular quota the coal was then very hard to get, and it is significant that now a consistent effort is made to furnish consignment for cargoes of this that seem to be arriving with more frequency.

For all-rail movement during October complete figures are not yet available. It may be said however that the past week the daily receipts of railroad fuel have averaged only about 95 cars, while early in the month the average was well up to 150 cars. This shows a notable falling off which is equally pronounced with commercial bituminous. For the same recent period the daily average receipts at the five New England gateways were only slightly over 300 cars. The total receipts of bituminous therefore have lately been only about 400 cars per day, as compared with 750 per day during August.

Anthracite—Receipts of domestic sizes continue about on the level of the past month; namely, a daily average of 400 cars at the five gateways. This is only slightly less than the average for August. More hands at the New York loading piers have helped materially in the tonnage dumped into barges for New England consignees, and more cargoes have been loaded the past week than has been the case at any time since Oct. 1. There are still expansive delays at Port Reading, due largely to the lack of facilities there for loading and handling so many bottoms.

There continues to be a notable shortage of stove and chestnut, practically every retail consignee being obliged to accept a proportion of broken and pea. The result is a pronounced surplus of these sizes, and in certain communities the local fuel committee have been broad-minded and courageous enough to insist that householders accept what they can burn in their heaters and ranges rather than what they prefer. Finally, the Boston Fuel administration followed suit, and dealers have been ordered to furnish broken and pea instead of egg, stove and chestnut.

NEW YORK

Wage increase creates a better feeling in mining regions and it is believed many workers will return. Coal not moving as freely as desired but warm weather eases consumption. Local dumpings show an improvement. Buckwheat and the smaller sizes plentiful, and consumers who can do so are urged to use buckwheat instead of the larger coals. Bituminous situation easy.

Anthracite—The increase in wages granted the mine workers in the anthracite regions has created a much better feeling, and will go a long way toward inducing many of the former employees who left for other industries because of higher wages and better conditions to return to their former employment. Operators are estimating that several thousand men and boys will be back in their old jobs.

Locally the situation, so far as receipts go, continues to be acute. Coal has not been moving as freely as the trade would wish, but there is no serious complaint inasmuch as weather conditions have not been conducive to heavy consumption. Unseasonable temperatures during the latter part of October eased up coal burning considerably, and this is greatly responsible for the present condition which is good considering that production was further cut by the influenza epidemic.

Receipts here are reflected in the dumpings for the week ended Nov. 1, which show an increase over the previous week, 6425 cars having been dumped as against 5597 the previous week. For the month of October the dumpings were 26,615 cars, as compared with 27,944 cars in September, and 32,494 cars in August, certainly not an encouraging sign as cold weather approaches. However, as dealers point out, the fact that nearly every consumer has more or less coal on hand to tide them over for at least a few weeks, would indicate that conditions are better than they have been in previous years.

With a scarcity of the larger domestic coals, there is an abundance of the small sizes available, and some shippers continue to shave prices in order to move rice and the smaller coals. Those consumers who can do so, and those who can change their grates to burn this class of fuel, are being advised to make the changes because as it is pointed out by the State Fuel Administration they can secure a sufficient supply. The Anthracite Committee has sent out circulars stating that advices have been received that there is no restriction at the present time on the amount of anthracite coal below buckwheat No. 1 that a manufacturer may receive. The State Fuel Administrators have also been authorized to give country clubs the necessary permits to receive and burn bituminous or steam anthracite whenever, in their opinion, there is a surplus of such fuel for that purpose.

Some anthracite dealers are advising their consumers that it is possible for them to burn the small sizes in their household furnace providing they make a bed of ashes.

Current quotations, per gross ton, f.o.b. tidewater, at the lower ports are as follows:

	Circular	Individual		Circular	Individual
Broken	$6.75	$7.50	Buck	$5.10	$5.90
Egg	6.65	7.40	Rice	4 65	5.10
Stove	6.90	7 65	Barley	4 15	4.30
Chestnut	7.00	7.75	Boiler	4.60	
Pea	5.50	6.25			

Bituminous—The local situation is favorable. There is plenty of commercial coal to go around, with some to spare, as a result of the unseasonable temperatures that existed a week ago. In fact, stocks with some shippers have been so large within the past ten days that there were fears that prices would have to be cut in order to move the coal. This, however, was not necessary as there was another serious cut in production due to the influenza epidemic.

Some shippers look for a further reduction in production now that the railroads have discontinued giving box cars to operators of wagon mines, the order having gone forth that these cars are needed in the West for the shipping of grain. Wagon mine owners received an allowance of 75c. per ton for loading these cars, which they now lose. What, if any, effect this will have upon production is a matter of conjecture, although some shippers look for a slight reduction in production figures.

The order of the Fuel Administration permitting the local traction and lighting companies to accumulate 100,000 tons of bituminous coal each, in order that there may be no interruption of service this winter, may be the means of cleaning up considerable of the surplus coal here. This tonnage represents approximately 60 days' supply for each of the traction companies, and the accumulation has been authorized where there is risk of interruption of transportation during the winter.

While there is an accumulation of ordinary grades in the market there is a good demand for the better grades, which are scarce, being taken up by regular customers and those who need them for their particular business. Conditions in the bunkering market are not as favorable. Production of the coals necessary for this class of trade have been greatly reduced.

Water shipments to New England and towns along the Long Island Sound have not improved greatly. Efforts are being made to hurry coal forward to these points before the approach of winter weather and the attending transportation difficulties.

Current quotations, based on Government prices at the mines, net ton f.o.b., tidewater, at the lower ports, are as follows:

	Mine Gross	F.o.b. N. Y. Gross
Central Pennsylvania:		
Mine-Run, prepared or slack	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of Mine	3.08	5.23
Prepared	3.36	5.51
Slack	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite wage increase causes slight stir. Consumers anxious as to their prices. Shipments meager. Companies assure trade of full allotments. Pea plentiful. Stove and nut grow scarcer. Steam coals all slow but No. 1 buckwheat. Bituminous continues plentiful. Good stocks ahead. Market approaching quality basis?

Anthracite—The decision of Dr. Garfield to allow the anthracite miners a wage increase averaging $1 a day was heralded so far in advance as to cause no particular surprise to the trade. For several days prior thereto it was known that the leading anthracite representatives were in Washington, and it was understood they were figuring out the details of the new mines price for the coal. It was intimated very strongly that the increased wage schedule could be put in effect without a consequent increase in the wholesale price.

So far as demand for coal is concerned, the almost unprecedented mild weather has avoided what would otherwise have been an uncomfortable situation. Practically no coal to speak of has come to the city during the past two weeks and the dealers are far from showing the same patience as the public. No fires have been needed and the consumers have been less insistent than in cooler weather.

After interviewing representatives of several of the larger shippers we are strong in the belief that this territory is to be further neglected. Coal is moving west and to tide, particularly the latter, and there are no signs of it being diverted to this market for the present. The shippers show little disposition to advise their customers just what they may expect. The reason for this, we are told, is that so many times their plans have been made only to be upset by some preferential order of the fuel authorities. We are, however, much inclined to believe that the small shipper does not consider himself under the control of the Fuel Administrator to the same extent as the large companies. As proof of this we know of dealers who bought no coal from shippers during the basic year of 1916-17 but who are now receiving coal from that source. No large tonnages are involved, but the exceptions are causing the trade to lose faith in the whole scheme. Another instance that we know is irregular is the offering of prepared sizes as an inducement to sell the slowly moving culm. Such cases may be rare but the transactions invariably leak out.

The companies are advising their trade that all their allotments will be shipped and there is every reason to believe they will be. The regular, steady consignments so much desired will not be possible under the present method of starting heavy shipments and then suddenly diverting to another market. The smaller dealer fears coal will arrive in larger quantities than he can unload without demurrage charges. All dealers claim it is almost impossible to secure help to trim coal and therefore they will be unable to fill their yards to their capacity if it does come in bulk.

Pea coal is by all odds the most plentiful of the family sizes and many dealers are using every effort to persuade buyers of chestnut coal to use it. Egg is not so scarce in the city proper, but in the suburbs where Philadelphia's portion is chiefly consumed, it is eagerly sought. Stove and chestnut seem to grow scarcer every day and many yards have had no stocks of it for weeks.

That the smaller steam sizes drag is shown by the new ruling of the anthracite committee of the United States Fuel Administration. There is now no restriction on the tonnage of anthracite in sizes below No. 1 buckwheat that a manufacturer or a florist may receive. This is particularly pleasing to the latter, who because of having been restricted to 50 per cent. of their fuel requirements were in despair. Many of the smaller growers anticipating the winter's coal troubles quit the business last spring and summer. As it stands now the sizes of steam coal smaller than No. 1 are becoming so common that some larger users with big stocks ahead are reaching the position where they want to name the kind of coal rather than merely take in a certain size which had become the custom since the war conditions arose.

Some welcome news was conveyed to the dealers this week when the railroad companies announced they would make refund for coal lost and stolen during the so-called coal famine last winter, when crowds mobbed loaded cars of coal and carried the fuel away. Dealers have been notified to call in person and sign vouchers releasing the carrying companies from all claims in excess of those already presented.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.25	Buckwheat	$3.40	$4.45
Egg	4.80	6.15	Rice	2.90	3.80
Stove	5.05	6.40	Boiler	2.70	3.70
Nut	5.15	6.50	Barley	2.40	3.30
Pea	3.75	5.00	Culm	1.25	2.15

Bituminous—Soft coal continues in abundance, with almost every one being fairly well supplied with good shipments. Of course, the tonnage coming into the city has shown some slight decrease due to the shortage of man power in the regions on account of the influenza epidemic reaching its height there. All restrictions as to storing seem to be down, and there is a general feeling that the coal question has been solved this winter. Certainly there never was a greater tonnage of coal above ground in this district. Even small concerns who are only accustomed to run from one car to the next have from 30 to 60 days' supply on hand.

BALTIMORE

Bituminous conditions here remain tight in the face of a constantly growing demand. Jobbers puzzled as to their status under new rule. Hard coal supply far below needs. Substitutes urged are not available.

Bituminous—With the mine forces and railroads slowly recuperating from the effects of the epidemic of influenza, there is still a movement recorded considerably below the recent normal of coal handling. The result here is that conditions for soft coal remain very tight, and this is the more marked as additional consuming concerns come into the field for a resumption of coal shipments as their reserve supplies, at one time from 60 to 120 days ahead, have dwindled to the allotment allowed by the government for non-essential and essential industries.

During the past week the local fuel administrator has sent quite a number of requests for diversion to the district representative to care for this business, not enough coal having arrived here to the account of the administrator to care for the distribution. A pretty fair line of coal is now coming through, when the fact that the government is using the best grades for strictly preferential business, is considered. Action against some mines accused of sending dirty coal through has apparently had some effect on the situation, and little real complaint is heard among consumers here now as to the grade of coal supplied.

The jobbing trade continues puzzled about the effect of the order which enables mines to bill consumers direct, when they so elect, on coal requisitioned by the fuel administrators. Some believe that only the largest mines have facilities for handling such business direct and that jobbers as a whole will not be seriously injured, while others believe that the practice will finally hit the line of business hard. The Maryland Jobbers' Association discussed the subject, and was told of some concrete examples where purchasing agents were in danger of losing long established consuming connections, and it is understood the subject will be taken up with the Fuel Administration in Washington.

Anthracite—The hard coal supply here remains far below needs. For the first six months of the coal year it is announced that a total of 543,696 tons was received by Maryland on an allotment of slightly more than one million tons; of which Baltimore city and suburbs received 365,654 tons on an allotment of slightly more than 700,000 tons. The shipment covered both steam and coal for specialized war industries and public service corporations. Under the two-third distribution plan, however, many homes have as much coal as they can burn until January or February next, while thousands have no coal at all.

Lake Markets

PITTSBURGH

Production down 40 per cent. altogether. Next change will be improvement. Weakness in some Ohio markets. Pittsburgh coal firm.

R. W. Gardiner, production manager for the Pittsburgh district, estimates that coal production at the moment in the district is running 40 per cent. below the maximum rate which was attained just before the epidemic of influenza started. This does not mean that miners have the disease in any such proportion, as some are at home on account of sickness in the family and some have absented themselves because inoculation against the disease reduced their enthusiasm for work. Furthermore, there has been some car shortage due to railroad employees being affected by the disease. For a time the situation as to shipments east on the Pennsylvania was very bad, there being scarcely any movement, in fact. Mr. Gardiner feels that the authorities have now got the situation well in hand, as to inoculation and segregation, and that the effects of the epidemic will now wane.

Lake shipments are being maintained about as well as was expected when the diversion of 200 cars weekly to domestic trade in addition to previous movement was ordered, that being before influenza threatened. In the week ended Oct. 19 more than 300,000 tons was moved, and it is probable that the average will be about 300,000 tons a week to the end of the season. Shipments will cease within a fortnight or so.

Opening of the Black Rock gateway has allowed considerable Ohio No. 8 to move into Canada by rail and has to an extent relieved the situation there, as to there being a surplus of coal over the demand of the markets in the zone; and with the curtailment in production generally there is less surplus in Ohio districts than there was. It remains the fact, however, that retail dealers and domestic consumers are better supplied at this time than was expected would prove the case, and the coal situation as a whole is relatively easy. As usual, exception must be made of the byproduct situation, as it is only with difficulty that the byproduct plants are supplied, and even then they do not always receive the kind of coal they require for the most efficient operation, while they receive little if any coal to place in storage.

TORONTO

Transportation conditions show improvement. Local deliveries slow owing to the epidemic. Large numbers still destitute of fuel. Remedial measures by provincial fuel administration.

Transportation conditions have latterly shown some improvement, and coal shipments from the mines are coming forward promptly. The local situation, however, is still quite serious. The work of supplying some 12,000 families reported as being completely destitute of fuel goes forward, but slowly, as a large percentage of the employees of the coal companies are laid off owing to the prevailing epidemic and deliveries are greatly retarded. The situation is particularly bad in the suburbs and outlying districts. R. Home Smith, Ontario Fuel Administrator, has warned coal dealers that matters have taken a critical turn, owing to the presence of influenza in the mining districts, which has so curtailed production as to threaten the season's supply. Dealers are urged to lay in a supply of bituminous, which is at present plentiful, and to advise the purchase of buckwheat and small sizes of an-

thracite to mix with ordinary sizes. All anthracite stocked in public buildings has been placed at the disposal of the local fuel commissioners, and made available for domestic consumption.

BUFFALO

Bituminous more plentiful. Consumers not buying freely. Anthracite not increasing. Lake shipments good.

Bituminous—Supply is ahead of the demand and there is quite some unsold coal on the market. Jobbers report that they are now receiving proffers of coal from the mines. Slack is especially plentiful. This state of things cannot last long. The influenza has cut down production materially, and there would surely be a shortage but for the closing of the lakes at the end of this month, which always makes the eastern supply easier. It will be some time before these contending influences can be sized up, and in the meantime it looks as if consumers were going out of the market too soon.

In spite of regulation, bituminous prices must now be reported as weak, but still at $4.65 for thin vein Allegheny Valley, $4.45 for Pittsburgh lump, $4.20 for Pittsburgh mine run and slack, $5.65 for smithing and smokeless, $5.60 to $6.10 for cannel, all per net ton f.o.b. Buffalo.

There is an effort to get a return to this market of the Ohio No. 8 after the lakes close, as it was cut off in order to supply that trade.

Anthracite—The demand keeps up, but the supply is light so far as the local trade goes, and it is likely to be so for at least another month. Some towns are adopting the plan of delivering one ton to a customer till all have some, but the retailers do not like the idea on account of the extra work.

It does not look as if the amount of coal in cellars was less than usual, but it is not well distributed. Some retailers have paid little attention to the rules and have delivered large amounts to friends and those who were most persistent in demanding coal. It is of course to their interest to do this. Everybody hopes that the shippers are right when they declare that there will be coal enough. They agree that it will be short of the demand practically all winter, for the consumers want their full supply now and will not relax their demands till they get it.

Shipments by lake continue liberal. There were no storms of consequence in October to hold up the fleet, so the loading went on unabated. Tonnage is plenty. The amount reported for the week was 140,300 net tons, of which 83,400 tons cleared for Duluth or Superior, consignee's option, 25,100 tons for Chicago, 13,800 tons for Milwaukee, 6600 tons for Ashland, 5500 tons for Fort William, 3200 tons for Hancock, 2700 tons for Racine.

The rate to Racine has advanced 25c., and Hancock, 27c., the list being $1.25 to Racine, 75c. to Hancock, 60 to 65c. to Chicago, 55c. to Milwaukee and 48c. to Duluth, Ashland and Fort William, per net ton, f. o. b. vessel.

CLEVELAND

Production in eastern and southern Ohio has been severely cut by the influenza epidemic, but on account of the decreased demand for bituminous for the lake trade this loss is scarcely being felt. Bituminous supply for the retail trade finally has become equal to the demand. Unexpectedly, the lake trade will come to an end 15 to 20 days before the date fixed, but the Northwest will receive its full quota in spite of this fact.

Bituminous—Production losses of 40 to 50 per cent. suffered by southern and eastern Ohio mines because of influenza are common reports just now. As operators were believing that the worst was over the epidemic broke out with renewed violence, and because of the scarcity of physicians and nurses in the small mining communities the death rate has been alarmingly large. Railroad crews have been affected even worse than the mine workers, but even so car supply has been exceeding requirements. For the first time in months retail dealers report receipts of bituminous equal to the demand. Also for the first time in months, operators are offering tonnages to retail dealers. Domestic consumers, however, are well coaled and dealers are not swift to seize at operators' proffers.

With shipments of slack and run-of-mine cut off from the Northwest, the supply for industrial consumers has increased appreciably. The demand for slack for more than a year has been greater than the supply, and all the slack turned on the market is being snapped up eagerly. Industrial and domestic receipts are coming in at about the same gait as for the past two weeks, the lost production due to influenza being taken up by the slackening lake trade.

Anthracite—Advice of the Ohio fuel administration that No. 1 buckwheat—which is practically all that has been coming here for some time—can be profitably burned when mixed with 70 per cent. stove and egg sizes is being accepted with reservations. All that is lacking is the remaining 70 per cent., dealers point out. Receipts of anthracite continue at a small fraction of the demands, and arrival of 100 cars a week is considered big.

Lake Trade—Diversion of vessel tonnage by the British has caused congestion at North Atlantic grain elevators. Consequently, elevators at Buffalo are choked, and the plans to divert lake carriers from ore to grain for all of November and half of December have been abandoned. As a result, the lake season will come to a close two or three weeks earlier than expected, and practically no coal will be floated after Dec. 1, it is now believed. Last December over 660,000 tons of bituminous were loaded for the Northwest. October's shipments, however, in the final analysis will be found about 1,000,000 tons ahead of the schedule, which called for 3,500,000 tons, and 2,400,000 tons in November, as planned, will just about see the Northwest supplied its 28,000,000 tons. The heavy movement in the first three weeks of October is all that has saved the Northwest, in view of the unexpected turn of events. With no grain to bring down there will be no need of coal ballast for the planned upbound trips. Upper lake docks, however, are so heavily loaded down the little coal that now is coming forward to Lake Erie ports is not consigned. Where bituminous loading at the lower lake docks averaged about 1,100,000 tons a week for the first three weeks of October, it now is at scarcely more than 700,000 tons. Modification of the zone lines, giving Ohio mines a larger outlet for the coal capacity that has been going up the lakes, is expected to take up the slack that will result when influenza wanes and full time production is resumed.

DETROIT

Steam coal is attracting less interest. Domestic buyers seem inclined to delay, hoping to get anthracite. Lake trade maintains good volume.

Bituminous—Although good steam coal is not overplentiful, the consumers seem less eager to buy than they were a few weeks ago. The fact that a number of the large manufacturing plants have fairly large reserves, while many of the industrial plants of lesser magnitude have no place to put more than a carload or so, is the explanation of the quieter state of the local market, according to jobbers. The insufficiency of storage accommodations at many of the plants also is preventing numerous consumers of steam coal from taking full advantage of the Federal Fuel Administration's recent relaxation of the restrictions on the size of reserves.

Jobbers say also that the consumers of steam coal, to assure a sufficient supply of stock, have been taking more or less coal of poor quality, which they desire to use before adding to their supply. The retail dealers are described as having found themselves confronting a similar problem, created by stocks of mine-run and coal from Illinois mines, which restrict their buying of the prepared sizes of better grades of coal coming into the market from Ohio and West Virginia. Domestic consumers, the jobbers say, are asking for the coal that dealers are in an unfavorable position to supply and are objecting to receiving the coal on hand.

Anthracite—Anthracite has been moving into the Detroit market more freely during the month and receipts are estimated at around 90,000 tons, part of which must be charged off on deliveries to be made later in the year. By crowding the early shipments it was planned to make possible distribution of part of their winter allotment to a greater number of families before weather conditions arise that may interfere with the program. The increase in movement threw a heavy burden on retailers. With labor hard to get and working forces reduced by the epidemic of influenza, delivery from cars to customers was not in all cases possible, and some of the dealers were obliged to unload cars in their yards, incurring the expense of handling the same stock several times.

COLUMBUS

A slack in the demand for both mine-run and screenings characterizes the Ohio trade. Restrictions on shipping mine-run into Michigan have produced an oversupply. Mine-run from the Hocking field cannot be shipped to the lakes. There is a good demand for lump and lake tonnage.

The feature of the coal trade in Ohio during the past week was the large amount of mine-run on the market and the efforts required on the part of sales agents to sell it. This is so different from the conditions that have prevailed for the past year or more as to be worthy of special notice. With mine-run kept out of the hands of Michigan steam users and further restrictions against shipping it to the lakes, the supply of that grade became large. Steps were taken at once to get the railroads to take mine-run in preference to using Indiana coal, as was ordered, and after several days the Fuel Administration secured the modification. That helped to relieve the situation to a certain extent. Operators had about decided that they would have to curtail production unless some relief was afforded. Steam users in Ohio are generally stocked up to the limit and in many cases have fuel supplies for three months in the future.

The lake trade is still active and a large tonnage is still moving to the Northwest. Reports indicate that the requisition for that section will be filled unless something unforeseen occurs. There is sufficient mine-run and screenings in the upper lake region, which has resulted in the prohibitions against shipping those grades from Ohio.

The retail trade is rather quiet because of the continued warm weather. Dealers have large stocks ahead and most of them have all available storage space filled. Dealers have a good supply of mine-run and are not accepting any more. They are still in the market for lump when obtainable. Pocahontas is out of the market completely. The Ohio dealers are depending largely on Ohio mined coal for their supply. Some West Virginia grades are being received. Retail prices are firm at former levels.

CINCINNATI

With demand good in all departments, the epidemic is the most serious factor in the supply. Little improvement is reported from mining districts.

Somewhat cooler weather prevailing during the past week tended to stimulate consumption of coal for heating purposes, and to that extent to improve the demand, which, however, has remained about normal, with an excellent supply, especially of steam coal. Domestic coals are also available in good supply, and several of the larger retail concerns are making vigorous sales efforts, by way of advertising, solicitation and otherwise, a condition which it was hardly anticipated would prevail during this season. Good receipts of rail and river coal, enabling these companies to accumulate large yard supplies, gave them the opportunity to do some aggressive sales work, and the opportunity was not overlooked.

Conditions at the mines are threatening seriously to interrupt the forwarding of adequate supplies of fuel, however, as the influenza epidemic, which is at its height in the Ohio, West Virginia and Kentucky fields within overnight journeys from this point, has reduced working forces badly. Should cold weather, which is daily expected by the weather office, come suddenly, bringing its usual large demand for fuel, receipts might prove inadequate. It is hoped that the epidemic is nearing its end, but just now the daily record of new cases and of deaths does not indicate any slackening of the power of the disease.

LOUISVILLE

General demand for coal draggy with possible exception of better grades of eastern Kentucky lump. Retailers loading up first real stocks of a long time. All grades of steam dull.

Mild October weather, coupled with the fact that domestic consumers as well as steam consumers are well stocked, has resulted in all grades of Western Kentucky coal being draggy, while Eastern Kentucky domestic coal is the only grade that is showing a real demand. It is claimed that Eastern Kentucky lump stands a good chance of being in demand throughout the entire season, owing to the small supplies that have been received to date, and the fact that no Virginia or Pittsburgh coal to speak of has been coming by rail or water. However, steam consumers using the better grades of Eastern Kentucky are apparently well stocked and are not buying liberally.

Western Kentucky domestic and steam coal has been sold freely on the market during the past few days, as several of the Western Kentucky operators were unable to make full delivery on Southern contracts, owing to influenza which closed down many industrial plants and resulted in a halt being called on the Western Ken-

tucky shippers. The result was that these shippers shoved as much coal into Louisville as the market could take care of. The steam grades were not wanted, while the domestic demand was chiefly from the retailers, who would have been willing to take considerably more coal if they could just get the labor to unload from cars.

There has been a considerably larger supply of Hazard coal coming on the local market within the past two weeks or so, and many consumers who had been objecting to taking deliveries of lower grades of western Kentucky accepted this coal.

Jobbers have been handling a little Indiana coal into Northern Indiana points, and have been fairly active in a small way in handling Kentucky coal in Louisville and out through the state, but as a whole the jobbing trade has been dull for the past two or three weeks in so far as steam and western Kentucky lump is concerned. Retailers are in the same fix, and being unable to sell have gone ahead and accumulated from a week to two weeks or better supplies of coal on the local yards, this being by far the best supply of domestic coal that has been on hand in the city at one time in a year or eighteen months.

Production has been very low as a result of influenza, which is showing much improvement, and which appears to be virtually checked in many localities. Many of the mines are beginning to get out something like normal production again. Eastern Kentucky mines expect to continue making deliveries to the lake region for three weeks if weather conditions permit, while southeastern Kentucky is still shipping south, and the Elkhorn district to the gas and byproduct plants. The short production caused by the epidemic has not been appreciably felt, and it is hardly believed that it will be felt to any great extent due to the fact that the country was well stocked up, and there was not much place to put fuel when the epidemic interfered.

BIRMINGHAM

With influenza on the wane coal production again improving. Steam market rather inactive. Domestic strong. Car supply adequate to requirements.

With the influenza epidemic, which has so seriously retarded coal production in Alabama for the past two weeks, rapidly losing its grip, the output is now showing a gradual upward trend. Sickness among mine workers at some camps completely paralyzed operations for several days, and caused more or less loss of tonnage at every mine in the state. The output for the week ending Oct. 19, was 323,310 net tons, the lowest since the Government has been tabulating production.

Despite the fact that there has been such a sharp decline in coal produced the steam market has not been stimulated to any noticeable extent. Buyers are manifesting a passive attitude, and new business and bookings already in hand are about equal to the available tonnage. Shippers have instructions to fill railroad orders 100 per cent. before supplying other consumers.

The domestic trade is very active and the shortage in supply is being felt by both consumers and dealers. Stocks on yards are low and retailers have much unfinished business on their books. The State Fuel Administrator has restricted delivery by dealers to one ton to each family at any one time, effective Nov. 1.

The Fuel Administration has granted an increase in the price of coal mined by the Warrior-Pratt Coal Co., fixing a figure of $2.25 for mine-run, $2.50 for prepared sizes, and $2 for slack and screenings. The West Helena Coal Co. is also allowed an advance, the new prices being $3 for mine-run; $3.30 for prepared and $2.65 for slack and screenings. To the above figures is to be added 45c. per ton.

Cars are now plentiful in this district and no complaints are reported on service being afforded.

Coke

CONNELLSVILLE

Curtailment in production less than might have been expected. Price expectations in event of hostilities ceasing.

Production of coke and of byproduct coal in the Connellsville region, while considerably curtailed by the epidemic of influenza, is considered relatively satisfactory in the circumstances.

While supplies of coke and byproduct coal are curtailed, there has been no particular shortage of coke at blast furnaces such as would in itself interfere with pig iron production. Indeed, a number of blast furnaces have been in more danger of banking on account of the influenza epidemic decreasing their working forces, than from any shortage of coke.

The imminence of a cessation of hostilities has brought to the front consideration of market conditions in such event. The iron and steel trade has hitherto regarded all Government prices as of virtually the same order, although iron and steel prices are fixed by the War Industries Board by agreement with the producers, while coal and coke prices are fixed by the Fuel Administration, under authority of the Lever act. For the transitory period the case is different. If it became desirable to sustain prices in the period from war time to peace time conditions, an agreement with producers as to minimum prices (fixed prices thus far having been a maximum, not minimum) might encounter legal difficulties. Coke, accordingly, takes a place by itself. The Fuel Administration's authority extends at least to the declaration of peace by Presidential proclamation, which doubtless will occur long after the cessation of actual hostilities has made business start seeking a peace basis, while furthermore a broad construction of the Lever act would seem to indicate that the authority granted is to fix prices either way, maximum or minimum, it being simply a detail that the Fuel Administration found that what was needed for the good of the country, being at war, was a maximum price for coke and not a minimum. The market remains quotable at the set limits: Furnace: $6; foundry, 72-hour selected, $7; crushed, over ¾-in., $7.30; clean screenings, over ½-in., $5.50, per net ton at ovens.

The "Courier" reports coke production in the Connellsville and Lower Connellsville region in the week ended Oct. 26 at 302,394 tons, a decrease of 11,651 tons, and raw coal shipped 234,517 tons, a decrease of 11,561 tons.

Middle Western

GENERAL REVIEW

No change over recent weeks. Car shortage and influenza decrease production. Only thing that will put life into Middle West market is a radical readjustment of zones.

The market is still weak, and this is rather remarkable when one considers that the production figures have taken a heavy drop, and at the same time an outside factor has entered the market and bought a large quantity of coal. We are referring to some of the railroads who have mines of their own, ample in size to take care of all the wants of their railroad owners. These mines, however, have been down on account of the influenza, and as a direct result their owners have been forced into the open market to purchase their coal. It is worth stating in passing, that in most cases these railroads have been able to purchase as much coal as they desire, at a figure considerably below the prices set by the Government.

The car question is again coming to the fore. The order some time back, taking coal-carrying equipment from the Middle West fields and sending it to eastern mines, is beginning to be felt by the operators, especially in the southern Illinois field, and in some districts of Indiana. This car shortage, while it is not serious at the present time, will nevertheless decrease the production figures for the week to a noticeable extent

The prevailing question among the operators is—"What will the situation be when operating conditions come back to normal, when it has already been demonstrated that the market for Illinois and Indiana coals cannot absorb even a greatly decreased tonnage?" The only answer to this question is a radical readjustment of the zones, which will give producing territories affected a larger and more extensive market for their productions.

The recent changes made in Zone D, for the benefit of the Indiana operators, have not proved as beneficial as hoped for, as there has been practically no change in the market on Indiana coals. There is a possibility however, that freight rates will be published for coal from mines in Indiana to points in Michigan hitherto not reached, except by expensive local rates. If these proposed rates are published, it will open up practically a new territory for Indiana, and ought to strengthen the present weak market in that district to a noticeable degree.

CHICAGO

Plenty of steam and domestic coal in Chicago. Little anthracite being received.

Coal continues to be plentiful in Chicago, both steam and domestic. We understand that today there are approximately three hundred cars of coal in the central district of Illinois, that are standing on the track, on which no disposition has been received. This is a decidedly significant thing, especially in view of the fact that both the State Fuel Administration and the District Representative for the Fuel Administration are doing everything they can to move this coal. There are an increasing number of fires reported in the various large storage piles throughout the city, and this, no doubt, has a tendency to hinder further purchases on the part of the large consumers.

The domestic situation is practically the same as the steam situation, with plenty of coal of all kinds being offered, and orders being canceled rather than placed.

There is little hope extended to the trade, so far as anthracite is concerned, and the parties who are handling this question for the Fuel Administration are still continuing to create considerable criticism.

ST. LOUIS

A lagging market, with no demand for either steam or domestic, and a surplus of all coals offered. Country business weak and prices unsettled. Mild weather continues and future is not promising. Cars plentiful and transportation good.

The local domestic demand at the present time is nil. The mild weather has even eliminated the usual buying of Standard coal among the poorer classes. This, of course, will come with colder weather. Steam users are buying just as little as possible, knowing that this attitude will force lower prices; and it has already done so in the case of Standard coal. Standard screenings are down to $1.50, 2-in. lump to $2.15, with the other sizes breaking below the Government maximum. In the Standard districts the mines are working only to the extent that orders are furnished. There is no car shortage. Conditions in general throughout the Standard field are satisfactory, or would be if there were orders. Labor seems to be better and car supply and transportation satisfactory.

In the Mt. Olive field the mines are working steadily, but the operators are having a hard time to dispose of the tonnage. There is a surplus in this field, as well as in others. Conditions are much better than in the Standard field, as this coal moves to better markets, and under better rates and conditions.

In the Carterville and Duquoin fields the car supply has improved to a great extent recently, and conditions in a general way are satisfactory, except that at some mines domestic orders are being caught up with. Throughout all southern Illinois the question of labor at some mines has been serious on account of the influenza epidemic.

The railroad tonnage throughout the entire district continues heavy. As a matter of fact, in the Standard and Mt. Olive fields if it were not for the railroad tonnage the general average of working days at the mines on commercial coal would be about 1½ days per week.

The domestic tonnage, however, in the Carterville and Duquoin fields for the present could take all the working time, but these orders will be caught up with in the course of ten days or two weeks' time and then the railroad tonnage would have to come in in order to keep the property running.

A strenuous effort has been made on the part of the Illinois operators and dealers in the State of Missouri and states west of the river to have the Fuel Administration release the present restrictions on zones for Illinois coals.

No outside coals are coming into St. Louis. There are no changes in the retail prices, and the wholesale prices are with the exception as noted above the same as last week, which are:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.55@2.75	$2.55@2.75	$2.40@2.70
3x6-in. egg	2.55@2.75	2.55@2.75	2.40@2.70
2x3-in. nut	2.55@2.75	2.55@2.75	2.40@2.70
Washed:			
No. 1	3.05@3.20	3.05@3.20	.....
No. 2	3.05@3.20	3.05@3.20	.....
No. 3	3.05@3.20	3.05@3.20	.....
Mine Run	2.35@2.50	2.35@2.50	2.20@2.30
Screenings	2.17@2.32	2.17@1.32	1.50@1.60

Special preparation on Carterville is 10 cents. extra
Williamson & Franklin Co. rate is $1.10.
Other fields 95 cents.

CURRENT PRICES—MATERIALS & SUPPLIES

IRON AND STEEL

PIG IRON—Quotations compiled by The Matthew Addy Co.:

	Current	One Month Ago
CINCINNATI		
No. 2 Southern	$37.60	$37.60
Northern Basic	34.80	34.80
Southern Ohio No. 2	35.80	35.80
NEW YORK, Tidewater delivery		
Penna. 2X	39.55	39.15
Virginia No. 2	41.70	41.70
Southern No. 2	41.70	41.70
BIRMINGHAM		
No. 2 Foundry	34.00	34.00
PHILADELPHIA		
Eastern Pa. 2X	39.15	38.65*
Virginia No. 2	40.50	40.50†
Basic	36.90	36.90*
Grey Forge	36.90	36.90*
Bessemer	39.10	38.80*
CHICAGO		
No. 2 Foundry Local	34.50	34.50
No. 2 Foundry Southern	39.00	39.00
PITTSBURGH, including freight charge from the Valley		
No. 2 Foundry Valley	35.40	35.40
Basic	34.40	34.40
Bessemer	36.60	36.60

*F.o.b. furnace. †Delivered

STRUCTURAL MATERIAL—The following are the base prices, f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

	Mill Pittsburgh	New York Current	New York One Year Ago	St. Louis	Chicago
Beams, 3 to 15 in.	$3.00	$4.27	$5.25	$4.27	$4.27
Channels, 3 to 15 in.	3.00	4.27	5.25	4.27	4.27
Angles, 3 to 6 in. ¼ in. thick.	3.00	4.27	5.25	4.27	4.27
Tees, 3 in. and larger	3.05	4.27	5.30	4.27	4.27
Plates	3.225	4.77	10.00	4.52	4.52

BAR IRON—Prices in cents per pound at cities named are as follows:

Pittsburgh	St. Louis	Denver	Birmingham
3.50	4.50	4.85	4.47

NAILS—Prices per keg from warehouse in cities named:

	Mill Pittsburgh	St. Louis	Denver	Chicago	Birmingham	San Francisco	Dallas
Wire	$3.50	$4.37	$5.11	$4.32	$4.76	$5.35	$4.75
Cut	4.00	6.50	5.61	4.47	.....	5.75	.....

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh	Cincinnati	Chicago	St. Louis	San Francisco	Birmingham	Denver
Standard railroad spikes ⅞-in. and larger	$3.90	$6.00	$4.50	$5.30	$6.70	$6.00	$5.55
Track bolts	4.90	8.90	5.50	Prem.	8.00	8.00	6.55
Standard section angle bars	3.25	....	4.45	Prem.	5.15	....	4.95

COLD DRAWN STEEL SHAFTING—From warehouse to consumers requiring fair-sized lots, the following discounts hold:

Cincinnati	Cleveland	Chicago	St. Louis	Denver	Birmingham
17½%	List	+10%	+15%	+30%	+30%

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill Pittsburgh	Cincinnati	Chicago	St. Louis	Denver	Birmingham
Straight	$5.75	$7.75	$6.50	$6.25	$8.00	$7.25
Assorted	5.90	7.75	6.50–7.00	6.40	8.25	7.50

Cincinnati—Horseshoe nails sell for $4.50 to $5 per 25-lb. box.

CAST-IRON PIPE—The following are prices per net ton for carload lots:

	New York Current	New York One Month Ago	New York One Year Ago	Chicago	St. Louis	San Francisco
4 in.	$70.70	$64.35	$68.50	$69.80	$68.00	$80.50
6 in. and over.	67.70	61.35	65.50	66.80	65.00	77.50

Gas pipe and 16-ft. lengths are $1 per ton extra.

STEEL RAILS—The following quotations are per ton f.o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

	Pittsburgh Current	Pittsburgh One Year Ago	Chicago Current	Chicago One Year Ago
Standard Bessemer rails	$57.00	$38.00	$67.00	$38.00
Standard openhearth rails	55.00	40.00	65.00	40.00
Light rails, 8 to 10 lb.	*3.135 (100 lb.)	83.00	*3.135 (100 lb.)	68.00
Light rails, 12 to 14 lb.	*3.09 (100 lb.)	82.00	*3.09 (100 lb.)	67.00
Light rails, 25 to 45 lb.	*3.00 (100 lb.)	75.00	*3.00 (100 lb.)	65.00

* Government price per 100 lb.

OLD MATERIAL—The prices following are per gross ton paid to dealers and producers in New York. In Chicago and St. Louis the quotations are per net ton and cover delivery at the buyer's works, including freight transfer charges:

	New York	Chicago	St. Louis
No. 1 railroad wrought	$30.90	$30.00	$33.00
Stove plate	26.10	25.00	25.50
No. 1 machinery cast	34.00	29.00	20.50
Machine shop turnings	16.85	16.50	18.50
Cast borings	16.85	16.50	18.50
Railroad malleable cast	31.10	29.00	32.50

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Cincinnati	Birmingham	St. Louis	Denver
$0.12	$0.16½	$0.18	$0.19	$0.18½

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis	Birmingham
Solid	16c	16c.	15c.
Hollow	24c.	...	...

PIPE—The following discounts are for carload lots f.o.b. Pittsburgh; basing card of Nov. 6, 1917, for steel pipe and for iron pipe:

BUTT WELD

Steel Inches	Steel Black	Steel Galvanized	Iron Inches	Iron Black	Iron Galvanized
⅛, ¼ and ⅜	44%	17%	¾ to 1½	33%	17%
½	48%	33½%			
¾ to 3	51%	37½%			

LAP WELD

2	44%	31½%	2	26%	12%
2½ to 6	47%	34½%	2½ to 4	28%	15%
			4½ to 6	28%	15%

BUTT WELD, EXTRA STRONG PLAIN ENDS

⅛, ¼ and ⅜	40%	22½%	¾ to 1½	33%	18%
½	45%	36½%			
¾ to 1½	49%	36½%			

LAP WELD, EXTRA STRONG PLAIN ENDS

2	42%	30½%	2	27%	14%
2½ to 4	45%	33½%	2½ to 4	29%	17%
4½ to 6	44%	32½%	4½ to 6	28%	16%

From warehouses at the places named the following discounts hold for steel pipe:

	Black New York	Black Chicago	Black St. Louis
⅜ to 3 in. butt welded	40%	43%	37%
3½ to 6 in. lap welded	36%	39%	33%
	Galvanized New York	**Galvanized Chicago**	**Galvanized St. Louis**
⅜ to 3 in. butt welded	28%	28%	22%
3½ to 6 in. butt welded	25	25%	19%

Malleable fittings. Class B and C, from New York stock sell at list + 15%. Cast iron, standard sizes, 5% off.

SHOP SUPPLIES

NUTS—From warehouse at the places named, on fair sized orders, the following amount is deducted from list:

	New York Current	New York One Year Ago	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago
Hot pressed square	$2.50*	List	$1.25	$1.65	$0.98	$2.00
Hot pressed hexagon	2.50*	List	1.05	1.50	.78	2.00
Cold punched square	2.50*	List	.75	1.25	1.00	1.50
Cold punched hexagon	2.50*	List	75	1.25	1.00	1.50

* List plus.

Semi-finished nuts sell at the following discounts from list price:

	Current	One Year Ago
New York	40%	50%
Chicago	50%	50%
Cleveland	50 + 10%	50%

MACHINE BOLTS—Warehouse discounts in the following cities:

	New York	Cleveland	Chicago
⅜ by 4 in. and smaller	30%	40 + 10%	37%
Larger and longer up to 1 in. by 30 in.	15%	20 + 5%	25—5%

WASHERS—From warehouses at the places named the following amount is deducted from list price:

For wrought-iron washers:
New York....$2.50 Cleveland.... List Chicago....$2.50

For cast-iron washers the base price per 100 lb. is as follows:
New York....$5.00 Cleveland....$4.25 Chicago....$4.50

RIVETS—The following quotations are allowed for fair sized orders from warehouse:

	New York	Cleveland	Chicago
Steel ½ and smaller	30%	45—5%	40%
Tinned	30%	45—5%	40%

Button heads, ⅜, ½, 1 in. diameter by 2 in. to 5 in. sell as follows per 100 lb.:
New York...$5.65 Cleveland...$5.15 Chicago....$5.67 Pittsburgh...$4.65

Concheads, same sizes:
New York...$5.75 Cleveland...$5.25 Chicago....$5.77 Pittsburgh...$4.75

MISCELLANEOUS

GREASES—Prices are as follows in the following cities in cents per pound for barrel lots:

	Cincinnati	St. Louis	Birmingham	Denver
Cup	7.2—8.2	7	8	12½
Fiber or sponge	7.2—8.2	..	8	20
Transmission	7.2—8.2	7	8½	20
Axle	4.6—4.9	4	4	5½
Gear	4.9—7.1	..	8	9
Car journal	4.9	..	5	8½

BABBITT METAL—Warehouse prices in cents per pound:

	New York		Cleveland		Chicago	
	Current	One Year Ago	Current	One Year Ago	Current	One Year Ago
Best grade	95.00	70.00	93.00	70.00	96.00	70.00
Commercial	50.00	40.00	23.00	24.50	25.00	25.00

HOSE—Following are prices of various classes of hose:

Fire

	50-Ft. Lengths
Underwriters' 2½-in.	75c. per ft.
Common, 2½-in.	40%

Air

	First Grade	Second Grade	Third Grade
¾-in. per ft.	$0.55	$0.30	$0.25

Steam—Discounts from list

First grade 30% Second grade 30–5% Third grade 40–10%

LEATHER BELTING—Present discounts from list in cities named:

	Medium Grade	Heavy Grade
St. Louis	45%	35%
Denver	35–5%	30%
Birmingham	35%	35%
Chicago	45%	40%
Cincinnati	40–10%	40%

RAWHIDE LACING—25% off list.

PACKING—Prices per pound:

Rubber and duck for low-pressure steam	$0.99
Asbestos for high-pressure steam	1.76
Duck and rubber for piston packing	1.10
Flax, regular	.99
Flax, waterproofed	1.21
Compressed asbestos sheet	1.10
Wire insertion asbestos sheet	1.30
Rubber sheet	.66
Rubber sheet, wire insertion	.99
Rubber sheet, duck insertion	.55
Rubber sheet, cloth insertion	.25
Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes	1.21
Asbestos wick, ½- and 1-lb. balls	.75

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York and St. Louis
Galvanized iron rigging	+20%
Galvanized cast steel rigging	List
Bright plain rigging	30%
Bright cast steel	17½%
Bright iron and iron tiller	5%

MANILA ROPE—For rope smaller than ⅝-in. the price is ½ to 2c. extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: ⅜-in., 8 ft.; ½-in., 6; ⅝-in., 4½; ¾ in., 3½; 1¼-in., 2 ft. 10 in.; 1½-in., 2 ft. 4 in. Following is price per pound for ⅝-in. and larger, in 1200-ft. coils:

Boston	$0.33½	Birmingham	$0.39
New York	.36	Denver	.36
Cincinnati	.33½	Kansas City	.34½
Chicago	.34	Seattle	.33
St. Paul	.34	St. Louis	.34½
San Francisco	.32	Los Angeles	.34

PIPE AND BOILER COVERING—Below are discounts and part of standard lists:

PIPE COVERING

Pipe Size	Standard List Per Lin. Ft.
1-in.	$0.27
2-in.	.36
6-in.	.80
4-in.	.60
3-in.	.45
8-in.	1.10
10-in.	1.30

85% magnesia high pressure List

For low-pressure heating and return lines { 4-ply 58% off; 3-ply 60% off; 2-ply 62% off

BLOCKS AND SHEETS

Thickness	Price per Sq.Ft.
½-in.	$0.27
1-in.	.30
1½-in.	.45
2-in.	.60
2½-in.	.75
3-in.	.90
3½-in.	1.05

LINSEED OIL—These prices are per gallon:

	New York		Cleveland		Chicago	
	Current	One Year Ago	Current	One Year Ago	Current	One Year Ago
Raw in barrel	$1.61	$1.23	$1.90	$1.30	$1.65	$1.27
5-gal. cans	1.76	1.33	2.00	1.40	1.85	1.37

* Nominal.

WHITE AND RED LEAD in 500-lb. lots sell as follows in cents per pound:

	Red				White	
	Current		1 Year Ago		Current	1 Year Ago
	Dry	In Oil	Dry	In Oil	Dry and In Oil	Dry and In Oil
100-lb. keg	14.00	14.50	13.25	13.50	14.00	13.00
25 and 50-lb. kegs	14.25	14.75	13.50	13.75	14.25	13.25
12½-lb. keg	14.50	15.00	13.75	14.00	14.50	13.50
5-lb. cans	.....	.....	15.25	15.50	16.00	15.50
1-lb. cans	.....	.....	.....	.....	17.00	.....

COMMON BRICK—The prices per 1000 in cargo or carload lots are as follows:

Cincinnati	$16.75	Birmingham	$15.00
St. Louis	12.00	Denver	9.50

WIRING SUPPLIES—New York prices for tape and solder are as follows:

Friction tape, ½ lb. rolls	48c. per lb.
Rubber tape, ½-lb. rolls	60c. per lb.
Wire solder, 50-lb. spools	46c. per lb.
Soldering paste, 2-oz. cans	$1.20 per doz.

PREPARED ROOFINGS—Standard grade rubbered surface, complete with nails and cement, costs per square as follows in New York, St. Louis, Chicag and San Francisco.

	1-Ply		2-Ply		3-Ply	
	C.l.	L.C.l.	C.l.	L.C.l.	C.l.	L.C.l.
No. 1 grade	$1.45	$1.70	$1.85	$2.10	$2.25	$2.50
No. 2 grade	1.30	1.55	1.65	1.90	2.00	2.25

Asbestos asphalt saturated felt (14 lb. per square) costs $5.35 per 100 lb.

Slate-surfaced roofing (red and green) in rolls of 108 sq.ft. costs per $2.40 roll in carload lots and $2.65 for smaller quantities.

Shingles, red and green slate finish cost $5.75 per square in carloads, $6.75 in smaller quantities, in Philadelphia.

ROOFING MATERIALS—Prices per ton f.o.b. New York or Chicago:

	Carload Lots	Less than Carload Lots
Tarfelt (14 lb. per square of 100 sq.ft.)	$64.00	$65.00
Tar pitch (in 400-lb. bbl.)	21.00	22.00
Asphalt pitch (in barrels)	40.00	45.50
Asphalt felt	72.50	77.00

HOLLOW TILE—Price per block in carload lots for hollow building tile:

	New York Current	Factory Perth Amboy, N. J.	Chicago	St. Louis	San Francisco	Dallas
4x12x12	$0.1025*	.....	$0.07	$0.07	$0.1125	$0.1032
6x12x12	.1350*	$0.1512	.095	.10	.15	.1444
8x12x12	.....	.1836	.12	.14	.....	.1856
10x12x12	.....	.216	.14	.17	.....	.2064
12x12x12	.....	27	.195	.20	.....	.2888

*Partition tile

LUMBER—Price of yellow pine per M in carload lots:

	1-in. Rough 10 In. x 16 Ft.	2-In. T. and G. 10 In. x 16 Ft.	8 x 8 In. x 20 Ft.
St. Louis	$34–38	$30.75	$36.75
Birmingham	33.00	33.00	29.00
Denver	43.25	35.00	43.00
Cincinnati	45.00	44.00	39.00

STEEL SHEETS—The following are the prices in cents per pound from jobbers' warehouse at the cities named:

	Pittsburgh, Mill, in Carloads	New York Current	New York One Month Ago	New York One Year Ago	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago
*No. 28 black	5.00	6.52	6.495	9.50	6.42	8.50	6.52	9.25
*No. 26 black	4.90	6.40	6.395	9.40	6.32	8.40	6.42	9.15
*Nos. 22 and 24 black	4.85	6.37	6.345	9.35	6.27	8.35	6.37	9.10
Nos. 18 and 20 black	4.80	6.32	6.295	9.30	6.22	8.30	6.32	9.05
No. 16 blue annealed	4.45	5.72	5.695	10.20	5.62	8.70	5.72	9.70
No. 14 blue annealed	4.35	5.62	5.595	10.10	5.52	8.60	5.62	9.60
No. 10 blue annealed	4.25	5.42	5.495	10.00	5.42	8.50	5.52	9.50
*No. 28 galvanized	6.25	7.77	7.745	11.00	7.67	10.00	7.77	10.50
*No. 26 galvanized	5.95	7.47	7.445	10.70	7.37	9.70	7.32	10.20
No. 24 galvanized	5.80	7.32	7.295	10.55	7.22	9.55	7.47	10.05

* For painted corrugated sheets add 30c. per 100 lb. for 25 to 28 gage; 25c. for 19 to 24 gages; for galvanized corrugated sheets add 5c., all gages.

COPPER WIRE—Prices per 1000 ft. for rubber-covered wire in following cities:

	Denver			St. Louis			Birmingham		
No.	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex
14	$15.00	$21.00	$35.00	$12.50	$15.50	$33.50	$13.00	$17.40	$36.80
10	25.65	28.90	57.45	27.20	31.00	63.00	21.40	24.40	42.75
8	36.45	40.25	80.30	38.00	42.00	78.00	42.35	44.35	.....
6	57.40	61.70	.....	.....	65.00	130.00	64.60	74.60	.....
4	83.40	88.70	.....	.....	93.00	.....	101.75	106.05	.....
2	126.60	132.80	.....	.....	140.00	.....	151.50	163.00	.....
1	164.15	172.40	.....	.....	182.00	.....	201.00	208.50	.....
0	206.80	206.80	.....	.....	242.00	.....	276.00	285.00	.....
00	278.80	278.80	.....	.....	290.00	.....	317.00	330.00	.....
000	341.65	341.65	.....	.....	360.00	.....	417.00	428.50	.....
0000	417.05	417.05	.....	.....	435.00	.....	516.00	516.00	.....

EXPLOSIVES—Price per pound of dynamite in small lots and price per 25-lb. keg for black powder:

	Low Freezing 20%	Gelatin 40%	Gelatin 60%	Gelatin 80%	Black Powder
New York	.....	$0.31½	$0.38½	.....	$2.50
Boston	$0.25¾	.28¼	.35½	$0.42¾	2.65
Cincinnati	.19¾	.23¾	.29¾	.....	2.45
Kansas City	.21¼	.27¼	.34¾	.44¼	2.55
New Orleans	.21¼	.28½	.35½	.45½	2.70
Seattle	.....	.25½	.32½	.....	.....
Chicago	.19¾	.23¾	.34	.44	2.45
St. Paul	.20	.27½	.34½	.....	2.55
St. Louis	.20	.27½	.34½	44½	2.35
Denver	.18¾	.26	.33	.43	2.50
Dallas	.26	.33½	.40½	.50½	.....

FREIGHT RATES—On finished steel products in the Pittsburgh district including plates, structural shapes, merchant steel, bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished), chains, etc., the following freight rates per 100 lb. are effective:

Boston	$0.295	New Orleans	$0.41
Buffalo	.195	New York	.27
Chicago	.295	Philadelphia	.255
Cincinnati	.255	St. Louis	.365
Cleveland	.195	St. Paul	.52
Denver	1.015	Pacific Coast (all rail)	1.275
Kansas City	.615		

Note—Add 3% transportation tax.

COAL AGE

Volume 14 New York, November 14, 1918 *Number* 20

The War Is Won, Now Let Us Win the Peace

PEACE has its problems not less acute than war, especially the peace which immediately follows a conflict. The reason why peace has such dangers is not so much because it is inherently dangerous—for it is not—but because the public prepares itself for an immense reconstruction and does not exhibit the patriotism of the war period in meeting the problems of peace as they arise. If people would only say that business will go along as usual after the war, there would be no danger of any disturbance.

Unfortunately, there are some unwise persons who believe that peace will furnish an opportunity for wage adjustments. There are labor men who scheme to seek raises in wage, and there are manufacturers and operators who expect reductions. All such unwise spirits who seek their own and not their nation's advantage are to be severely reprobated.

The cost of living and of commodities will not change markedly, as some are prone to think. It is based on wages, and these must not be meddled with. If wages are raised, the cost of living must go up, so what is the advantage to labor in raising them? If wages are lowered, profits will not be increased, for prices will go down with wages, so where is the advantage to capital in reducing the size of the fortnightly pay? Every good citizen will do his best to keep both wages and prices stationary, as a change in either will work to the detriment of us all.

There is the threat of foreign competition, but it is remote in time and will probably never eventuate. No one will be able to fill the insatiate need of the world for a long time. There are no large stocks on hand to be dumped in our markets, and before Europe can become settled and have goods to ship here in quantity the wages of Europe may be lifted almost to the American level.

It must be remembered that never was there a time when wealth was so great or so generally distributed. Everyone today owns a bond. So everyone has buying power should any dislocation of industry lay him out of work. There are the means in hand, therefore, for correcting any temporary trouble. Nearly every corporation has its nest egg. Usually up to their necks in debt, corporations are in general marvellously woebegone organizations. During the months of war most of the corporations have provided themselves with Liberty Bonds which would strengthen their position should any slackness intervene, for it would furnish excellent collateral for a loan. So neither individuals nor corporations will have at any time any need to slacken their buying.

During the war all kinds of public work have been delayed. We do not wish to see a lot of unreasoned construction, but much is highly necessary for the national welfare. Schools, roads and railroads demand large expenditure. Whatever is necessary should be done, and we may well prepare to anticipate some of the needs of the future so as to provide work in case the public might be disposed to delay private work pending developments.

But such plans should be carefully labeled "For Emergencies Only," and care should be taken lest the public, having seen the preparations and estimates being made, should insist on the completion of the work involved long before the need for such employment of labor is actually felt. Unfortunately, as there are those who lay their plans to profit, rightly or wrongly, on all public improvements, there is always a disposition to build what has been planned whether a proper occasion presents itself or not. Thus we often find some needless construction standing in the way of the performance of far more necessary work.

America has few reconstruction problems, for she has few war-made cripples, she has few women in industry, and she has suffered but little from the war. The struggle did not last long enough to put us on an ultimate war basis. Not nearly as large a body of men as in Great Britain and France have changed their wonted occupations. For these many reasons there is no occasion for any manner of apprehension if everybody from one end of the country to the other will "sit tight" and not attempt any radical changes or wait for such changes to occur. We have patriotic duties still before us. Let us not fail to be as true to the State in peace as we have been in war. Peace does not in any way absolve us of our citizenship.

IDEAS AND SUGGESTIONS

Method of Working Thick Coal

BY M. STAFFORD
Chase River, Vancouver, B. C.

At present the deep workings of the Canadian Western Fuel Co. at Nanaimo, B. C. (somewhere around 1000 ft.), are in the Douglas seam and extend over large areas. The thickness of the coal varies from almost nothing to over 30 ft. within a distance of less than 100 ft. This variation is caused by irregularities, sometimes in the floor and sometimes in the roof, in other instances in both. The method of working these thick pockets (by "thick" is meant anywhere between 10 to 26 ft.; above that height the coal is very seldom taken on account of the length of timbers required in mining it) is by "straight face"; that

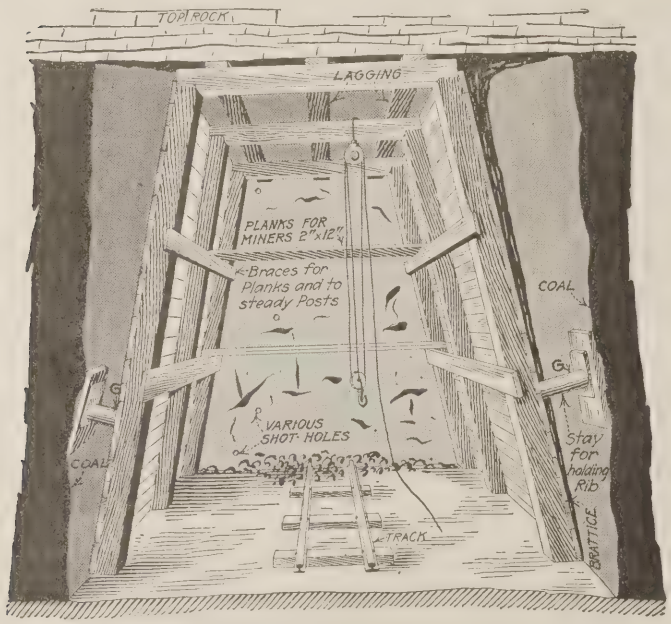


FIG. 1. WORKING THICK COAL FROM PLATFORMS

is, the face is worked as nearly vertical as possible, shooting the bottom out and then putting the perpendicular 6-ft. holes as high as the miner can conveniently reach; the top coal is mined by drilling the shot holes from planks or platforms, as in Fig. 1. Some of these places require as many as three platforms, which rest on planks nailed to the posts.

The work is very tedious. The repeated climbing up to examine the coal face and roof to get down any loose material takes a lot of the miner's time, and this is especially so while timbering. Two men can handle the timber up to lengths from 12 to 18 ft., according to weight, but above these lengths they usually provide themselves with double or single blocks and about 70 ft. of ⅝-in. rope. Sometimes they are able to run a "set" up between loading cars, at other times on account of the distance between the last "set" and the face exceeding 4 to 5 ft., the loading must wait until the timbering is finished, which takes two good men about half a shift.

In this method of working the sides are neglected as it is impossible to reach them to trim off the loose coal. Consequently, at times the short timbers *G* have

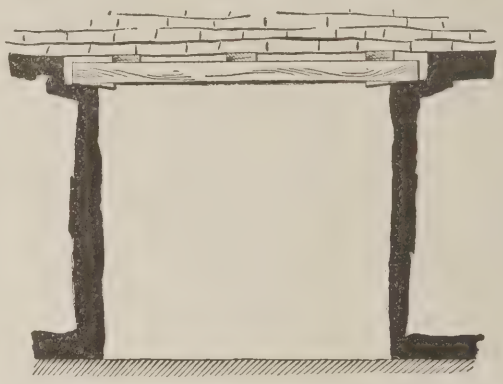


FIG. 2. MINING BY BENCHES—COLLAR HITCHED INTO RIB

to be put in from the rib to the posts. Any pressure from the sides tends to force out the posts. Sometimes the rib gives way, smashing the plank supports and letting down the platforms onto the miners; at other times the roof and top coal fall and cause injury. So you see the miner by this method has no control of his roof or ribs, two points of vital importance in mining. I may add that the company spares no expense in the matter of safety. Anything that the miner desires in this respect is provided. "Safety First" is the slogan, which accounts for so few accidents. So much for that method.

Another method of working thick coal known to many

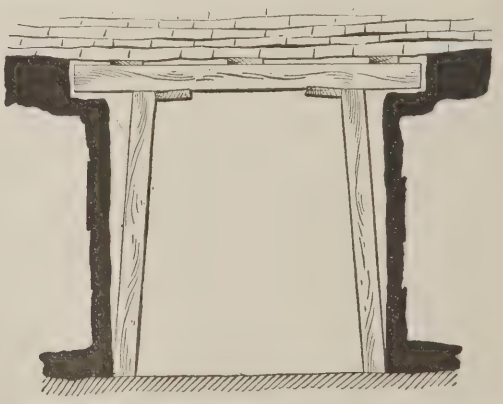


FIG. 3. BENCH MINING—THREE-PIECE SET TIMBERING

miners is shown in Figs. 2, 3 and 4. To the writer it is preferable on account of the miner always having control of the roof and sides; working in comfort; less anxiety about falling roof and sides, and easier timbering. You will see that the collars, Fig. 2, are hitched into the rib, the miner beginning work next to the top and mining the seam in benches, Fig. 4; standing on the loose coal he can trim the sides up pretty well with

the pick. After loading up his loose coal, he erects long posts which can be notched to fit other notches in his bar, if so desired; or cleats can be nailed to the bar as shown in Fig. 3, to form a notch. Another great advantage of this method is that cars do not have to be stopped, the miner can load and timber alternately. When from four to eight places in a district are all timbering at the same time, as sometimes happens, the output falls off considerably.

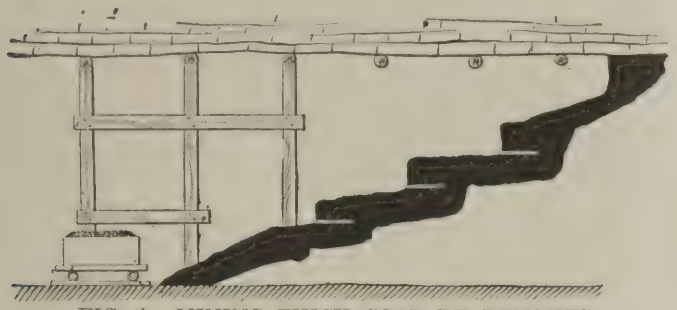


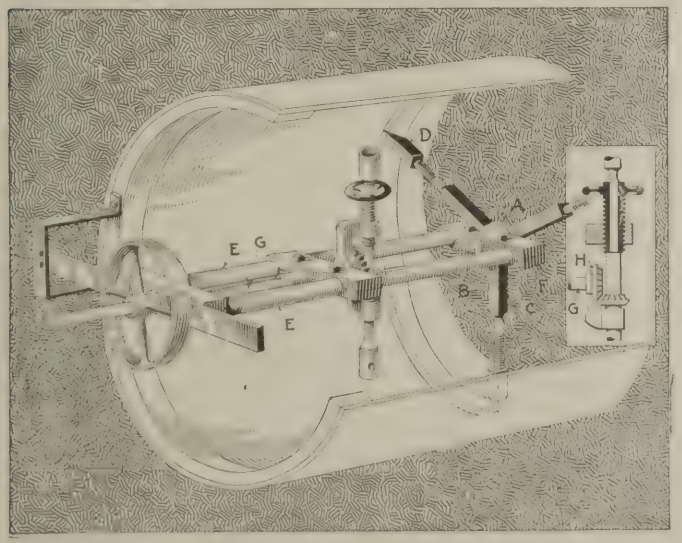
FIG. 4. MINING THICK COAL BY BENCHES

As regards the first method there are the following disadvantages: Danger of roof and sides falling, excessive climbing, danger in working from and upon planks, slower timbering and shortened output, and danger from falling picks and drilling tools. As to the second method, there are the following advantages: The miner has better control of the roof and ribs, the timber is easier handled, the method is safer and greater output can be secured.

A Special Drilling Device

By J. A. Lucas
Ozone Park, N. Y.

The accompanying illustration shows a device that has been found of advantage when it is necessary to drill a hole from the inside of a boiler or tank. *A* represents a base piece made with a journal stud *B*.



DETAILS OF A SPECIAL DRILLING DEVICE

This base piece is provided with a radial arm *C*, with threaded ends and units made with conical projecting ends, as shown at *D*. One of these pieces is used at each end of the machine, when convenient, for entering and holding the frame. When not convenient to use two of them, one end of the frame is sustained as shown in the illustration or in some other manner that may suggest itself.

The casting *F* is made of two pieces and is provided with a bearing for the pin *B* and holds the ends of the rods *EE*. The actuating shaft *G* carries the bevel wheel *H*, more clearly seen in the figure at the side, which drives the drill spindle, whose ends are of different lengths for convenience in reaching to different distances. The cross-head may be slid along as required on the rods and the revolving frame and the drill turned around to different positions.

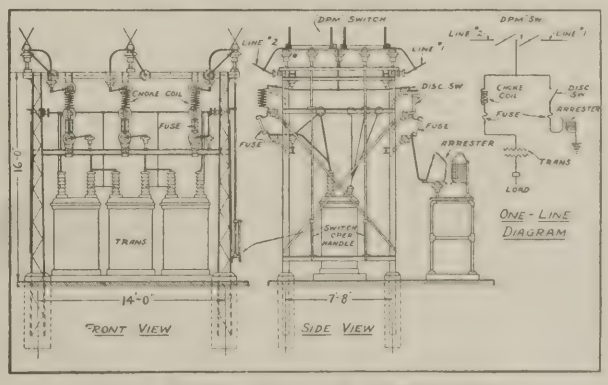
Outdoor Mine Substations

By H. W. Young
Chicago, Ill.

When considering the purchase of power from a transmission system one of the important points requiring attention is the type of control and protecting equipment. The outdoor substation is rapidly being adopted for this class of service, as it has the advantages of low cost, safety and simplicity, which appeal to the operating man.

The 33,000-volt, three-phrase, 900-kv.-a. design shown in the accompanying illustration is applicable to many installations, as it provides for two sources of power supply and thus insures greater continuity of service.

The steel framework is made up in standard sections easily assembled at the point of installation—the desired base dimensions being secured by longer or shorter connecting cross members.



COAL MINE OUTDOOR SUBSTATION

The high-tension control and protecting equipment consists of standard-unit type switches, choke coils, fuses and resistance-type horn lightning arresters connected as shown on the one-line diagram. The switches can be opened or closed from ground level by means of a handle and can be locked in either the open or closed position.

This type of station has the advantage of insuring quick assembly, and when desired the footings can be so made that the equipment can be quickly moved to a new location. The construction is so simple that ordinary labor can be employed for both installation and operation, and since all parts are in plain view inspection from ground level can readily be made.

Keep the boys smiling! Help them while away the lonesome moments by contributing to the War Activities Fund.

Progress of Electricity in Coal Mining

By FRANK HUSKINSON
Trinidad, Colo.

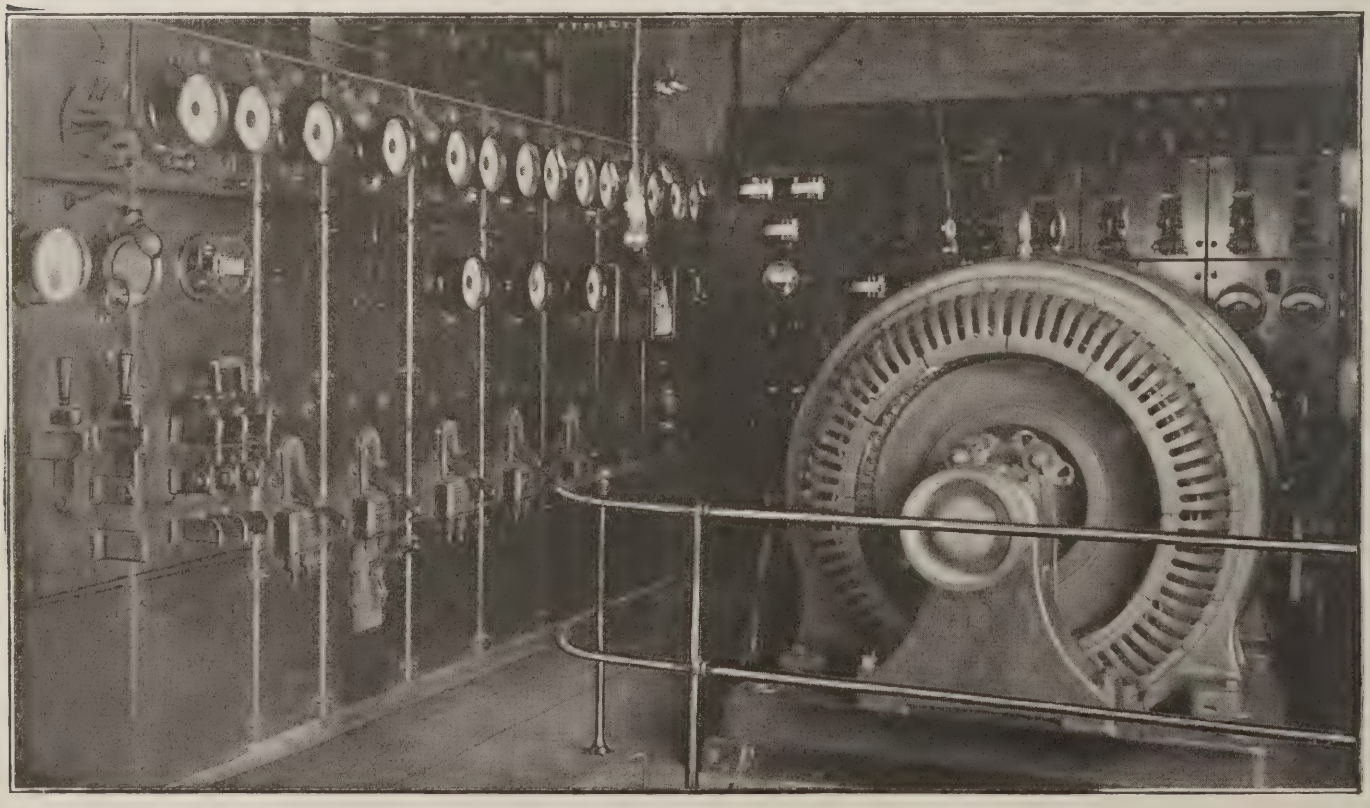
SYNOPSIS — *The great strides made in the use of electrical equipment around the mines has been due to its inherent advantages over other forms of power distribution. Some of these, as well as the various types of equipment most in use, are here enumerated.*

IN THE early days of the coal industry the low cost of fuel and a general familiarity with the use of steam fostered the emloyment of steam engines of various types for hoisting, pumping, ventilation, surface haulage and the driving of conveyors, breakers, tipples, etc. The use of steam underground has, however, always been both difficult and costly, and with even a limited application there it serves to diminish the factor of safety in an industry in which potential danger to workmen must always be considered.

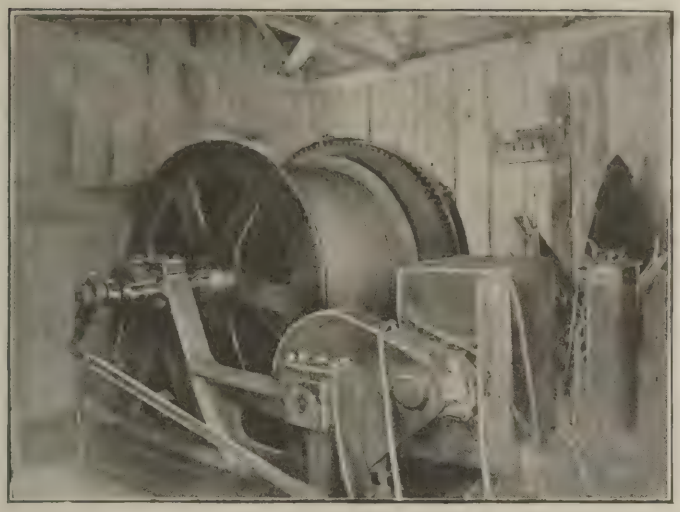
Compressed air for underground work met some of the objections to the use of steam, and as a result was extensively used for this class of work until the advent of electrical service. This at once rendered possible the application of a single form of power to all classes of machinery, both on the surface and in the mine itself.

The use of electricity in coal mining is not new, as it has been employed to a limited extent for many years, but the rapid extension which has recently characterized its application has been due to several causes, the more important of which can be briefly outlined as follows: (1) The improved efficiencies of modern electrical machinery in general, and the increasing use of alternating current with its greater flexibility in transmission over distances beyond the economical limit of direct current distribution. (2) The specialization of electrical machinery for the power requirements peculiar to coal mines. (3) The notable operating economies that have resulted in numerous installations utilizing electric power, even under the severest conditions, and the attainment in practically every case of an increased output for a given power consumption. (4) The necessity for the development of coal fields in which the geological conditions were such that the mines could not be economically operated by the older methods; also the continually increasing distances between the working faces and the delivery points in mines already in operation have tended to render electric haulage practically imperative.

That the foregoing causes have been given the practical consideration which they deserve is demonstrated by the fact that in recent coal-mining developments of appreciable size electricity has been adopted as a source of applied power either wholly or in part. In many of the older mines it would be true economy to scrap a large percentage of the old steam power equipment and replace it with electrical machines. In some cases, however, mining companies are not fully aware of the inherent economy of electric service and its practically universal applicability. They are therefore disinclined to supersede older equipment which, while admittedly not economical in its operation, has proved its utility.



MOTOR-GENERATOR SET AND SWITCHBOARD IN A MINE SUBSTATION



SMALL ELECTRICALLY DRIVEN MINE HOIST

As a logical demonstration of the value of electricity in coal mining this article attempts the explanation of the advantages of the electric drive for all classes of coal-mining machinery. Typical examples are given of the application of motors, the use of both alternating-current and direct-current generators, motor-generator sets and rotary converters.

Power is required in the production of coal, primarily for undercutting, ventilating, transporting, hoisting, pumping, signaling, and the operation of the tipple and other outside machinery. In the electrically operated mine or group of mines, all the machinery may be served from a single power plant. No other general field of power usage imposes upon the electric generator the severity of conditions inseparable from mining service. Nothing can be more trying, for example, than the common instance of a generator supplying power for the operation of mine locomotives. This work calls for instant and frequent changes from no load to full load and usually to a considerable overload. The requirements for a generator that will give satisfactory results in mining service is a capacity for endurance of heavy loads suddenly applied, as well as large overloads applied with equal suddenness and continuing for long periods of time.

The voltages in use range from 220 to 500 volts, for all direct-current installations underground and on the surface. Generators are as a rule compound wound, as it is desirable to have the voltages at the machines increase with a heavy load, so as to keep the potential constant at distant points in the mines. The standard practice in operating two or more direct-current generators is to connect them in parallel. When thus connected, electric generators should be of the same design and construction, and should possess the same or as nearly as possible the same characteristics in order to secure the best results.

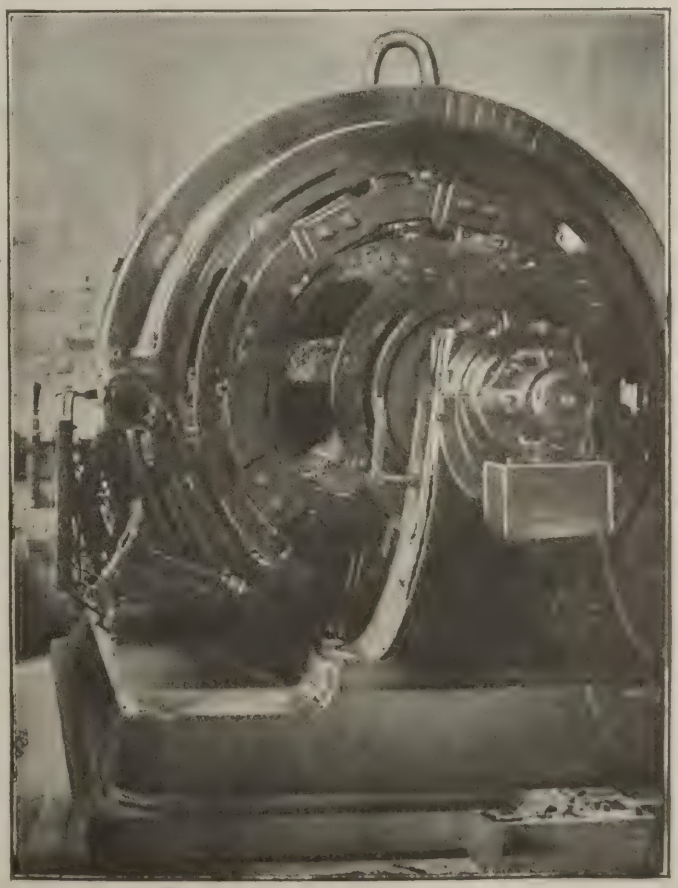
The coal-mine operator in the past few years in many instances has come to regard the purchase of central station power as a more satisfactory and economical means of operating his mines than its generation. This removes the worry and care of a power plant, is the means of lower cost of operation and secures greater reliability. This means greater production while increased power can be obtained quickly at a small initial cost. The average coal-mine operator formerly believed that the power produced at his power plant was at a fairly low cost, because of cheap fuel, simple apparatus, cheap labor and the low cost of completed buildings.

The cost of fuel is of course low at the mine, but its value should be figured at the price that could be obtained for it if sold. The water-supply question is often a serious one. Some of the early plants were compelled to have all the water for use in the boilers and elsewhere transported a considerable distance by rail. Again, the water that is found at the mines is often so bad that it causes corrosion, pitting, foaming or scale in the boilers. In many cases this occasions heavy repairs and results in accidents and shutdowns.

The boilers, engines and generators as a rule are the simplest and cheapest obtainable. In many of the early plants at the mines the first cost of a piece of machinery was the only item considered, there being little incentive for high economy at such a power plant. Low cost and reliability are the first requisites, and with the class of unskilled help generally found about the mine reliability can be obtained only with the simplest kind of apparatus.

With the use of "central station power" the old power house is either removed or converted into a substation. The steam engines are replaced by large synchronous motors and belted to the old generators. The old switchboards are used as before, with the addition of new panels to handle the alternating-current motors and other circuits.

The rotary converter is the most popular means of converting the alternating to direct current. Its use in connection with central station power has been found



ROTARY CONVERTER IN A MINE SUBSTATION

to have certain disadvantages that are overcome to a certain extent by the employment of a motor-generator set. As a rule the local conditions are taken into consideration in determining which is the better for the purpose.

The motor-generator set has a decided advantage over the rotary converter in special cases, since there is no electrical connection between the two elements, and independent voltage adjustment over a wide range is possible. Regulation is not greatly affected by the fluctuations of the supply current. The ratio of the direct-current voltage to that of the alternating current in a rotary converter is practically a fixed quantity. This is a serious disadvantage where it is desirable to have the direct current potential increase with the load so as to keep it constant at some distant point. Adjusting the field rheostat or strength of the fields of a rotary converter changes the phase of the current. A lagging alternating current passing through an inductive circuit causes a decrease in the voltage, while a leading current causes a rise.

The superiority of the electric locomotive for mine haulage has caused it to supplant almost all other means of transporting coal inside the mines. This is largely due to the fact that in addition to its high efficiency, mechanical strength, dependability and simplicity of control, it is the most compact form of tractor available. This last characteristic is of the utmost importance in underground operations where the available headroom is usually limited.



HAULAGE AND GATHERING LOCOMOTIVES AT THE MOUTH OF THE MINE

The electric locomotive for mining service is built in various types and sizes. Four general forms are now commonly used. The standard and the most practical as well as the most successful drive is the friction, or electric traction locomotive. This type of machine can be used on good tracks with grades up to 5 per cent. and at times on even greater inclinations. The gathering locomotive is practically the same style of machine, being equipped with either a cable reel or an auxiliary motor, drum and cable. The rack-rail drive is used for heavy pitches met with in some mines. One combination locomotive is a rack-rail and friction drive machine. This type finds application where the track is both ordinary and steep, these conditions being encountered in some hilly mines.

For the main haulage in mines the mule or horse has been almost universally discarded where electric service can be obtained, inasmuch as a single locomotive can effectively displace a considerable number of animals, can travel faster, requires less headroom and can operate 24 hours a day. For gathering, however, animals are still used to some extent.

The standard mine locomotive motor equipment consists of two direct-current units, each connected to a driving axle through a single reduction gear. Three motors are sometimes used with three pairs of driving axles and wheels. It is only in exceptional cases, where the generating and auxiliary motor equipment of a mine is all built for alternating current, and a heavy investment would be required for rotary converters or motor-generator sets, that locomotives utilizing polyphase induction motors can be adopted with success. The necessary speed control would then be secured by a variable external resistance connected in the rotor circuit.

Owing to the high speeds characteristic of this type of motor it is necessary to interpose double reduction gearing in order to obtain the running speeds that are safe for mining service. Two overhead trolleys or a double trolley are also required. Bonded rails may be used for the third conductor. The electric locomotive is a much more flexible system of transportation and more convenient than the rope haul. Electric locomotives are made in many various types and sizes, so that it is possible to find a machine that will operate and give satisfactory results and service in any mine or under any ordinary conditions.

For haulage in slope mines or in drift or shaft mines where the different levels are connected by slopes of considerable length, the locomotive cannot be used, and recourse is had to various forms of rope haulage with permanent hoisting drums located either on the surface or in underground chambers. Due to its rotary motion and high torque characteristics, the electric motor affords an ideal method of applying power to hoists. For this purpose, either direct- or alternating-current motors have numerous advantages as compared with steam and air systems.

The intermittent service of hoists involves a necessity for certain precautions in running and resuming the operation of steam hoists after they have been shut down, which are entirely absent when the electric type

is used. The motor-driven hoist is the simplest and most compact form, inasmuch as the motor to drive it can usually be mounted on a common base with the hoisting drum and arranged to drive it directly or through gears, thereby forming an entirely self-contained unit and effecting an economy in weight and in the amount of space required for its installation. This is often of appreciable importance when hoists are placed within the mine. Owing to the superior speed control of the electric motor it has great flexibility in operation, while its simplicity minimizes the amount of repairs and obviates the necessity for the services of an experienced engineer to run it.

The relative importance of the pumping equipment in different coal mines is dependent upon the geological conditions encountered. In many mines the service required constitutes a comparatively negligible demand on the power station. On the other hand, a large percentage of the mines situated below local water levels are absolutely dependent for continuous operation on the efficiency of their pumps.

As in the applications already referred to, the electrical operation of pumps renders possible economies and efficiencies otherwise unobtainable, and the benefits derived as compared with either steam or air power service increase in direct proportion to the diversity of the applications and the distances over which power has to be transmitted.

The problem of the main pumping units in coal mines is simplified by the recent improvement in the efficiencies of multi-stage centrifugal pumps. These were formerly only applicable to comparatively low head service, but are now successfully delivering water from sumps located more than 1000 ft. below the surface. The high speeds which are characteristic alike of the electric motor and the centrifugal pump render it a simple matter to design an effective combined unit.

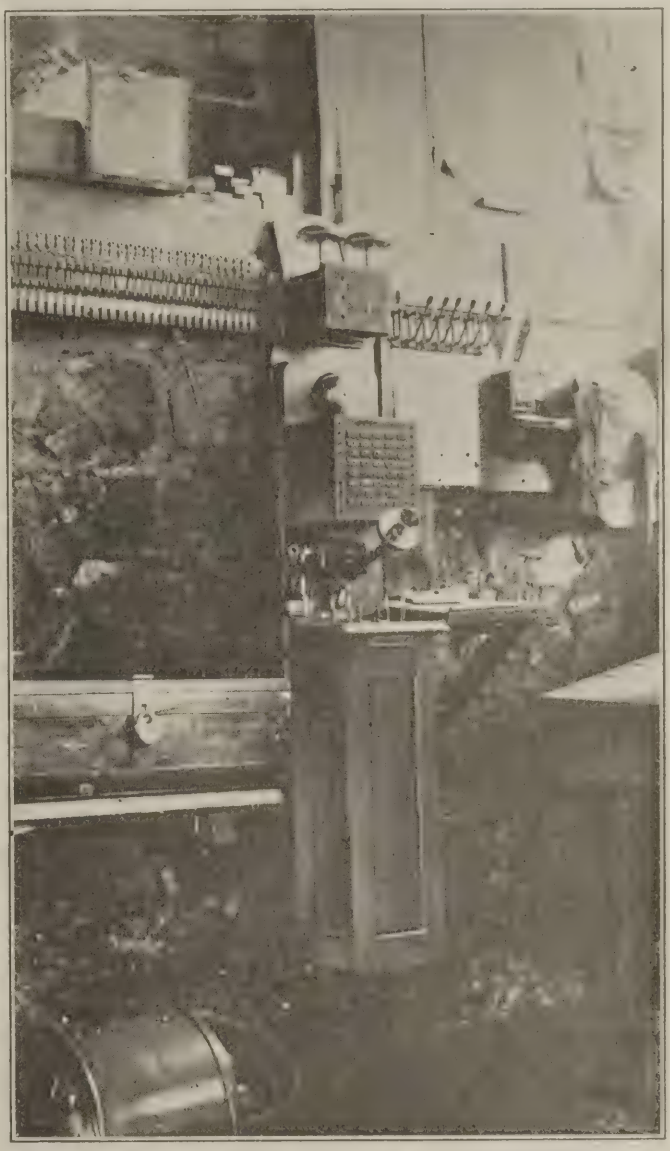
Existing pumps, originally designed for steam operation, are sometimes changed to motor drive. This reduces the amount of power required and the expense of attendance necessary, since such machines can be safely made automatic in operation, if desired. Where motors are geared to reciprocating pumps their use insures the direct application of a larger percentage of the initial power developed than where other methods are employed. Both alternating- and direct-current motors are readily adapted to all forms of pumps, the type of motor selected depending upon the service required and the character of the electrical energy available.

The adoption of the centrifugal type of pump in coal mines is due not only to the improved efficiencies of the modern multi-stage form, but also to the ability of the centrifugal type to handle liquids containing a considerable percentage of solid matter in suspension more successfully than can reciprocating pumps.

A good demonstration of the superior flexibility of electrical operation in coal mines is found in the installation of a portable pumping set. This can be lowered down the shaft or slope, rapidly hauled to any portion of the mine by the electric locomotive and immediately put into service by connecting the suction pipe, unreeling the discharge hose and connecting the motor to the feeder wires.

Uninterrupted service is the primary requisite of a coal-mine ventilation system. The imminence of the hazard to workers underground involved in a failure of the supply of fresh air is of course dependent on the character and formation of the mine. Mechanical ventilation by means of rotary blower or exhaust fans which give a positive and fully controllable supply of air is almost universal in coal mines.

In driving ventilating fans with electric motors the reliability of the service is increased. Mine fans are normally placed only at the mine openings, but in some



SMALL MINE TELEPHONE SWITCHBOARD

mines booster fans are used along the entries or in the air courses. The centrifugal type of fan is the one in almost universal use as a main unit, and as the name implies it is built with the blades parallel to the shaft and forcing the air out at right angles to it. The disk type of fan with radial blades set at an angle to the shaft is used mostly for booster or inside work.

The electric undercutting machine has undoubtedly lowered the cost and increased the production of coal. Approximately 40 per cent. of the production in the United States is mined by machinery. Since the introduction of mechanical coal cutters the use of the electric motor-driven type has increased steadily and more rapidly than other forms, owing to the superior flexi-

bility and economy of the electrical distribution and application of power. The typical modern coal cutter is mounted on a self-propelled truck and all its movements in loading upon or unloading from the truck, and during the process of mining, are made under its own power without hand labor.

In up-to-date mines the holes for explosives employed in blasting the coal down are drilled quickly and economically by the use of portable electric rotary drills. The electric rotary drill is a powerful, serviceable and thoroughly efficient machine for use in coal. Blasting by electric detonation is the most effective and economical system. It surpasses all others in safety and certainty, as well as in results that are accomplished. Electric blasting makes it possible to fire several charges simultaneously.

Signaling service in mining work must be absolutely reliable, in the face of the most adverse conditions. For this purpose primary batteries are used to some extent in connection with bells and relays. Block signaling systems employing electric lights as the warning medium are used in mines employing several locomotives hauling coal from the same section.

A reliable telephone system in a coal mine and around the outside works is an important item. The saving in time and money which such a system effects by reliably transmitting routine orders or when there is a temporary suspension of power, a shutdown of some part of the plant, an accident, or an emergency affecting both life and property, justifies many times over the investment required.

Mine telephones and systems usually consist of several instruments connected to one pair of wires, forming a party line. Local battery magneto telephones are used and signaling is done by a code of rings. The severe conditions encountered underground, due to moisture, gases, acidulous water, etc., make it necessary to provide instruments unusually well protected for this service.

Mining is rough, hard work, and mining apparatus must be exceptionally strong and rugged to stand the strain. Especially is this true of the storage battery for use in mines. The use of the storage-battery locomotive is becoming more widespread of late, with the recent improvements and development of various types of such batteries.

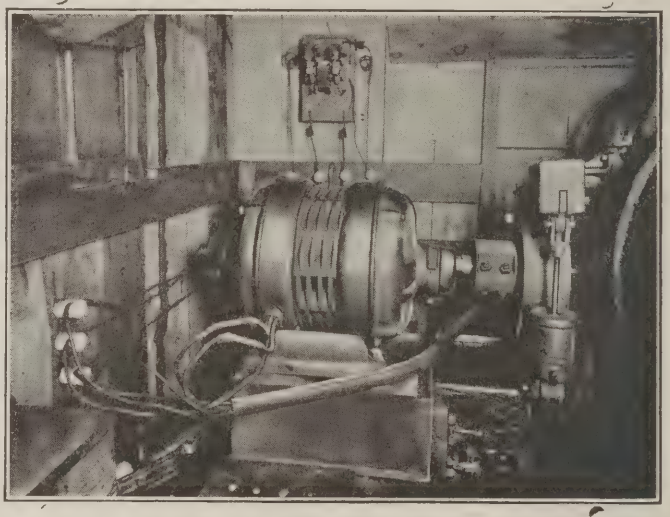
Electric safety miners' lamps are increasing in popularity every day. The greatest danger in mines today is the use of open lights. Artificial light of some sort is necessary, and much ingenuity has been shown in trying to adapt portable electric lamps to this work. Incandescent lamps are used for lighting all important places inside the mines as well as all buildings on the surface. The use of colored lamps to denote dangerous places and safety manholes, signals, signs, etc., is almost universal in the coal mines today. The electric arc lamp and the flaming arc lamp are used to some extent for illuminating large areas of ground or buildings on the surface.

The trolley wires underground are generally supported by special hangers directly from the mine roof, or timbers, except where the height or the unevenness of the roof make it necessary to attach the suspension to a length of pipe fastened either to the roof or the side walls. A suitable insulation is incorporated in the construction of the special trolley-wire hangers so as to prevent leakage of current.

All feeder lines and wiring are installed on porcelain or glass insulators. The locomotives and all motors working underground on direct-current power utilize the track as a return circuit. The rails on the main haulage roads are bonded with a short flexible bond of copper wire compressed into holes that are drilled close to the ends of the rails.

With the advent of the central station power at the mines, the use of alternating-current motors for all classes of drives has increased, both underground and on the surface. Alternating-current power has some speicfic advantages over direct current. It is more flexible in comparison. With direct current only one voltage is available and that is the one that is generated. With alternating-current it is possible to have as many different voltages as desired by the use of suitable transformers, regardless of what the voltage generated may be.

The induction motor, of the constant-speed squirrel-cage type, is used wherever possible. Its advantages



ALTERNATING CURRENT MOTOR DRIVING A SMALL HOIST

over the direct-current machine are numerous. It is the simplest kind of an electric motor and will stand more abuse and give satisfactory service with less attention than any other type. With the elimination of the commutator and brushes the fire hazard and safety conditions are greatly improved.

For tipple service and for box-car loader drives either alternating- or direct-current motors may be used. In the direct-current installations the use of compound-wound motors is the accepted rule in almost all cases. The constant-speed type of induction motor is used extensively for operating picking tables, drags, conveyors, shaking screens, etc. In fact they are the universal drive for all machinery and apparatus that requires practically a constant and uniform speed. The variable-speed wound-rotor type of alternating-current motor is used for drives that require excessive starting torque and that are subject to stops and sudden reversals.

In general electric motors afford the most satisfactory form of power for driving machinery of all classes. This superiority is due to several causes, among them being the following: The economy with which electric

energy can be generated in large central stations, transmitted over wide extents of territory and delivered to the most remote user in a form suitable for his purpose; the high operating efficiency of electric apparatus; an electric motor is one of the most efficient of energy transforming devices while operating, and the instant it stops all expense for power ceases; the ease and certainty of control and the small amount of attention required.

The control of an electric motor is the acme of simplicity and can be effected by almost anyone. In fact the operator need not be near the motor he controls, but can start and stop it from a distant point. Furthermore, in many instances an automatic controller can be arranged, thereby making the starting and stopping automatic and dependent upon current conditions and the work to be performed.

Who's Who In Coal Mining

James Brown Neale

James B. Neale, the Fuel Administration Production Manager, is a man whom the war surprised. He was not extensively known before he was appointed to his present office. He was one of the men who were, and even still are, practicing in a narrow sphere a work which could be expanded into one of national scope and importance if the opportunity were offered. The workers of the Buck Run Coal Co. and the Darkwater Coal Co. near Minersville, Penn., watched Mr. Neale around the breaker and down in the mine dressed in his mining clothes and they little thought of him as the man who would later be production manager for the United States.

An energetic man, he lived at his work and stayed by it night and day. The advice he gave to the West Virginia operators to stay "close to the game" (he did not use those words exactly) was the advice he followed himself as an operator in so far as that was physically possible, for he had general charge, as president, of not only the Buck Run and Darkwater operations in the anthracite region, but over the Sonman Shaft, near Johnstown in Cambria County, Pennsylvania, and over the Canmore mine, in far-away Calgary, British Columbia.

James B. Neale was born on Oct. 4, 1872, in the town of Kittanning, Penn., a few miles north of Pittsburgh on the Allegheny River. His father was Alonzo Potter Neale and his mother Martha Elizabeth Colwell. He was educated at Yale and received his A.B. degree in 1896, being admitted later to the bar. In due time Mr. Neale became a member of the coal firm of Thorne, Neale & Co.

Mr. Neale has, at no time, been robust, yet there is in him that spirit which drives him along unceasingly despite the weakness of the physical framework which holds it. The bedplate of his engine is somewhat too light for the large diameter cylinders and high-pressure steam which shock and jar it, but it nevertheless has, so far, contrived to hold its own. Buck Run and Darkwater collieries in the steeply dipping folds of the southern anthracite field are not quick-yielding or easily mined propositions. When in 1903 the Buck Run Coal Co. opened the Buck Run mine, every mining man in the valley predicted for it a short life. But their fears were groundless as the present going colliery will show. Darkwater had been abandoned, but Mr. Neale's company reopened it and it is running successfully today.

At Buck Run Mr. Neale erected a fine clubhouse and a beautiful school building. When the fire of a year ago destroyed the breaker, it ruined also a fine washhouse and convenient first-aid quarters. At Buck Run a trained nurse is provided for the sick and injured residents of the village. The miners' homes are small and the wild nature of the surroundings prevents gardening, but these disadvantages are more than offset by the recreational opportunities provided. A saving fund has long been a feature at this colliery, the money being kept as in a bank subject to the depositor's call.

Mr. Neale asked no more in West Virginia than he has provided for his own men in Pennsylvania. But he



JAMES B. NEALE

knows as well as any man that "plans of mice and men gang aft agley" and that no matter what is done to solve the labor problem there will be some labor troubles to make mining difficult. When he was touring West Virginia, the men he had served so well at Buck Run, mostly Lithuanians, a class of men always ready for any trouble presenting itself, went out on strike with the other mine workers in the southern field.

The production of coal is often not so much a technical problem as a moral issue. In war, coal supplies the army, the navy and the nation; in peace, it is the motive power from which come our comforts and our sustenance. Who shall say that the filling of such an important part of the national and world needs as is the supplying of coal is not a duty preëminent among the many we owe to our neighbor? Only a man of Neale's temperament and qualities could have achieved the great work which he has done to sustain and increase tonnage or could have given to the great army of coal mine workers and operators their wonderful morale during the continuance of that struggle which appears to have just reached its close.

Research and Progress in Byproduct Coking in Great Britain—II

By J. B. C. KERSHAW
Colwyn Bay, Liverpool, England

SYPNOSIS—*Coal tar is an extremely useful and interesting substance. Its distillation into various substances such as naphtha, creosote, anthracene, etc., is a process presenting many possibilities for improvement. At present the intermittent process is mostly employed, but continuous distillation would yield many advantages.*

IN THE PAST large quantities of the crude or raw tar produced in byproduct coke ovens have been used in England for road-making, while in America it has been employed as a substitute for solid or liquid fuel in metallurgical operations; but this can hardly be considered a satisfactory or scientific method of disposing of this valuable byproduct of the coking industry. Distillation, for the purpose of recovering some or all of the various constituents that form the base materials of several important branch manufactures, is therefore now regarded not only as the more patriotic, but as the more profitable course to follow with regard to this product.

The explosive, aniline dye, synthetic drug and perfume industries are all based on substances derived from tar; and although the popular idea that the beautiful colors manufactured from tar are already really contained in this material as it leaves the gas or coke works where it is first produced is quite erroneous, it is nevertheless true that without cheap and adequate supplies of tar to provide the base materials—benzol, toluol and anthracene—the dyeing and explosive industries could never have attained their present development in Germany, England and America.

Tar Most Remarkable Compound Known

In 1897 Germany obtained only 52,000 tons of the tar she required to support her color industry from coke-ovens, whereas ten years later, in 1907, she obtained 632,400 tons per annum from this source and another 300,000 tons from gas works. The tremendous expansion of the byproduct coking industry in Germany during the next decade—the ten years 1908-1917—of course explains why she is now practically independent of the rest of the world as regards supplies of benzol for her great explosive and color works.

Tar is regarded by the general public as a nasty black viscous substance, with an evil odor and a reputation for spoiling children's clothes. To the chemist it is one of the most remarkable compounds known, being a mixture of hydrocarbons, both aromatic and paraffinoid, with certain oxygen- and sulphur-containing compounds of acid character, also some nitrogenous compounds with basic properties. The fact that tar contains comparatively large quantities of benzol and anthracene, two important organic bodies, with the carbon "ring structure," explains why tar is such an important material for the synthetic drug and color industries. Nearly all these valuable derivatives are based on the benzene "ring" discovered by Kekulé in 1865. It was this discovery, and the preliminary work required to establish the ring theory of structure for these higher hydrocarbons, which led to the rapid development of the color industry in Germany, rather than in England or France.

The composition of coal tar is so varied that no one analysis can be accepted as representative, but as a rule its specific gravity varies from 1.1 to 1.2, and the higher the temperature used in coking the greater the percentage of anthracene and pitch. The character of the coal used, the shape of the ovens or retorts, the compression used in charging them and the temperature of carbonization all have some influence upon the character and composition of the tar.

Tar Should Be Kept Free from Contamination

It is important that before the tar is subjected to distillation it should be freed from the ammonia water that has collected or condensed with it. This separation of water from the tar by settling, however, is sometimes hindered by the presence or the tar oils, used for extracting toluol and benzol from the gas, since these oils produce an emulsion with the water and tar. In order to obtain a good separation it is necessary, therefore, to make certain that no tar oil from the benzol-recovery plant has been allowed to contaminate the tar.

If the tar is intended merely for road-making uses, the products that are removed by distillation are ammonia liquor, benzol, toluol, solvent naphtha and carbolic acid; the heavy creosote oils and anthracene oils being left. The tar distillation plants that have been erected at many English gas works in recent years are for this purpose, and the tar produced is sold to meet the road board's specifications for "road tar."

The tar prepared under this scheme would probably be classed in America as "soft pitch." It leaves the still at 260 deg. C. in the fluid state, and passes through a "heat interchanger," in which it gives up some portion of its surplus heat to the inflowing cold tar. The aqueous vapor and light oils driven off during the distillation are also first condensed in a cast-iron coil immersed in cold tar, so that here again some heat is saved and returned to the still with the fresh charge.

The amount of water and light oils obtained from one ton of tar by this process is usually 30 gal. The chief advantage of this method of tar treatment is that it recovers the ammonia and phenols, and provides an outlet for the pitch, which forms 50 per cent. of the total weight of tar distilled in all tar works and is often a difficult byproduct to dispose of. The disadvantages are that the heavy tar oils and the anthracene are also left in the final product, and that these constituents are sometimes more valuable than those recovered.

Each case must be studied therefore in the light of

local conditions. In this connection the following figures from an article by E. B. Wilson in *Coal Age* for Feb. 10, 1917, are of interest. The prices upon which the estimate is based will of course now require revision, for in most cases they have advanced during the past eighteen months.

YIELD AND VALUE OF BYPRODUCTS FROM A CONTINUOUS TAR-DISTILLATION PLANT, USING 10,000 GAL. OR 42 TONS OF TAR PER DAY

	Yield, Gal.	Value
Ammonia liquor (3 per cent.)	273	$8.01
Naphtha	117½	11.76
Light oil	994	94.40
Creosote oil	1772	86.10
Anthracite oil	726½	36.33
Pitch	5500	330.00
Total	9333	$566.60

Since the cost of distilling 10,000 gal., or 42 tons, of tar was only 28c. per ton, equal to $11.76, the receipts work out at $554.84 as compared with $300 if the tar had been sold. A much larger profit would of course be obtained if the crude products named above were still solid it is difficult to handle, and its dust causes a dangerous disease known as "pitch cancer" among the workers.

According to Butler (*Journal Society of Chemical Industry*, Jan. 31, 1918) one of the best methods of handling pitch from tar stills is to run it while still hot and fluid into pans holding half a ton. It is here allowed to cool and set. When cold, by means of a crane the pan and its contents are swung over a railway car and tipped, the whole block of pitch being thus moved from the still to the railway car without any handling.

As regards the treatment of the light-oil fraction, the latest English practice is to wash the oils with dilute caustic soda. This chemical combines with the tar acids to form phenolates and other salts, and on treating the solutions of these with CO_2 the carbolic and other free tar acids separate from the solution of sodium carbonate, which is formed as a result of the reaction.

The larger portion of the light-oil fraction, however, is unacted on by caustic soda and contains the benzene,



GENERAL VIEW OF AN ENGLISH BYPRODUCT RECOVERY PLANT

further refined before sale. This would, however, demand a much larger plant and an expert staff of engineers and chemists to manage it.

English Practice in Tar Distillation

If it be decided that recovery of the byproducts is desirable, the tar by the first distillation may be separated into the following fractions: (1) Below 150 deg. C., ammonia liquor; (2) 150 to 170 deg. C., light oil; (3) 170 to 230 deg. C., middle or carbolic oil; (4) 230 to 270 deg. C., heavy or creosote oil; (5) 270 to 400 deg. C., anthracene oil.

The pitch which remains in the still at the end of the distillation amounts to between 50 and 60 per cent. of the tar used. Its disposal, as already pointed out, is one of the problems of tar distillation. When cold and toluene, xylene and solvent naphtha. All of these are highly valuable byproducts at the present time. These are separated one from the other by further distillation, after a preliminary treatment of the light-oil fraction with concentrated sulphuric acid, in order to remove the unsaturated hydrocarbons and sulphur compounds, which are impurities that would hinder the success of the fractionating process.

The middle oils which distill between 170 and 230 deg. C. consist chiefly of carbolic oils and naphthalene, and on standing some time the latter separates out in crystalline form. The mother liquor from these crystals contains 30 to 40 per cent. carbolic acid, which is recovered by treatment of the oil with caustic soda and CO_2 as described above.

The creosote oils which come over between 230 and

270 deg. C. deposit naphthalene in a crystalline form on cooling and after separating the crystals by centrifugal action these oils are ready for use either as a wood preservative or as a liquid fuel. Naphthalene is purified by washing with sulphuric acid and caustic soda, and is then either redistilled or sublimed in order to obtain a pure marketable product.

Anthracene is separated from the heavy anthracene oil by cooling in vessels provided with mechanical agitation. The greenish crystals are separated from the oily mother liquor in a filter press, and are then passed through a centrifugal machine to remove the last traces of the liquid oil. By treating the crystals in a steam-heated hydraulic press under a pressure of 200 to 300 atmospheres (2940 to 4410 lb. per sq.in.), the bulk of the impurities of the crude anthracene flow away in the liquid form, while the balance can be removed by washing the crystals that remain with solvent naphtha and pyridine. The products of these operations is a 90 per cent. anthracene, which is employed in the color works to produce "alizarene," the base of many important red and purple dyes.

The form of still used for tar distillation is usually a pot still, of 10 to 20 tons capacity, with a dished or concave bottom. In large tar works these stills are arranged in rows of five or ten. In order to economize heat a "preheater" is attached to each still, and in this vessel the vapors proceeding from the still are made use of to heat the incoming charge of tar, while in some cases the pitch as it flows out is also employed for the same purpose.

Satisfactory Type of Still Not Yet Evolved

Many continuous forms of still have been patented and tried, but so far no one type has been generally adopted and the old form of pot still is still used in the majority of tar works. The advantages of continuous distillation, both as regards economy of heat and working expenses are so great, however, it is reasonable to believe that in time all difficulties will be surmounted, and that a satisfactory type of continuous tar-distillation still will be evolved.

A paper read before the American Iron and Steel Institute in 1916, by W. H. Childs, contained a large amount of information upon American methods of working up coal tar. The author stated that in the United States the horizontal type of still was more common than the vertical type favored by European tar distillers. As regards continuous stills, encouraging results had been obtained both in Europe and America, and further experience would no doubt improve the design and operation of this type of apparatus.

Steam or air agitation was generally used in the United States in conjunction, at times, with reduced pressure. In running the still to pitch, five fractions were generally taken—that is, light oil or crude naphtha, carbolic or middle-oil, heavy or creosote oil, anthracene oil and pitch.

As regarded the latter product, American tar distillers had gone in advance of European distillers in producing soft and medium pitches suitable for a great variety of purposes, and large sums of money had been expended upon technical application and the education of the public in the use of these soft and medium pitches for roofing, road-making and similar purposes.

Finally, an American patent for a continuous type of tar still may be referred to. This was granted to R. P. Parry in March, 1916, and is numbered 1,175,079. In this case the tar is fed continuously as a thin film onto a rotating drum or surface, which is kept moving at a uniform rate and is heated to 537 deg. C. (1000 deg. F.). The speed of rotation and the heat applied must be sufficient to drive off all the volatile constituents of the tar, and to convert the residue into pitch coke, which is then automatically removed from the drum as it completes each revolution. A similar device, working under a partial vacuum, has been employed for the preliminary dehydration of tar before distillation. In this case, however, a much lower temperature suffices to drive off the water and highly volatile oils.

(To be continued)

Coal Production in France Since 1913

The production of mineral fuel, including lignite, in France in 1913, was 40,843,618 tons. During the first months of the war, owing to German occupation, all of the Valenciennes basin and the greater part of that of the Pas-de-Calais, with a normal output of about 22,500,000 tons, or more than half of the total coal production of France, were eliminated from the native coal supply. Moreover, the collieries in active operation lost a large part of the miners through mobilization. The production, therefore, during the second six months of 1914 was greatly reduced, and the output in January, 1915, was only 1,532,000 metric tons. The production slowly but gradually increased during 1915 and 1916, reaching 1,676,000 tons in January, 1916, and 1,861,000 tons in December of the same year. The progress was more marked in 1917. The maximum monthly production was reached in October, the output being 2,783,000 metric tons, nearly the normal monthly production before the war. The estimated total French coal production during the past year was nearly 29,000,000 metric tons, or more than 9,000,000 metric tons greater than in 1916.

Normally the annual production of French coal is about 40,000,000 metric tons, and the annual consumption 60,000,000 metric tons, the shortage of 20,000,000 metric tons being made up by the importation of foreign coal. During 1917 there was 17,333,156 tons of coal fuel imported, including briquets and coke, which, with the native production of 28,930,000 metric tons, made the total coal supply of France for the year 46,263,156 metric tons. But owing to the increased activity shown in many branches of French trade during the past year, there was an increased consumption of fuel and the demand was greater than the supply.

Of the imports of coal fuel in 1917, Great Britain shipped 15,848,734 metric tons of coal, 662,662 tons of coke, and 753,772 tons of briquets; and the United States 57,136 tons of coal. The receipts of American coal would have been much larger had the shippers not been handicapped by the prohibitive freight rates which prevailed, owing to the scarcity of available tonnage.

The consumption of coal in France for household and industrial purposes is regulated by statute, preference being given in the allotments to establishments working for the national defense.—*Commerce Reports.*

Hazards and Safeguards in Anthracite Breakers and Washeries*

By D. K. GLOVER
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PERHAPS the most logical method of covering the hazards encountered in preparing coal for market is to follow the flow of the coal through the breaker. At the dump, as the coal leaves the mine car, the hazards are from flying pieces of coal or rock and cars jumping the dump, resulting in injury to the men engaged in removing the latches of the car door. Injuries from flying material can be prevented by inclosing the dump at the sides and top. The jumping of cars is possible on certain styles of dumps, particularly on the old balance or gravity dump. Where this style of dump is used, timber framework should be placed to check the car but not so as to interfere with the dumping. On the Greene dump, the rotary dump, the self-dumping cage and steam dump there is only a remote possibility, if any, of accidents from this cause. On old-style dumps, where wooden cars with end latches were used, it was customary to have a man knock off the latches with a sledge hammer while the car was being dumped; with the rotary dump this is entirely eliminated. On the Greene dump the latch can be loosened while the car is moving slowly; at the steam dump the car latch is partly opened while the car is at rest, and the final opening is made by blocks set at the sides of the dump. Where the self-dumping cage is used, with a steel car equipped with a sliding ring on a horn, it is necessary to pull the ring by hand. In order to safeguard the man performing this duty, he is placed on a platform high enough so that no material from the car can possibly strike him. He is also provided with an iron rod, 8 ft. long, with a U-shaped prong large enough to pass over the horn but not over the ring; and as he stands at an angle of about 45 deg. with the direction of the flowing material he is out of all danger.

Safeguards Protect Platform Men

If the coal is not checked as it flows down the dump chute there is a possibility of it having sufficient velocity to pass over the shakers and strike the platform men. To obviate this two forms of checks have been devised, both of which work very satisfactorily; one is a suspended gate nearly the width of the dump chute, about 4 ft. high, made of 3-in. oak covered with ¼-in. sheet iron. This gate is forced open by the weight of the material resting against the upper side, thus allowing the material to flow under. The other is the slowly revolving feed, which is the width of the dump chute, and consists of four paddles about 18 in. high set at right angles to one another. While this feed is not primarily a safeguard, it acts in that manner on many occasions. To eliminate the possibility of large lumps bounding over the feed and striking the workmen on the picking platform, second-hand 40-lb. T-rails are strung across the top of the platform, these being raised about 2 ft. above the floor to allow ordinary lumps to pass under.

On the first platform, where the class of material handled is large and rough, the possibility of a man injuring himself by straining is eliminated by arranging that he stand so that his waistline is at the level of the platform. To safeguard him from cutting his fingers while pushing rock off into the rock chute, he is provided with either leather mitts or hand leathers; to protect his fingers from pinching when starting a jam, he uses a two-pronged hook.

Leather Gloves Save the Fingers

On the second platform the material handled is finer than at the first platform, as it has already passed through the shakers; the only possibility of accident is the cutting of fingers on sharp edges, and this is eliminated through the use of leather gloves. The chutes are protected near the rolls on which the coal passes, so that in the event of a man carelessly stepping into a chute he cannot slide down to the rolls. The rolls are entirely covered, with the exception of the covered chutes leading into the rolls and the chute under the rolls, thus preventing anyone from accidentally stepping into or falling into rolls and eliminating accidents from flying pieces.

As the rock passes to the rock pocket, the chutes are built with sides high enough to prevent flying pieces striking employees. When the rock is loaded out of the chute, accidents to loaders, who in times past stood in front of the chutes to pull the lever operating the gate, are prevented by the installation of steam rock gates, operated from a platform above; the operator is in an absolutely safe place and performs his work without straining.

The coal, on leaving the main rolls, is again passed over sets of shakers and sized before passing to the jigs. Accidents around shakers usually occur at the shaker shafts while men are oiling. If a railing 42 in. high, with four removable pipe sections, is constructed in the rear of the shaker shaft and the cam straps are provided with grease cups, there is not much chance for an oiler to be caught. Several fatal accidents, in which the victims were wrapped around the shaker shafts, have come under my observation—all due to removal of railings by thoughtless oilers.

At jigs, the hazards consist of being caught around jig shafts, or, in some types, coming in contact with sprockets and chains on the elevators. The first hazard is readily removed by covering the jig shaft, leaving the cams and straps exposed, with the grease cup placed on top of the cam strap; the second, by a guard over the sprocket wheel and chain.

During repairs of the jigs, when it is necessary for men to work inside, there is small possibility of accident, as the repairs are usually made at night when no material is passing through the breaker; or, if extensive re-

*Paper read at the seventh annual congress of the National Safety Council, St. Louis, Mo., September, 1918.

pairs are necessary, the flow of water and material can be diverted without great difficulty.

In the loading pockets, to which the coal passes from the jigs, the only hazard present is when, under extraordinary conditions, the pockets become blocked. It is necessary for a workman to start the coal, and he may be drawn down with the flowing coal and buried. This hazard is safeguarded by the use of a safety belt or by the construction of a walk on one side of the pocket. Another possibility that occurs to me is that of a workman accidentally falling into the pockets. However where a substantial railing of standard height is maintained there is not much danger of such an accident.

The running of cars under the breaker for loading presents several hazards; one is the danger of a car runner being knocked off the car by the lip of the chute. As it is contrary to good principles of operation to have chutes very high above the cars, on account of breakage, and the fact that there is so much variation in the height of standard-gage coal cars, necessitating a chute high enough to suit the highest, it requires caution on the part of the car runner while handling cars under the breaker. Inasmuch as the cars are under control at all times, ordinary precaution and attention are all that are necessary.

Danger Signs Are an Aid to Safety

Another hazard is that of persons being squeezed between cars and the side of the breaker or breaker supports. In breakers that were built before the safety campaign assumed such proportions, wherein the clearance is not very ample—it would require great expense to remodel so large a structure and possibly interfere with production—a danger sign should be posted, warning all concerned of the accident possibilities while the breaker is running. During cleaning-up time, after hours, a man should guard the incoming end of the breaker to prevent cars from being run under the pockets. In new breakers, or at old breakers where interference exists that can be changed, a clearance of 7 ft. from the center of the track on each side should be made.

The foregoing probably covers every stage of the preparation of coal, but there are other hazards that occur throughout breakers and washeries in general. One of the most serious is that of horseplay. Very often boys have been injured while sliding down stair railings; teasing one another, resulting in coal, bolt nuts or other pieces being thrown and either striking the person intended or some bystander; wrestling, pushing through or over protective railings and chasing one another up or down steps. There is no question but that boys will be boys and enjoy fun, but there is room for an educational campaign on the proper way for boys to play, as exemplified in the publications of the National Safety Council. A splendid field for an educational safety campaign is afforded in every school located in a mining community and great benefits would be derived therefrom. Very often it is hard to determine whether or not the injury was caused by horseplay, but when fully proved it is sometimes effective to take advantage of the clause in the Workmen's Compensation Act of Pennsylvania which denies compensation for injuries received while engaged in acts which are not furthering the interests of the employer. This affects the boy's pay envelope, brings his parents' attention to the cause of the accident, and sometimes results in the boy being forcibly reminded of his carelessness. One case that comes to my mind is that of two boys fooling, then quarreling and finally throwing pieces of coal at one another; neither one succeeded in stopping the other until one boy threw a ¾-in. nut. This struck an old man, who was passing at the time, above the eye. Both boys were brought before the foreman, lectured and made to stand equal shares of the man's earnings while he was disabled. Horseplay in this breaker received a great setback.

Another hazard is the use of mushroomed tools by repairmen. The simplest and surest way of correcting this evil is to instruct the smith who sharpens the tools to dress both ends before returning them; also through periodical inspections.

In timber repairs, erecting additions, or construction work, safety belts have proved very satisfactory. In handling material, the heavy parts are usually hoisted in a corner of the building so situated that it is somewhat removed from the operating and frequently traveled part of the building, thus eliminating the hazard of falling material. Where canvas gloves are used by the men handling sheet iron for chute bottoms very few cut fingers result.

Suggestions for Mine Rescue Work

A portable telephone suitable for rescue and recovery crews is an important adjunct to a recovery outfit, especially for a crew that is descending a shaft and combating a mine fire. In recovery work an ordinary mine-telephone set and the necessary wires should be installed and be kept well up to the recovery crews. Such a telephone installation is of great advantage in case the ventilating fan stops and facilitates the sending of material where most needed. In the absence of a telephone, the main entries of the mine should be divided into sections of 500 to 1000 ft., and competent and reliable men should be detailed to patrol each section to give alarm on the occurrence of danger.

Men wearing heavy breathing apparatus should not be called on to transport dead bodies from a mine in case of disaster except in special emergency, and then for short distances only. Their work is to seek living miners, locate fires and rescue the recovery crews should they venture too far.

Some recognized authority must be in charge of the rescue and recovery operations at a mine following a disaster. This power should be vested in a man of good judgment, a cool head, and mild temperament. Such a person will confer freely with the men who have tendered their services and will not hesitate to ask for and receive suggestions. Executive charge will automatically go to the senior official of a mine, or to the state mine inspector, if the latter has arrived. The local officials are generally so much disturbed by the horror of the accident that they are glad to turn over the direction of the rescue and recovery work to the state inspector or to other qualified persons. In the early stages it may be necessary for the outside officials and employees to select one of their number to assume charge until the arrival of some more experienced man, such as the state mine inspector.—*Rescue and Recovery Operations in Mines.*

Increasing Coal Mine Efficiency—V

By CHARLES E. STUART
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SYNOPSIS—*This, the last article of the series on this subject, deals with central station conditions and problems. Many such stations are overloaded during the day, and as additional equipment is difficult to obtain these stations and their war-industry customers are faced with some objectionable but not altogether destructive alternatives.*

IN MANY mine centers served by central stations, as well as in other war-industry centers such as the Pittsburgh and Philadelphia districts, there is a growing power shortage and in other sections an approaching shortage. This fact is due to the rapidly increasing demand incident to the speeding up of industry to meet war necessity. I am familiar with a case where the demand on a central station serving coal mines almost exclusively has doubled within the period of a year.

Fig. 32 is a load curve of one of the largest central stations in the country serving mines. It will be observed that the demand is actually in excess of the present capacity of the generating station. In this particular case the present condition is the result of breakdowns. At the same time the company in question has insufficient reserve capacity and for that reason the failure of one of its larger units is sufficient to curtail service to the entire system.

Additional Units Mean Increased Investment

The question will be asked: Why not increase the generating capacity by additional units? To do this, as a rule, involves heavy investment cost. Many of the utility companies under present operating conditions cannot show a balance that would enable them to finance such an investment. Moreover, where satisfactory earnings are shown, there arises the question incident to the present high cost of apparatus and the relationship of such excessive cost to the conditions that will exist after the war, and particularly when the load falls off.

But even where the financial condition of a company is favorable, as is true in cases, there is involved the impossibility of financing against Government requirements and the difficulty of financing under the rules of the War Finance Corporation.

In spite of these considerations, the central stations are obtaining a great deal of financial assistance where it is necessary. However, even with funds needed for improvement in hand, equipment must be obtained and installed under nearly impossible conditions. There is a demand for turbine equipment far in excess of the supply. A turbine of any size today cannot be obtained within a year. Boiler manufacturers are in the same condition as are the turbine builders.

Where a breakdown occurs there is delay in effecting repairs, even with all the priority assistance that can be given. Furthermore, there is the consideration of skilled labor necessary to look after the complicated requirements of a central station system. Linemen and other similar help are not exempted. The chief engineer or the chief dispatcher in the central station is liable to call on short notice, with attending demoralization to service. All of these facts are focusing the consideration of the mine owners and central station operators toward establishment of measures of relief.

Mine Power Service Receives Priority

In Pittsburgh and Philadelphia recently the office hours of buildings, department stores, lofts and other similar power users have been staggered. No lighting or elevator service, for instance, is allowed to meet such requirements between 7:30 a. m. and 10 a. m. Mine power service in the Pittsburgh district has been given priority over service to all other war industries; thus, the steel mills in the Pittsburgh district are being subjected to shutdowns, while the coal mines are kept running. Non-war loads, such, for instance, as the glass manufacturers, have been required to go on night shift. Certain war loads are doing the same. The steel mills are already operating a night shift.

There are a number of alternatives with which the coal operators, as well as the central stations serving mines, will be faced, as conditions grow more acute. Some of these are enumerated as follows: Placing all non-war loads on night shift, insofar as they conflict with the mining or other war-industry loads. Placing cutting machines and pumps on night shift, where this particular class of load, if so placed, would take sufficient demand from the day load to be of assistance. This is now being done in the West Virginia fields. To stagger the loads—that is to say, start certain mines at an early hour in the morning, other mines a few hours later, and so on, thus flattening out the peak, and where conditions are extreme, to operate groups of mines on alternate days. The advantages from such procedure would be that the mines in operation would have continuous service and would not be subject to frequent shutdowns throughout the day, which has been found to be far more disastrous to the output than the alternative suggested.

Staggered System in West Virginia

The precedent for these suggestions was the arrangement made in the West Virginia coal fields a few months ago when a large unit broke down. In that case certain mines were operated in the morning and other mines in the afternoon.

The West Penn Power Co., of Pittsburgh, is suffering at the present time through a lack of capacity. In this case all non-war load has been thrown on night service. Even so, however, the demand is still in excess of the capacity by about 10 per cent. It has been arranged to cut off certain circuits for a period not exceeding 10 minutes and to rotate the cutoff so as to include all of the mines during the day. Thus, any one mine is liable to cutoff from one to three times per day for a period

of 10 minutes at each cutoff, or a total of 30 minutes during the day.

The result of the foregoing is to more or less systematize interruptions. The mines know when an interruption occurs that it is not going to last for more than 10 minutes. It is not possible to give any previous notice of an interruption, since the circuits are only taken off as the demand on the power plant exceeds a certain capacity, and that demand can never be predicted in advance. In this connection it has been found necessary to arrange for better coöperation between the telephone company, the central station and the mine, so that information concerning interruptions can be quickly transmitted.

There remains the radical alternative of night operation of mines. At the present time the West Penn Power Co. is taking on no new contracts unless the mining company is willing to operate at night. By referring to Fig. 32 it will be seen that after four o'clock in the afternoon and before seven in the morning the load curve is far within the generating capacity. Between these hours it is possible to take on additional load.

A few mines have accepted the alternative of operating at night, but they have not been on this service long enough to report results. However, it can be readily seen that the adoption of such an alternative may become inevitable, if production is to be maintained. Though the suggestion where made has been received with considerable disapproval, it may be noted that already many classes of war industries are accepting the inconvenience attendant upon night operation.

It is difficult to see why, if the steel mills, for instance, in normal times can satisfactorily operate on night shift, the mines cannot do the same, provided the necessity is sufficiently urgent. England, France and Germany in peace times have all established the precedent of a night shift. In a number of the mining centers of this country cutting machines and pumps have always been operated at night.

There are, however, on account of established precedent in this country, many difficulties to be overcome, and it is with a full knowledge of these difficulties, both physical and psychological, that I suggest that night operation may become inevitable in certain centers.

Not to do an injustice, it may be observed that many of the central stations serving mines have today ample capacity for their present as well as for additional load. Moreover, it is difficult to say that an operator with his own plant, the demand upon which is increasing, is in a particularly favorable position. The difficulty of expanding individual installations or of making new ones involve the same element of time, and the same considerations of high cost and skilled labor as those pertaining to central stations.

Today it will be far simpler from all angles to meet any large demand for additional power by increasing central station capacity than by the expansion of isolated plants, or the building of new isolated stations. Finally, it should be observed that through following some of the prescriptions elsewhere indicated, the operator himself can go a long way toward assisting the central station to take care of its load.

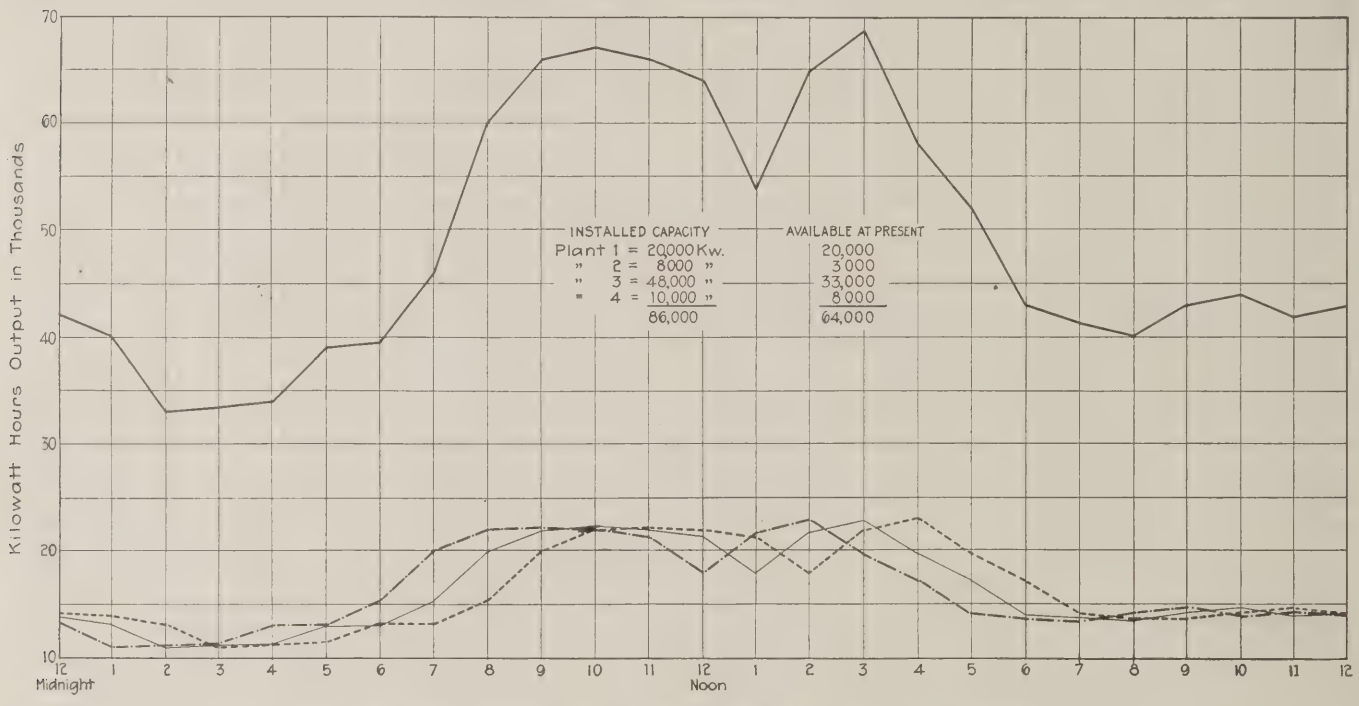
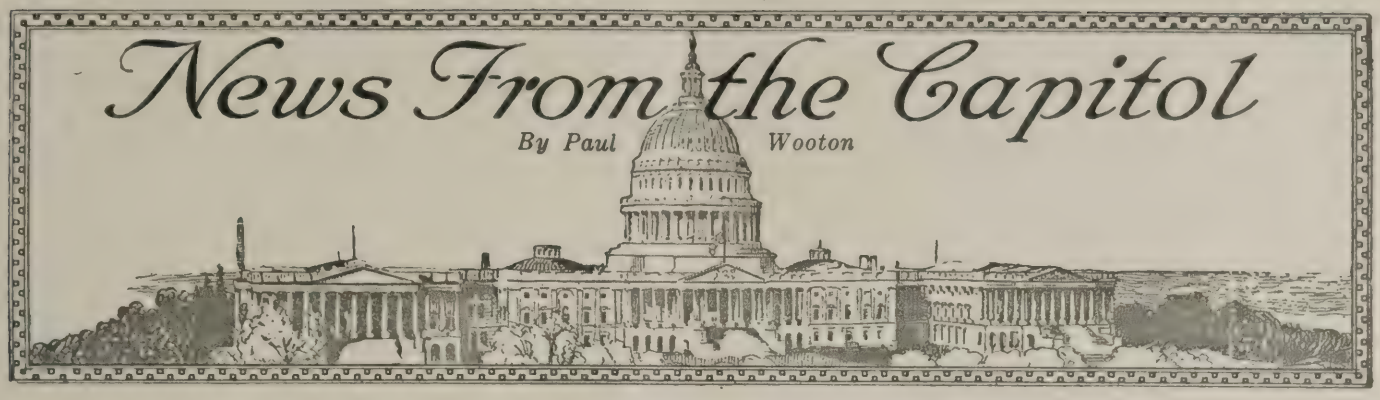


FIG. 32. LOAD CURVE OF A LARGE CENTRAL STATION COMPANY

Waste of Coal in Pumping Plants

It is estimated by the Chicago bureau of public efficiency that not less than 100,000 tons of coal are used annually in pumping water that is never used. This coal will keep 10,000 families warm during a cold winter. This waste could be put under control by the universal use of water meters. The Chicago water works is pumping about 260 gallons of water daily for every person in the city, which is about twice as much as most other American cities find ample for their needs. Pitometer experts have been at work searching for underground leaks which do not show on the surface of the streets. Several large leaks have been located and repaired.



Will Fuel Administration Cease to Function on Declaration of Peace?

Apparent proximity of peace has filled a great number of the men in important positions at the Fuel Administration with a great anxiety to return to their regular work. Some seem to think that the Fuel Administration will be the first of the big war agencies to go. While there is considerable demand on the part of consumers for the continuation of certain governmental regulations, it is regarded in some quarters that Congress would view unfavorably any proposal to continue the administration with the expiration of the present act.

The Railroad Administration, which will operate the railroads for twenty-one months at least after the signing of the peace treaty, will continue the zone system, it is said. Most officials at the Railroad Administration are said to be convinced that Government operation of railroads will continue indefinitely and plans are being made to perpetuate the zone system.

Such a decrease in consumption as may result from cessation of war work will be taken up, it is believed, by the normal industries, which have been curtailed. As a consequence, it is believed that the country can absorb the year's record-breaking output. It is also believed that the shipping situation will be such in the near future to permit of large coal exports.

Large Saving of Coal at Power Plants

Coal is being saved at the rate of 11,000,000 tons annually as a result of increased efficiency at power plants. While the Fuel Administration has returns to justify only an estimate of 7,000,000 tons saved, those in a position to know are certain that the higher figure is a conservative estimate.

For the efficient execution of the program of industrial conservation, under the plan developed, the engineers of the country have been mobilized through the professional societies and the operating engineers and firemen, and as a result there are today 1500 volunteer engineer specialists and power plant men organized by states, inspecting power plants, classifying them according to their operating efficiency, and aiding the work of rapid development. As a direct result of the operation of this plan, it is estimated that the total annual saving throughout the country will be about 25,000,000 tons of coal without reducing the output of the factories. Special printed material, instructing on the proper use of fuel, has been prepared by the United States Fuel Administration and may be obtained free of cost upon application.

The campaign has been organized in consultation with the State Administrators, the Bureau of Mines, and the Committee of Consulting Engineers of the Engineering Council, which represents the four national engineering societies. These four societies have contributed largely in supplying expert advice of engineering talent; special relations have been formed between the Fuel Administration and the National Association of Stationary Engineers, the International Brotherhood of Stationary Firemen and Oilers, the Laundry Owners' National Association, the Portland Cement Association and other national bodies who have given full coöperation to this plan.

Coke Workers Prove Efficient Railroaders

When the ranks of the men in the train service at the Republic yards of the Monongahela R.R. were invaded by influenza, it became impossible for the railroad to handle the cars to and from the coke ovens. Thereupon fifty coke workers, who had some knowledge of railroading, volunteered and cleared up the yard and saved a situation which threatened to stop coke production at Uniontown, Pennsylvania.

New Schedule of Anthracite Costs

After a period of intensive deliberation and discussion, the Fuel Administration has announced a new schedule of costs for the sizes of anthracite coal which comprise 70 per cent. of the total anthracite output. The actual increased cost per ton, because of labor, was found by engineers of the Fuel Administration to be 74c. This information was developed by taking the average number of men employed over a period of six months at each different kind of labor, in each mine, and developing therefrom the total increase in labor cost. This divided by the annual output of approximately 81,000,000 tons, gave the increased cost per ton. Dividing this in turn by the percentage of output over which the advance was spread, gave $1.05, the increase applied per ton.

While the new price schedule was not agreed upon finally until Nov. 6, it was made to apply to all coal mined on and after Nov. 1. Dr. Garfield, in announcing the increase in prices, emphasized the fact that approximately 60 per cent. of the season's supply was mined prior to Nov. 1, all of which will be sold at the former prices. "The full power of penalty under the Lever

Act," he said, "will be exercised to prevent the adding of any allowance to any coal shipped on or after Nov. 1 on which the increased wages were not paid."

The schedule takes care of no increased cost other than that of wages. The increase was based on a finding of the conference of National Labor Adjusting Agencies. That body found that wages in the anthracite region were below the standard paid in the bituminous industry and other comparable industries.

The increase was not applied to the remaining 30 per cent. of the output from the fact that, with any advance, bituminous coal would undersell these sizes and they would fail to move. Prices on sizes where no change was made are: Buckwheat, $3.40 to $4.15; rice, $2.90; barley, $2.65; screenings, $1.50.

The new prices make no change in the differential between the product of the large companies and of the individual operators. The new schedule is as follows:

White Ash Grade:		
Size	Operators	Price
Broken	Companies	$5.95
	Individuals	6.70
Egg	Companies	5.85
	Individuals	6.60
Stove	Companies	6.10
	Individuals	6.85
Nut	Companies	6.20
	Individuals	6.95
Pea	Companies	4.80
	Individuals	5.55
Red Ash Grade:		
Broken	Companies	6.15
	Individuals	6.90
Egg	Companies	5.45
	Individuals	6.20
Stove	Companies	6.30
	Individuals	7.05

Red Ash Grade—Continued:		
Size	Operators	Price
Nut	Companies	$6.30
	Individuals	7.05
Pea	Companies	4.90
	Individuals	5.65
Lykens Valley Grade:		
Broken	Companies	6.40
	Individuals	7.15
Egg	Companies	6.30
	Individuals	7.05
Stove	Companies	6.70
	Individuals	7.45
Nut	Companies	6.70
	Individuals	7.45
Pea	Companies	5.15
	Indviduals	5.90

For purposes of comparison, prices of certain of the sizes on the schedule which have been superseded are given: Broken—White Ash, $4.90; Red Ash, $5.10; Lykens Valley, $5.35. Egg—White Ash, $4.80; Red Ash, $5; Lykens Valley, $5.25. Stove—White Ash, $5.05; Red Ash, $5.25; Lykens Valley, $5.65. The foregoing are company prices. The differential for individuals is 75c. The new prices are subject to the graduated reductions for summer prices.

Record Production in West Virginia Fields

October production in the Pocahontas and Tug River fields exceeded by 40,000 tons the production in any previous month of the calendar year. This production was attained by 13,000 men, or more than was mined by twice that number in normal times. Owing to the shortage of coal for the Navy and for byproduct plants, this unusual record is particularly gratifying to James B. Neale, director of production for the Fuel Administration.

Fuel Administration Insists on Clean Coal

Nineteen mines in Pennsylvania and Alabama have been added to the list of mines ordered closed by the Fuel Administration on the ground that coal was improperly prepared. This brings a total of closure orders to 111. The Fuel Administration now is in a much better position to check its requirements as to clean coal.

In the week ended Nov. 2, 637 reports were received from the Administration's inspectors and 81 from state inspectors, making a total of 718. These reports showed that 545 mines were preparing coal properly and 161 improperly. Sixty-six carloads were rejected at tidewater; eleven cars were penalized and one was condemned at the mines. Up to date 80 inspectors have been appointed by the Administration and 124 by the railroads, while 106 state inspectors coöperated with the Administration in the work.

Plenty of Coal at Army Camps

Orders for 4,350,811 tons of coal and coke have been placed by the Raw Materials Division, of the War Departments, for use in army camps, posts, forts, proving grounds and hospitals throughout the United States for the fiscal year of 1919. This tonnage consists of 3,691,650 tons of bituminous coal, 642,728 tons of anthracite coal and 16,288 tons of coke. The winter supply of coal at the various camps is rapidly accumulating and considerably more coal is on hand now than at the same time last year. On July 1, 1918, the reserve was 190,000 tons. By Oct. 12, 1918, it had been raised to 530,308 tons. The fuel supply at posts most distant from coal fields is receiving particular attention.

Speeding Up Coke Industry

The seriousness of the coke situation has spurred the Fuel Administration to extraordinary efforts to increase the supply. Less than a week's supply is on hand at the 411 blast furnaces of the country.

Appointment of W. S. Blauvelt by the Fuel Administrator to look after coke production is bringing forth early results. Increases in coke production have been reported from several of the important districts. To assist Mr. Blauvelt, production managers are being appointed in the coke-making districts. A. H. Carpenter has been appointed for the Birmingham district and George B. Hughes for the Clinch valley and Southwestern Virginia district.

Advises Mixing of Anthracite Coal

A saving of at least 25 per cent. of the larger sizes of anthracite can be made by the combined use of buckwheat with the larger sizes, the Fuel Administration believes. Such a saving has been accomplished in Vermont. Owing to the scarcity of the larger sizes and the comparative abundance of buckwheat, the Fuel Administration is urging the mixing of the two by domestic users.

Garfield Resents Interference with Plans

A house-to-house coal survey, planned by the police department of Greater New York, brought forth the following letter from Dr. Garfield to Mayor Hylan:

"I am informed that the police department of Greater New York intends making a coal survey for the Fuel Administration beginning Nov. 7. I am advised by Delos W. Cooke, Federal Fuel Administrator for New York, that such survey was not requested by him and that it would be an interference with the best distribution of the available supply of coal allotted to New York State.

"I must respectfully but firmly request that this survey be not made, and that you prevent interference with the orderly distribution of coal in Greater New

York under orders issued under my authority by Mr. Cooke. He has full authority to act and understands that you will coöperate with him to any extent necessary. I must insist that Greater New York authorities be not permitted to interfere with the action of the United States Fuel Administration."

Austria Able to Meet Its Coal Needs

Austria will be able to supply its own coal needs for this winter, the Fuel Administration is advised, but there will be no surplus for exportation to Italy, it is said. Owing to lack of food, production from the Austrian mines recently has fallen to 50 per cent. of normal output. The return of men from the army in good physical condition and the improvement of the food supply of the country will make it possible, it is believed, to attain again the normal production, which is sufficient for domestic requirements.

Coal Exports in September

Exports of coal, as reported by the Department of Commerce for September, 1918, and the figures for September, 1917, as finally revised, are as follows:

	September, 1917	September, 1918
Anthracite, tons	448,124	442,714
Bituminous, tons	1,812,412	2,170,425
Exported to:		
Italy, tons	33,201	None
Canada, tons	1,553,196	1,820,244
Panama, tons	15,786	94,795
Mexico, tons	18,941	22,746
Cuba, tons	80,302	98,022
Other West Indies, tons	23,473	21,026
Argentina, tons	12,072	2,738
Brazil, tons	37,391	33 829
Chili, tons	None	32,712
Uruguay, tons	5,244	39,023
Other countries, tons	132,806	5,290
Coke, tons	88,071	132,553

Imports of coal during September, 1918, were entirely from Canada. They amounted to 111,196 tons, as compared with 112,705 tons imported from Canada in September of 1917.

Lake Shipments to End in November

Coal from western Pennsylvania will be made available for New England, New Jersey and New York after Nov. 15, when Lake shipments will be discontinued. On the same date, coal from District No. 8 will be made available for distribution in western Pennsylvania, in New York State west of Buffalo and in Canada.

Coal Loadings Show Increase Over 1917

From Jan. 1 to Oct. 26, 1918, a total of 724,978 more cars of coal were loaded than during the corresponding period of 1917. For the week ended Oct. 26, as compared with the corresponding week in 1917, loadings of coal cars were as follows:

	1918	1917
Total cars bituminous	192,529	187,939
Total cars anthracite	32,059	41,747
Total cars lignite	3,416	4,148
Grand total cars all coal	228,604	233,834

The Senate Committee on Manufactures will conduct another investigation of the coal situation. Senator Reed, the chairman of the committee, and Senator Lodge, a Republican member of the committee, are particularly anxious to have another hearing following the line of the hearing conducted by the Manufactures Committee some months ago.

To Improve Power Conditions At Mines

Steps have been taken by the Fuel Administration to improve power conditions at coal mines. In each production district a power engineer is to be named. He is to head a committee of three and will be charged with the duty of improving power conditions.

Loads on power companies are growing rapidly, the Fuel Administration states, and the tendency is to take all the load offered so that in many cases there is no reserve, while the extension of work by agencies like the Ordnance Department, for example, foreshadows further drains on stations supplying mines.

"The central stations in nearly every coal-producing center of the country are overloaded," says a letter from the Fuel Administration to its production managers, "and eliminating the question of power demand for additional mines, the rate of increase of power demand of mines already in operation is rapidly increasing to a point where the stations in many cases will be unable to carry their load. We believe that by coöperation along these lines great service can be rendered."

Legal Department

WYOMING COMPENSATION ACT VALID — The Workmen's Compensation Act of Wyoming is constitutional and valid in all of its provisions. (Zancanelli vs. Central Coal and Coke Co., 173 Pacific Reporter, 981.)

CONTRIBUTORY NEGLIGENCE OF MINE DRIVER—Plaintiff, in collecting loaded cars in a Missouri mine, drove a mule attached to a car along an entry. Without stopping the mule, he stepped off backwards, without taking heed as to his location with a view to avoiding injury because of any narrowness of the entry at that particular point. He might have readily stepped off in the clear at a nearby point, but, alighting at a corner of a room neck, his back struck a hump or ridge in the side of the entry, unbalancing him and causing him severe injury through being crushed between the car and the side of the entry. Under these circumstances, it is held by the Kansas City Court of Appeals in the case of Maize vs. Big Creek Coal Co., 203 Southwestern Reporter, 633, that plaintiff was guilty of such contributory negligence as debars him from recovering damages against defendant, his employer.

LEASING A WARD'S LAND—A lease of a ward's real estate for mining or other purposes is not valid beyond the period of his disability, and the legislature of a state cannot validate leases beyond that time. This is the gist of an important decision handed down by the Kentucky Court of Appeals in the case of Lawrence E. Tierney Coal Co. vs. Smith's Guardian, 203 Southwestern Reporter, 731. A statute enacted at the 1916 session of the Kentucky legislature declared that the guardian of a minor or of a person of unsound mind might lease the ward's real estate "for the purpose of mining and removing all or part of the coal, oil, gas and any or all other mineral or mineral substances and products therein. . . . Such lease may be for such length of time as the guardian . . . may approve, without being limited to the time at which the disability of such infant or person of unsound mind may be removed." This statute, the court holds, is unconstitutional as an interference with the ward's enjoyment of his property rights on becoming legally competent to transact his own affairs. Speaking of the rights of a ward, the court said: "It is, of course, true that he will derive from it each year a valuable income, but this falls far short of the exclusive dominion that every adult citizen of sound mind desires and should have the high privilege of exercising over his own property."

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The prospect of peace that brightened the end of last week had also the effect of making manufacturers less clamorous for coal. All of a sudden it seemed as if the fears of coal shortage were ended except in so far as anthracite was concerned. It seems certain, however, that a readjustment will soon take place, and the industries now restricted will come into the market and make their claim for full supplies of fuel. It cannot be that the frantic cry for coal will be followed by a surplus which will make the mine workers mark time even in the winter, when the demand is usually at its briskest.

However, no one can feel much confidence in the consuming public. When it cannot get coal it is ready almost to start a revolution to obtain it, and then, as soon as a slight letup in demand arrives, the average consumer is willing to wait indefinitely in order to force prices down. If it is criminal to raise prices in a public extremity it is equally criminal to depress them by concerted abstention from purchase. The buyer has duties as well as the seller. He has no more right to conspire to secure an unfair price than has the seller a right to conspire for the same reason. If it is not a conspiracy, but overstocking, then the buyer has been storing to excess and so has been acting equally unpatriotically.

MARKET ANSWERS THOSE WHO SEEK INCREASE

It may be said, however, that the condition of the market will do a great deal to make the mine workers of the bituminous region satisfied with their generous wages. They have been clamoring to Fuel Director Garfield and even to the president of the United States that wages were too low and that the profits of the operators would permit of a readjustment. If the industry is put fairly on a competitive basis and if the mines which ought not to be in operation are closed down by the decline in price it will no longer be possible for the mine workers to make complaint and the last will be heard of their demands, at least for a while.

The wage increase in the anthracite region which aroused the jealousy of the bituminous mine workers has not satisfied the anthracite men. The officials of the union claim that the faith of the board which determined the wage has been broken. It was clearly understood, they say, that the increase was to date from Oct. 1, whereas now the award is made, Nov. 1 is the date fixed, and the mine workers lose what it had been planned that the operators should pay them out of pocket, for only the wage could be retroactive.

The operators could not make a retroactive charge on coal already sold and in any event they have to write off expenditures between Nov. 1 and the date of Dr. Garfield's order of readjustment of prices. As the average increase per month to each worker is roughly $25 it is easy to see that the matter at issue was about $3,827,000 for the month of October only. The miners, however, would not feel satisfied even had Oct. 1 been set as the date for the adjustment. Some would set it back to a period some 10 months ago, to a point immediately following a conference which occurred early this year.

It is said that the anthracite mines are getting more men because of the increased wage. Probably the decreased probability of steady work in munitions plants has something to do with their return. The end of overtime and Sunday work has probably had some influence, as also the return of cold weather. This return of the working force should assist greatly in easing the situation in the anthracite region, now recovering from the ill-effects of the influenza.

Peace celebrations are proving severely restrictive of production even in those areas where demand continues at a maximum and is sure to continue even now that hostilities have come to an end, as we hope, for ever. Manager of Production W. L. Byers in the Connellsville region has been making personal appeals for more coke to the working forces of that region.

The appeal that the mine workers "work as they (the soldiers) fight" has been addressed to all the coke workers, especially to the Czecho-Slovaks. The mining and coke-yard forces, he has dubbed "Our Coal and Coke Army." The armistice, however, makes it necessary to write the matter differently, for we will have to work when the soldiers don't fight, for having won the war we must now make the peace secure.

RABBITS, CELEBRATIONS AND THE INFLUENZA

The opening of the rabbit season has made some mines in Pennsylvania close down. Coming with All Saints Day it was hard to prevent a general abstention from work. Especially was this the case in Butler County. Rabbits, celebrations and influenza combined to make a three-fold disturbance with which the production managers found themselves utterly unable to cope.

An excellent spirit has been shown by the men of Davy in the Pocahontas district, where the Superior Pocahontas Coal Co. is operating, George Wolfe being manager. Not only the miners are willing to help by doing more than a day's work, but the store and office employees and a clerk employed by the Norfolk & Western Ry. and one employed by the McDowell County Telephone Co. have gone to the mines to work after their regular day's work is done. They pledged themselves to mine two gondolas a week from the Cletus mine of the Superior Pocahontas Coal Co. They have been going to the mine every Wednesday and Saturday and have been returning home at midnight. The roster of patriotic men includes the mine foreman, two motormen, two brakemen, a mine engineer, a cashier, a bookkeeper, a scrip clerk, four store clerks and the two clerks already mentioned as not in the regular employ of the Superior Pocahontas Coal Co.

The influenza has been particularly grievous in the Fairmont region, especially in Barbour County, which lies on both sides of the Tygart River. The mines of the Winifrede Coal Co., just above Charleston, W. Va., have been put virtually out of commission by the influenza. The company had to erect a temporary hospital for the care of the patients. The influenza epidemic is raging also at Olcott in the Kanawha district. The New River district, which for a long time escaped the influenza epidemic, finally received it in its full strength. It almost closed down the operations of the New River Co. and those of the McKell Coal and Coke Co.

British Columbia Still Has Difficulties

British Columbia miners in the Fernie-Michel district of Crowsnest Pass are still working, but they have apparently decided that the conditions they have imposed on the operating company shall not be subject to the inquiry purposed by a royal commission. The men insist that the single shift must be permanent and they are strongly opposed to any investigation to determine the danger or safety of any other manner of operation. Knowing that any royal commission, which was ex-parte, would be regarded as unfair and invalid they have delayed appointing a representative to act for them on the commission. Consequently the commission cannot meet.

The mine workers declare that under Provincial Regulations which prohibit public gatherings as a step toward

stamping out influenza they cannot meet to make the selection of a representative. Strange to say, despite these Provincial Regulations they have been able to protest most vigorously against the no-strike order of the Dominion government. Apparently there is no risk of influenza when protesting against the government, but great danger when meeting to elect a representative for a royal commission.

The protest runs as follows:

"Whereas, the new order-in-council taking away from the workers in Canada the right to strike, although introduced as a war measure, will be made permanent if it can be made effective, therefore, be it resolved that the Gladstone local union 2314, United Mine Workers of America, register its solemn protest against such legislation, that a committee be appointed to interview Dr. Bennett, the federal representative of this district, and urge him to immediately wire Premier Borden a strong objection to the order-in-council, and that a copy be immediately sent to the trades and labor congress of Canada together with an expression of disapproval that that body has shown itself unworthy of confidence by its neglect to take drastic action in the face of the publication of such an autocratic order by the cabinet of Canada."

The circular sent out with this resolution to all organized labor bodies concludes by saying: "If we submit without protest to the passing of such an order, no labor organization will be necessary because we shall revert to abject slavery."

It was understood when the Fernie miners returned to work that all the workings except those rightly regarded as being development places should be placed on a single shift. The determination of this matter was naturally difficult. J. O. Jones, advisor to W. H. Armstrong, director of coal-mine operations in District No. 18, and Robert Livett, international representative of the United Mine Workers of America, accompanied representatives of the management of the colliery on an inspection trip of the mines as soon as the men voted to go back to work. They visited all the places alleged by the company to be under development. Over 30 of these development places occasioned dispute, but finally almost all of them were satisfactorily classified. Those which remained unclassified are to be referred to Mr. Armstrong for final decision.

Unique Mine Portal

By Ralph W. Mayer
Connellsville, Penn.

The Beaver Mine is located a few miles down the Monongahela River from Brownsville, Penn. The coal it produces is all loaded on barges and shipped by water. The hill in which the coal bed lies rises rather abruptly from the river. The narrow bench between the base of the hill and the stream is occupied by the double-track line of the Pennsylvania R.R.'s Monongahela Division. The coal seam lies on a level with the railroad track, or lower. All the coal has to cross the railroad tracks in order to reach the barges on the river.

To build a high tipple from the mine across the railroad tracks to the river would have been expensive. This expense would have been unwarranted considering the small acreage that the mine will develop. A cheaper method of developing the mine had therefore to be used. A tunnel was driven from the river, under the railroad, into the hillside, striking the coal bed.

This tunnel was lined with thick walls of concrete well back into the coal. The portal, or entrance, is below high-water mark. This was necessary in order to get it under the railroad track. High water on the river would thus completely fill the mine. To prevent this a water-tight door was placed at the portal, or entrance, and another well inside the tunnel.

Around the entire circumference of the portal 1½-in. bolts were solidly embedded in the concrete. These were spaced about two ft. apart and were provided with suitable nuts. The door which closes the mouth of the tunnel has holes around its edges, corresponding to the position of the bolts embedded in the concrete. Four-inch washers are placed on the bolts on the outer side of the door, to spread the pressure of the nuts over a larger surface. This holds the door firmly against the concrete lining forming the mouth of the tunnel. All the seams or cracks around the edge of the door and between it and the concrete are caulked with oakum. A coating of pitch over this and over all exposed nail heads makes the door practically water-tight. The door is made from 2 x 12-in. planks placed horizontally with surfaced, tongued and grooved 1-in. boards nailed



UNIQUE PORTAL AT BEAVER RUN MINE

diagonally across them, on both sides. The second, or inside, door of the tunnel is made and fastened in the same manner. The entire inner surface of the tunnel is lined with concrete. This includes the floor under the track. When it is desired to place the door in position, a short length of track at the end of the tunnel is removed. No ballast is placed under this portion of the track next to the concrete, thus allowing the end of the concrete lining to be clear for about 2 ft. below the floor of the tunnel. The door therefore comes into contact with the concrete below the track. This seals the entrance, or portal, around the circumference.

A short incline runs from the mouth of the mine to an inexpensive tipple set on piling and from which coal is loaded onto barges. This tipple is made simple and inexpensive, so that it can be readily removed.

Coal Deposits of the World

The distribution of the coal deposits of the world tabulated by countries, is as follows:

	Short Tons		Short Tons
United States—including Alaska	4,231,352,000,000	Russia in Europe	66,255,000,000
Canada	1,360,535,000,000	Union of South Africa	61,949,000,000
China	1,097,436,000,000	Austria	59,387,000,000
Germany	466,665,000,000	Colombia	29,762,000,000
Great Britain and Ireland	208,922,000,000	Indo-China	22,048,000,000
Siberia	191,667,000,000	France	19,382,000,000
Australia	182,510,000,000	Other Countries	69,369,500,000
India	87,083,000,000	Total	8,154,322,500,000

EDITORIALS

Shall We Traffic with Germany?

WHEN the question is asked "Shall the Allies accept goods of Germany after the war?" the first impulse is to say "No"; for we are all apt to regard the purchasing of goods as a favor to be denied those who have offended us. Yet it is true that those who sell us goods do us a service. The man who sells us labor and materials is helping us by that act as much as we are helping him by making payment for them. We are bartering one kind of goods for another unless, indeed, one party is in debt to the other; and then the goods are not really exchanged but given in payment of the debt.

Germany will be the party in debt if she is compelled to pay reparation in accord with the evil she has done. She will be so much in debt that she will not be able off hand to pay what she owes. She will not have the monetary resources to meet her obligations with the savings of the past. She will have to earn the payment. She must mortgage the future. In a sense the world will be obliged to garnishee her wages.

But if she is to have work and earnings, some one must employ her, some one must buy her goods. When a man has been allowed to run up a big bill at the company store, out and beyond all reason, the manager of the company desiring to see it paid is quite apt to keep him at work regardless of his character. If the man is discharged, and worse yet, if he is blacklisted, there is no hope for payment; for what a man does not earn cannot be garnisheed. If we will not take spoil of Germany, year by year, how can she pay us the tribute that will settle the bills she has so lightly incurred?

No nation can do a business indefinitely that is all outgo. We cannot ship goods without taking goods in exchange, for no nation has the money to buy indefinitely, unless she produces gold and silver; and if she does, these metals, coined though they may be, are in themselves a form of goods. Germany cannot send us or the Allies the large amount of money due unless some one is willing to buy from her. We must therefore take our choice between reparation or ostracism, or impose both only in a degree.

If the Allies insist on the payment of the debt they must accept nearly all of it in goods, delivered over a period of years. They may regulate the nature and rate of the payment somewhat, but, in goods, payment must and will be made. Only by cancelling the debt or wiping out most of the account can we put up the bars resolutely against Germany.

The proposition revives memories of the discussion relative to prison labor. Some would keep the product of the prison from the market. As it is now, in general, we let the well-intentioned go without recompense and even make the well-intentioned part of the citizenry pay for the keep of the prisoner. He pays back nothing to society for what he has taken. There is no reparation, but there is punishment. The prisoner suffers and usually is rendered vengeful, and the public is in no way advantaged. As it is when we exclude prison goods so it will be if we wholly exclude German goods. The nations will have to repair what Germany has destroyed. Better it would be to take a few of Germany's goods till the bill is paid. We would keep them without further payment, and thus we would square up the indebtedness that is owing to us and our Allies.

Redeeming the French Coal Fields

THE newspapers have been persistent in playing up the town of Lens as the one coal-producing spot of France. The correspondents seemed to be obsessed with the idea that if the Allies had Lens, France was a coal producer, or might eventually become a producer; if the Germans had it, France had no coal. Like most newspaper tales, this does not represent the truth.

Coal is pretty well sprinkled over France. True, the deposits are not large, but they are worked quite generally. The largest body of coals is in the Départements du Nord and Pas-de-Calais. This is the deposit that the Germans invaded. They probably rendered much of it unworkable, for it is likely that much which they did not take they menaced or destroyed by their shells. Where, however, they did not actually take possession the destruction could not be complete.

It may be many months, even years, before the mines in the Département du Nord will be operable, and many around Lens in the Département of Pas-de-Calais will be equally slow in being brought to the point of production. Before the war the output of the mines around Lens was put at thirteen millions of tons, and the whole field, Nord and Pas-de-Calais, totalled thirty-seven millions, the whole output of France being forty-four millions.

Thus this one northern field produced about 70 per cent. of the coal and the region around Lens about 30 per cent. The other fields were the Loire, Bourgogne with Nivernais, Gard, Tarn with Aveyron, Boulonnais, Auvergne, Alpes, Hérault, Vosges, and the "West."

These many small fields have been greatly stimulated by the war. Whereas forty-four millions was the output of the whole country before the war started, in October of last year the production was at a rate equalling nearly thirty-seven million tons, or nearly 80 per cent. of normal. With peace established, with a return of the mine workers from the battling lines, and with the demand for coal at the 1914 figure, it is likely France could supply herself with coal without assistance from Lens and without any outside help other than such as she had always accepted.

But France has always used about twenty-two million tons of imported coal, and after the war the demand

will continue for a while to be abnormal. That demand may be as large or larger than it is today. It is doubtful whether Great Britain will be able to supply it all, for the demands of its own trade will be quite large. Every effort will be made to retain the French as Great Britain's customers, and to that end England will go short herself rather than lose her prestige in France.

All But the Squeals

IT IS said that every part of the hog, except the squeal, is used by the packer. That cannot be said of coal. We demand that the bone be left in the mine and the pyrite also. There are clays which would serve for the making of brick. There are bituminous shales which could perhaps be profitably worked for their oil. But we leave these in the mine and tumble the roof upon them. Some day we may save all these byproducts of mining. We know there is something combustible in shale when we note how hotly a rock dump without any coal in it will burn. There seems to be no fuel present, but the pile is nevertheless inexplicably hard to extinguish.

Should we some day pay the miner by the day instead of by the ton, we shall be able to extract the coal even cheaper than we do today; and if we are willing to take all that goes with it, we shall find that we can get the other minerals—bituminous shale, bone coal, sulphur, clay and brick shale—for little additional cost. As it is, we operate our mines on the piece basis and pay no more for clean coal than we would have to pay if we took all that comes; so we demand that the coal shall be clean. If we were buying only the meat of pork, and told the farmer we wanted the bones also, he would try to give them to us at meat cost; and if he was as illadvised as the miner, he would hold out till he got it accomplished, and he would in consequence sell no bones at all at any price. If a contract had been made of this kind with the farmer, the meat business would never have reached its present stage. Let us think seriously of the time when we shall use every part of the mineral deposit—all except the squeals.

Are These Sudden Scruples Inspired By German Statements?

BEFORE the war we sent our goods to Great Britain without tax, but we taxed all that Great Britain sent us. Then we tried to make reciprocity arrangements with other countries which had tariff walls against us. We sought in these to give them a lower tariff in return for lower tariffs in those countries. Thus, though Great Britain admitted our goods free we tried to arrange matters so that Great Britain would in trading with us be at a disadvantage as compared with other countries, and in trading with other countries would be at a disadvantage as compared with us.

We did not think for one moment it would make Great Britain bitter. We did not believe it would be a fosterer of wars. We trusted her breadth of view to prevent any such thing. No! that does not adequately express it. We could not conceive that any such action on our part would make a criminal nation out of Great Britain, of whom we believed instinctively almost everything good, though we were somewhat chary of stating it. We knew what we might do financially against her could never make her take up the sword against us.

What has made such a change that we are told today on excellent authority that "the experiences of the past among nations have taught us that the attempt by one nation to punish another by exclusive and discriminatory trade agreements has been a prolific breeder of that kind of antagonism which often results in war, and that if a permanent peace is to be established among nations every obstacle that has stood in the way of international friendship should be cast aside?" What has made this change in viewpoint? Is it not Germany—that Germany that bleats like a lamb yet has the horns and tactics of a goat?

Before the war we endeavored, in the traffic of some materials, to make arrangements as hard and painful for Great Britain as those we are now discussing for Germany. We tried to do to Great Britain, seeing that she was generous and easy, what we are trying to do today to Germany because she is so vicious. We did not think it dangerous then. It wasn't dangerous. It is dangerous only with Germany because of a certain inherent satanic quality of the wild tribes beyond the Rhine.

Surely no moral scruples should restrain us—scruples to which we have been strangers hitherto. If we so desire, we have a perfect moral right to keep Germany from our market and admit the Allies thereto. If we have not, then we are convicted of years, generations even, of a certain moral obliquity. Germany surely realizes, deep in what should be a heart, that she richly deserves punishment.

If we schemed to make Great Britain pay the penalty of discrimination without desert on her part and for her very virtue, surely we should not hesitate to make Germany pay it in view of the blackness of her many infamies. Everyone is aware of the maudlin disposition to punish a peccadillo with fine and imprisonment and to rebuke murder with a mere slap on the wrist or a harsh look. The plans of those who would spare Germany from exclusion from our markets out of mercy and would reserve that punishment for some other country are amazing.

Are we looking for a country more infamous than Germany before instituting this penalty, or are we planning to visit that punishment on some better country who may anger us not by murder but by failing to invite us to participate in some portion of its trade or by holding out from us some trifling privilege of transportation—a port leave, for instance, or the right to use a canal, a channel or a water power? True, that would be a preventive and not a punitive action; but it is providing a bigger punishment for a peccadillo than is provided for a crime of outstanding heinousness. It is making a mountain out of a molehill, and, worse yet, a molehill out of a mountain.

The question of whether we will ostracize Germany from our markets is not so much one of morals as of expediency. It is likely that confronted with difficulties in reparation we and our allies will be disposed to let Germany trade a little with us and that we shall remember that if Germany's trade is so barriered that she can do business only with neutrals we shall find her competition with us made the fiercer by that restriction.

MOVING MINING MACHINERY

Safety Letter from a Large Company to Its Men:

A mining machine can at times act almost like a wild beast in tearing or lacerating hands and feet. It is most important that men operating machines should learn to think and thus anticipate what may be the next movement of their machine.

A lion trainer in a cage full of roaring lions is perfectly safe just because he knows exactly what each lion is going to do the next instant and knows it one instant before the lion can do it. He has a trained mind which can anticipate the lion's next act, and he has trained himself so that he knows what he must do to protect himself before the lion is able to act.

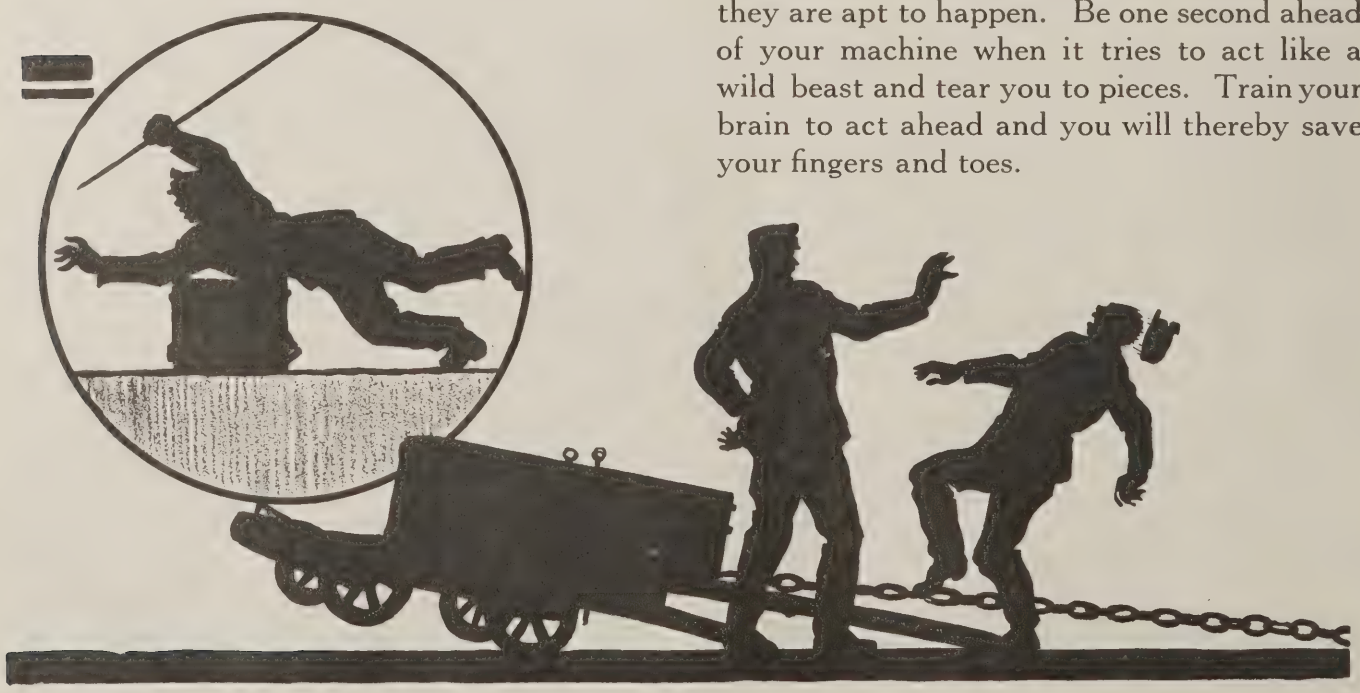
Mining machine men must especially look out for their own safety by knowing how accidents have happened and by understanding beforehand what they must do to protect themselves. They must train their brains to keep one second ahead of their work.

In this company nine men have this year broken ribs by falling over the frame of the machine when the bar they were using to



skid the machine slipped. Four men have this year had arms or feet caught by the sudden tilting of the machine as it was unloaded. Three men, while walking or crawling alongside of the machine, have had hands or feet injured, either by slipping under it or by having it upset and fall on them.

Your life is the most important life that has ever been lived—so far as you are concerned. You know bars will slip when skidding your machine. Be prepared for them to slip. You know machines will tilt up when unloading them. You know machines are apt to get off the track—but why tell you these things which you already know? The big thing is for you to anticipate the time when they are apt to happen. Be one second ahead of your machine when it tries to act like a wild beast and tear you to pieces. Train your brain to act ahead and you will thereby save your fingers and toes.



DISCUSSION BY READERS

Iron vs. Wood Mine Cars

Letter No. 2—The inquiry pertaining to the choice between iron and wood mine cars, which appeared in *Coal Age*, Sept. 26, p. 615, was doubtless read with interest by many. This is a question that is often discussed, in the different coal fields, where there are always strong advocates of both of these types of cars. There is also a multitude of men who are wedded to a composite or combination steel-and-wood car.

Many different details, however, enter into and decide the choice of a mine car, as to the material to be employed in its construction. For example, a mine located in close proximity to good oak timber that will enable a company to build its own car bodies, ready for mounting on a high-grade truck, which together with the body irons can be obtained at a reasonable cost at a nearby factory, will generally decide the choice in favor of wooden cars.

In such a case, the present high price of steel and the difficulty of obtaining it make the use of wood for the purpose more than ever desirable. Moreover, a wood car that will carry as much coal as an all-steel or composite car will cost less and be less subject to the corrosive effect of the acid mine waters, which often makes the wood car desirable.

Combined Iron and Wood Cars Give the Greatest Amount of Satisfaction

Where conditions are favorable, however, the consensus of opinion seems to favor a combination of these materials or a composite type of car, having steel sides and ends and wood bottoms. The most serious objection to an all-steel car is the fact that where a wreck occurs in the mine and the cars are piled up, one or more of them will be banged so badly as to make their repair difficult and cost almost as much as to build a new car.

It is true that when a wood car is built properly it is frequently a massive affair and cumbersome. Also, while a wood car is durable, it does not have the same flexibility as a part steel and part wood car and, for the same outside dimensions, its capacity is appreciably less than that of a steel car. In my experience, a combination steel-and-wood car is more easily dumped, especially when a thin piece of steel is laid over the plank in the bottom of the car, as the coal then slides more readily from the car.

A minor point, but one that is still worthy of consideration, is the fact that the center of gravity of an all-steel or combination steel-and-wood car is relatively lower than in a wood car, and less racking of the car and wear and tear of the running gear results, and there is less coal spilt along the roadway. Where the cars are equipped with plain-bearing wheels, the jerk of the locomotive, in starting a trip, is more severe when the center of gravity of the car is higher above the tracks. This matter is not so vital, however, where the cars are equipped with roller bearing wheels, as the trip is then started with less jerking and bumping.

Everything considered, my choice favors a composite car, strongly braced and equipped with roller-bearing wheels. The question of the extra weight of all-steel cars is of more importance where heavy grades occur on the haulage road or the cars must be hoisted in a shaft or slope.

OPERATOR.

Philadelphia, Penn.

Mining Equipment

Letter No. 8—Speaking of mining equipment, the repair of broken parts in and around a mine has always been a source of trouble to every superintendent and foreman. A vital piece in a machine that is in constant use suddenly breaks. The nearest foundry is several miles away. Unless the old part can be patched or a new part secured immediately, a shutdown will result. The case is urgent, the need pressing; what is to be done?

Fortunate, indeed, is it if the superintendent has learned of the general use of the electric arc-welding machine, which has followed so closely on the heels of all modern equipment. Some time since, he heard that good welding could be done by this machine; and, efficient man that he was, he secured one in anticipation of just what has now happened.

The new device has been in use in the shop long enough to enable a workman to be thoroughly acquainted with its use. Word is telephoned to the shop and, in less than an hour, the broken part is mended and the disabled machine is again in operation and the dreaded shutdown of the mine avoided. In the meantime, a new part is ordered to be sent from the factory and held in readiness to replace the mended part should it give way again.

Saving Effected by Arc-Welding Process

The importance of the arc-welding machine, in such work, can scarcely be overestimated. The average railroad machine shop, a few years ago, was wasting thousands and thousands of dollars, because they did not know that broken parts of steel or iron could be welded and made fit for service again. Few had faith in the welding process. Locomotives were laid up for weeks while being fitted with now boiler tubes, and a breakdown on the road meant a staggering loss to the company.

Many of our mines, today, are throwing away thousands and thousands of dollars, because of the same ignorance or lack of faith in the efficiency of the welding system. Many mine operators, superintendents and foremen have yet to learn that butt-welded joints can be made almost as strong as the original metal, by

welding with or without reinforcement. Where reinforcement of the metal is possible, however. the original strength of the metal can be realized. Experience shows that much stronger and more perfect joints can be made by the electric process than by the usual gas method of welding, and the cost will be but a fraction of that incurred by the use of gas for this purpose.

No Preheating Required in Electric Welding

An important feature in welding with electricity is that no preheating of the parts is necessary in making an ordinary weld by the electric process; but the use of gas for that purpose generally requires the previous heating of the parts so that the filling metal will not be chilled, which would impair the strength of the weld. In the electric process, the material to be welded is the positive terminal and, consequently, the hottest, which insures perfect fusion, as the heat generated warms the material and prevents the chilling of the filling electrode or material.

The welding equipment is very simple in construction and has no complicated parts that require expert knowledge to keep them in serviceable condition The device has been so improved and protected that it is nearly foolproof and can hardly be misused. The equipment consists of a suitable motor with a low-voltage generator, which is protected against overloads caused by heavy rushes of current at the time the arc is struck.

Because of the low voltage, it is necessary to make contact and then break away when drawing the arc. By "making contact," I mean that the metallic or graphite electrodes must touch the metal that is to be welded, in order for the flow of current to start. It is at the time of drawing the arc that heavy overloads occur. Then, if the right kind of attachments is not employed, the generator will likely be put out of commission. Cast iron, steel and cast steel are the most common materials that can be handled to the best advantage by the electric-arc system.

Skill of the Welder an Important Fartor

The average worker who has been properly instructed in the process of mending broken parts is fast being recognized as one of the most useful men around a plant, since it is his skill that will often keep the plant going when otherwise it would have to close down to await repairs. The fact is generally accepted that the enormous saving, which has been proven in railroad and electric railway shops, can be exceeded by the more general use of welders at the mine. This is because of the fact that the location of the latter is generally inaccessible to the sources of supply and often void of good shipping facilities.

It should be stated, here, that when welding smaller pieces the metallic electrodes are used and the amount of current varies from 50 to 200 amp., depending on the bulk of the material or size of parts to be welded. Where heavier parts are to be welded, however, carbon or graphite electrodes are used, and the current varies from 300 to 600 amp. These varying degrees of current are obtained by the cutting in or out of the resistance.

Good welding can be done by the use of a sufficient number of cast-iron resistance grids; but that method is wasteful, because much of the electrical energy is then dissipated in the form of heat, by reason of the resistance grids. The use of the regular electric arc-welding equipment is much more economical where the current is drawn from the main power line. In fact, the use of this welding outfit has proved so economical that it is hard to understand how the mining industry has overlooked its possibilities for so long a time.

What needs to be safeguarded against, however, is the lack of skill of the worker. A poor welder can ruin a vast quantity of material, while an efficient welder is worth his weight in gold, by reason of the economies he will effect. All reliable vendors of electric arc-welding equipment are ready to furnish the services of a skilled demonstrator, at a nominal charge. In ten days' or two weeks' time such a one can thoroughly train a bright man in the successful operation of the equipment.

F. K. Howard.

Philadelphia, Penn.

Ventilating a Gassy Slope Mine

Letter No. 6—Being a coal miner of 33 years' experience in the mining of coal, both in Scotland and in this country, and being familiar with the varied methods of working coal seams and the essential requirements in order to secure the best results in production, I am not surprised at the frank manner in which "Mine Foreman" seeks information, through the columns of *Coal Age*, in regard to the best method of ventilating a slope mine that he is about to open in a seam having a general dip of 6 per cent. and generating large quantities of gas, as stated in the issue of July 25, p. 191.

In the haste to realize on the investment and secure quickly a large output of coal, very little thought is often given to the essential features of the ventilation that will be required in the future development of the mine. These requirements relate to the number, kind and size of openings; kind and size of ventilating fan; and the volume of air that must be circulated in the mine to comply with the mining law of the state and give to each man and beast employed in the mine the specified quantity of air. The circulation must, at the same time, be sufficient to dilute, render harmless and drive away the gases that would otherwise accumulate in the workings. Such are the important features that must be considered in the prospective ventilation of a mine.

Requirement of the Colorado Mine Law

While the driving of three main slopes on the full dip of the seam, as suggested in the reply to this inquiry on the same page, is a proper answer and will apply to the opening of such a mine in most states and districts, it does not meet the requirements of the coal-mining laws of Colorado, where the new law provides for an independent opening called a manway or travelingway, which must be separated from the main haulage opening by not less than 300 ft. of natural strata, except as otherwise permitted by the written consent of the chief coal mine inspector.

The suggestion of R. W. Lightburn, in his excellent letter on the subject, Aug. 22, p. 373, more nearly expresses my idea. Mr. Lightburn states that this mine should be opened by five headings driven on the dip of the seam, adding that two of these should be made intake airways and haulage roads, while the remaining

three entries would serve as return airways. But, inasmuch as this arrangement would necessitate men going to and from their work, either traveling the haulage road or one of the return airways, I am obliged to differ with him somewhat, in respect to this plan.

In my opinion, it is not safe for men or animals to be obliged to travel a main haulage road; neither do I consider it a healthy proposition for miners to be obliged to use the return airway in order to reach their working places. The plan I would propose for opening this mine consists in driving not less than five slopes on the full dip of the seam. Indeed, better results will often be obtained by employing seven openings, which will provide ample facilities for ventilation, especially in a mine generating much gas. I consider that good ventilation is the most essential feature in any mine, whether the seam is generating gas or otherwise. In the matter of securing the economical production of coal, let me say, the ventilation of a mine is second only to that of hauling, as miners will not work in a poorly ventilated place any more than they will tolerate bad haulage conditions and a limited car supply.

Allow me, therefore, to advise "Mine Foreman," in opening his mine, to adopt a method that will provide ample facilities for ventilation. After the five main slope openings have reached a sufficient depth, cross-entries or levels should be turned to the right and left, on the triple-entry system. If this seam is generating gas in large quantities, the cross-entries should be driven to the boundary, while butt headings are driven off these on the full pitch of the seam.

Retreating Panel System of Working

I would suggest driving the cross-entries or levels at distances of 100 yd. apart and the butt headings 200 yd. apart, so as to block off the coal in sections or panels measuring 300 x 600 ft. This will have a tendency to drain the gas from the coal before the panels are worked. In this plan, roomnecks can be turned, but the rooms should not be opened or widened out until the butt headings, in each section, hole through into the return airway above. Both on the main slopes and on the cross-entries, the center entry is made the haulage road.

In working out the coal on the retreating system, the work should be started on the inby section at the boundary. No pillars should be drawn, in any of the rooms, until all the rooms in the block are finished, when the room pillars and entry stubs should be drawn back in regular order and that section closed. If the triple-entry system is employed, as here suggested, not a door will be required on any haulage road.

In the operation of a gassy mine, let me suggest that electric cap lamps should be adopted and safety lamps used only for testing for gas, by the firebosses. I would recommend the use of the cap lamps approved by the Bureau of Mines, as soon as gas appears.

The suggestion of duplicate fans being provided is good; but, in my opinion, that is hardly necessary where the fan is operated by a steam engine. Under no conditions would I approve the use of an electrically driven fan for the ventilation of a gassy mine. Such a fan may be thrown out of commission by a thunder storm.

Since every mine must be operated in compliance with the state mining laws, it is important for a mine foreman to consider carefully the requirements. He must think twice before starting operations. Where a seam is liable to generate gas, it may happen that a mine foreman will get what the miners call a "lead-pencil mark," and still be able to operate his mine and avoid serious difficulty, in a seam dipping only 6 per cent. from the surface.

No gas may appear to cause trouble, for a long period of time and, then, the foreman may get a pencil mark that will cause him to sit up and consider. The longwall method of mining, when this can be applied, affords the best facilities for ventilation and not much difficulty will be experienced with the gas, only the circulation must be sufficient to comply with the mining law.

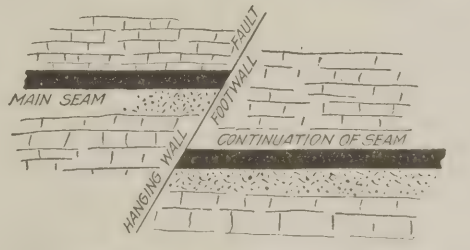
In closing, let me say that at this time, when miners are "going over the top," both in the purchase of bonds and the production of coal, it is more than ever important that they be provided with good air when working in the mine and given every opportunity to do their utmost in the winning of the war.

Farr, Colo. Robert A. Marshall.

Locating the Coal Beyond a Fault

Letter No. 1—From the description of the fault given by "Superintendent," in the inquiry in *Coal Age*, Oct. 24, p. 797, there is no doubt in my mind but that this is a reverse fault.

What is known as a "reverse fault," in geology, is one in which the hanging wall has slipped upward on



ILLUSTRATING A "REVERSE FAULT"

the footwall. The movement has taken place as the result of enormous pressure that has pushed the strata forming the hanging wall and caused it to slide upward over the footwall, along the line of fracture. Such a fault is sometimes called a "compression fault."

What leads me to conclude that this is a reverse fault is the fact mentioned regarding the appearance of the strata at the line of fault. It is stated that the strata had apparently been subjected to a tremendous pressure, as the rock there is much broken. That is just the condition in a reverse fault. The strata are much crushed along the line of fracture, making it difficult and, at times, impossible to identify any of the layers.

As a rule, there is generally a thinning out of the seam at a fault line, and the strata often show an inclination in the direction in which the slip has occurred.

I agree fully with the suggestion made in the reply to this inquiry, that the coal struck in the two boreholes belongs to the "X seam," and that if the holes had been sunk a few feet deeper they would have found the "Y seam." I would say that the throw of this fault is from 45 to 47 ft., as has been already suggested.

Tomhicken, Penn. Joseph Lawrence.

Justice to the Miner

Letter No. 5—Some time ago there appeared in *Coal Age* [July 6, p. 29] the record of a coal miner who loaded 23 tons of coal a day, which was his average for an entire month of 22 working days. The statement led to a discussion that showed what can be accomplished by a good patriotic worker where the conditions are favorable. Whether or not that was the case in the instance mentioned the record was a good one.

However, in justice to many miners who are unable to make such a record, it must be remembered that many conditions exist in the mine that govern and control the possible daily tonnage of the miner. While some miners will shoot and load a large tonnage even where conditions are not particularly favorable, there are others who will load little more than half of such tonnage, under the same or even better conditions.

Much will depend on whether the mine is worked by machine or the coal must be mined with the pick. At times, the coal is already mined and all the miner is required to do is to load it into the cars. The thickness of the seam and the quality of the coal are also large factors in loading a big tonnage. Where the coal is a good thickness and clean and the car supply is ample it is not difficult for an experienced miner to duplicate the record mentioned. On the other hand, in thinner coal, or where the seam contains binders or other impurities that must be separated before the coal is loaded into the cars, the best miner cannot equal such a record.

Big Records Not Frequent in Pick Mining

Large daily records are difficult and quite uncommon in pickwork, while in machine mining and when drawing pillars under favorable conditions, it is nothing extraordinary for a good miner to load a big tonnage. Only a few days ago, a miner working in a 6-ft. seam having one binder loaded 16 cars holding 1½ tons each, which made a record of 24 tons, but that was in pillar work. At another time, I observed a miner make a record of 25 tons, in a single day, loading coal that was already mined.

As I have stated, it is evident that the conditions under which a man is working are a large factor. It would certainly be impossible to make a big tonnage in a low seam or a thick seam with binders and impurities that must be removed. When a man loads 23 tons of coal a day, he has no time to clean the coal, and he must have plenty of room to move around quickly. He must also have one or more cars on hand in his place all the time.

Strange as it may seem, loading a big tonnage does not depend so much on a miner having the coal down and ready to load, as on his having one or more cars in his place ready to be loaded. A good miner will seldom keep a driver waiting, whether his coal is down and ready to load or must be mined, as he plans his work according to the cars he has to load. If an empty car is standing in his place all the time, there will always be a load ready for the driver or motorman to take out when he comes.

Let me say, here, that the operator and the miner alike are gainers when the foreman sees that every working place has a car in it ready to load. When a load is taken out, an empty should be set in its place. But when a miner has his coal down and ready to load and there is no empty car in his place he ceases to work and both the miner and the operator sustain a loss.

It is true that many miners will shovel their loose coal back out of the way to make room for more, while waiting for cars; but this means performing double work and is a loss in efficiency. No miner can load the same large tonnage when he must do this. If the car is ready in his place, the loose coal is loaded into it at once, and the work is not impeded by handling the coal twice. Every miner will load an empty car as quickly as possible, in order to get it out of his way; but when no car is on hand, he works more leisurely.

Thomas, W. Va. EXPERIENCE.

Letter No. 6—Coal miners, today, are confronted with the greatest, most vital, and most important task on which the fate of the world depends, and I want to say most nobly are the miners of this country responding to the call and demand made on their patriotism. With depleted ranks, they are doing splendid and remarkable work in keeping up the production of coal to its present standard.

To the earnest onlooker, it appears as if the great body of coal miners are falling into line in military order, the employees at each colliery forming a company, while the combined forces of a large coal company, operating many mines, constitute a regiment. The superintendent is the major in command, while each mine foreman is appointed to the duties of captain, and all the assistant bosses are his lieutenants and training officers. The miners themselves are the rank and file that form the great service army on which the fate of the world depends. In charge of this great organization is Fuel Administrator Garfield, who is the commander in chief.

While the work of the miner as compared with that of the soldier at the front is vitally important, his sacrifice, in contrast to the sacrifice of those who have answered the draft call, is as the light of a candle to that of the sun. But the fighting army at the front and the industrial army at home are mutually dependent on each other. Without the product of the miners' work, the armies would be helpless; and without the supreme sacrifice of the soldier, the miner would shortly experience days of tyranny equal to those witnessed in Rome in the time of Nero.

Problem of the Production of Coal Growing in Importance

As the war continues, the question of ultimate victory grows in assurance, while that of the needed production of coal is a matter of some concern. The problem is how to increase production with an ever-lessening number of men. Failure to meet this situation would mean both disaster to our army and suffering in numberless homes the coming winter.

However, the noble response of the great body of miners is a sufficient reply to the country's need. They declare as follows: "As a large service army, the miners will not prove false to the trust reposed in them; we will not lose work without reason and gamble our liberty for the lives of our boys, in this hour of the country's need."

Let us strive to introduce into all the mines the same spirit that animates the men in service on land or sea. No sooner does a soldier or sailor fall sick or become disabled than his place is filled by a volunteer whose thought is not for himself but for his country. When the miner has the same desire to keep the coal moving, and is ready and willing to jump into any place where he can serve best, then and only then will we be living up to the patriotism that we inherited from our forefathers, who fought for the freedom of America.

Today, a few districts are falling short of their maximum output, and it is the duty of men in those districts who are not engaged in Government work to heed the call of the colliery whistle in the morning, which is like the bugle call to arms, and volunteer their service for the sake of their country and the freedom they enjoy. Like our boys in France, let us go to our work in the mines singing and filled with the same enthusiasm, and showing the same American spirit, which is the promise of victory. JOSEPH R. THOMAS.

Plymouth, Penn.

Letter No. 7—I have been following closely the numerous references, in *Coal Age* and in the daily press, to the attitude and disposition of the miner in respect to the war. For the most part, the merry chorus has been hammering the miner and calling him to account for his seeming disloyalty. Many of these remarks and comments do a great injustice to our miners as a class. We Americans are too prone to place the blame for conditions before we have carefully weighed the evidence.

That there is intemperance in the coal regions cannot be denied, but it is also true that the same condition exists in other great centers of industry. Compare, for a moment, the workers in the mines with those engaged in building ships. No protest is heard when the report comes from the shipyards showing that 185,000 rivets were driven on Saturday and only 85,000 on the following Monday; and yet the work of shipbuilding is as important, today, as that of mining coal. Failure in either case cannot win the war.

CONDITIONS IN THE ANTHRACITE REGIONS WHERE FOREIGNERS OUTNUMBER AMERICANS

Glance for a moment at the conditions existing at present in the coal regions. Some years ago the foreigner was induced to come here and go into the mines. It was the hope of operators that coal would be produced at a cheaper rate than that paid the American miner. The result is that the foreign miner now outnumbers his American coworker. It is not always the case that the sympathy of these foreigners is with our cause, although that may not be altogether his fault, which is often the case. A large majority of them cannot speak and much less read the English language. Their knowledge of conditions must, therefore, be obtained through an interpreter, who is always in a position to instruct and guide them according to his own inclinations.

A recent case in hand is that of a certain local in which the Americans were outnumbered by the foreign-speaking miners to such an extent that many of the former ceased to attend the meetings. The foreigners were instructed by an interpreter who cared nothing for American army success, but much for American money. The result was that a vote was secured that had the effect to restrict the production of coal in that locality. This was shortly after corrected by the union officials in the district; but, in the meantime, the miners lost much time and needed money.

Again, there can be found, in all coal regions, little executives who lack vision. Instead of inspiring their men they retard production by the "swashbuckling" attitude that was so common in the coal fields before 1902. To curse men and to attempt to make them work faster by threats may succeed for a brief period, but in time such methods will cause rebellion.

As a boy, I remember the banner carried by the miners, at my home, in their first union parade. The banner was inscribed "Gomer Jones, our First Organizer." Mr. Jones organized his men by using the whiphand over them; and a large proportion of our foreign-born miners are under the same control. Such are the conditions that affect the loyalty of many of the workers in our mines, today.

INFLUENCE OF ITALIAN MINERS IN RECENT STRIKE IN SCHUYLKILL COUNTY

Let me refer, here, to the recent struggle in Schuylkill County where the Italian miners were willing to work, because the war had been made real to them. We must make the war real to all our foreign miners, particularly those who cannot read our papers. Our greatest chance for doing this is through their children. The children of the foreigner are, almost without exception, American to the core. As schoolboys and girls they are our best students, and through them we may hope to reach their parents and the boarders in their homes.

Foreign-speaking miners who have boys in the service should be induced to wear their service pins while at work. At each breaker building, slope or shaft, should be posted in a conspicuous place, a list of the boys who have answered the call to service. Much could be accomplished if "Colliery nights," at the local movie theater, could be arranged. At such times, the official films of the United States could be shown and explained in the different languages, in a manner to bring the war home to the men.

In closing, let me give one more proof that the miner is not of the tippling sort that many regard him. The average miner is self-reliant, able to act for himself and industrious. He longs to reach the open air when his day's work in the mine is done. It is this class of workers that find no trouble in securing work at the large factories and plants, who are in sore need of men.

People who are unacquainted with mining conditions little realize the risks taken by miners in their daily work. Men are gassed every week in the mines of Pennsylvania. These and other conditions have made them bold and fearless. It is not claimed that the miners are perfect. Many of them have not as yet caught the vision of world democracy; but for that they are not wholly to blame.

Let us do the miner justice and give him every encouragement and assistance to make him the capable worker and loyal assistant for which he is fitted. In other words, let's boost for more coal by boosting our fellows who get it out, for on them we must depend.

Jeddo, Penn. PATRIOT.

INQUIRIES OF GENERAL INTEREST

Cost of Upkeep of Mine Cars

Observation in the mining regions shows that there are, at the present time, a great number of cheap and inferior mine cars being thrown onto the market, as the result of the stringency placed on the manufacture of cars and other mining equipment by reason of the war. Many mine officials are buying these cars for use in their mines, either ignorant of or ignoring the fact of their inefficiency.

At this time when coal must be produced in greater quantity than ever before, the efficiency of all mine equipment is of the greatest importance and should have equal consideration with that of producing a large output of coal. Not only this, but the fact should be noted that the future of the coal industry is being impaired by the installation of inferior equipment.

Any man of ordinary intelligence who will stop to think for a moment will realize that the difference in cost between a good mine car and a makeshift is so slight as to bear no comparison with the gain that would result from the employment of good mine cars and the best possible grade of other equipment. A cheap mine car is a source of constant expense for repairs, to say nothing of the frequent delays and consequent loss, by reason of wrecks and breakdowns, caused either by broken drawbars, split planks, broken or sprung bolts, wornout wheels and, last but not least, bent or broken axles.

System in Recording Cost of Repairs

In this connection, I am moved to ask if any of the readers of *Coal Age* have available records of accurate costs of the upkeep of either plain- or roller-bearing mine cars. Also, whether they have any figures on the cost of repairing cars in a haphazard or makeshift fashion, as compared with the cost of keeping them in proper condition, by employing a regularly appointed mine-car repairer who understands his business and can systematize the work and lessen the cost for repairs and upkeep of all equipment.

Allow me to instance the case of a mine, in the metal country, that has recently come to my knowledge. The mine had in use only 230 mine cars or "trams," as they are called out there. With this equipment, they saved slightly more than $5000 in a year's time, by placing a competent man in charge of their repair work and upkeep, including the oiling of the cars.

Formerly, at this mine, the company had employed what they describe as a hit-or-miss method where no system was used and repairs were made by anyone and at any time that was most convenient for that purpose. It goes without saying that there was no selection of proper material, no duplication of parts, nor any systematic arrangement; but each car presented a proposition all its own and was patched and mended accordingly.

The most casual observation shows that practically every mine has more or less cars laid up for minor causes, such as I have mentioned. Frequently a car will be laid aside for days at a time, owing to some slight cause that could be remedied in a short time and the car again put in use. This would not happen if a man were placed in charge and made responsible for this work. His daily report to the superintendent or manager would show what was being done and keep that official in touch with conditions that need his constant attention if there is to be no interruption in the daily production of the mine.

Most of the repairs on mine cars are a simple matter. A broken plank needs to be taken out and a new one put in its place; an axle has to be straightened, or its fastenings made more secure; wornout wheels must be replaced by new ones; a broken drawbar mended; or numerous other similar repairs require to be made if the rolling stock is to be kept in good condition.

This work should be done as soon as the first signs of trouble appear; but, around most mines, minor repairs are postponed until something serious happens as a result. The condition is illustrated by the old ditty that runs, "For want of a nail the shoe was lost; for want of a shoe the horse was lost; for want of a horse the rider was lost; and all for want of a horseshoe nail." So it is with the many little repairs that are continually needed by mine cars.

In urging the discussion of this question and the submission of comparative costs of haphazard and systematic methods of dealing with repair work in mines, let me suggest that the running gear of a mine car should receive special attention. Suitable thrust washers should be provided to take up the play caused by wear, which will thus be reduced to a minimum. Wheels should be oiled regularly, a plain-bearing wheel requires to be oiled at least four times a week and a good roller-bearing wheel every few months. Until this question is more thoroughly understood and given attention, haulage costs in mines will be excessive and the production of coal will suffer. Let us have comparative cost-sheets that will teach their own lesson. OBSERVER.

Pittsburgh, Penn.

The proposition presented in this inquiry has not been overstated in respect to its importance to the economical production of coal. Cost accounting in respect to supplies of material and labor in coal mining is no greater in importance than is the cost of upkeep or maintenance of haulage and other equipment. Immense good will result from the practical discussion of these questions and the submission of comparative cost-sheets, as suggested by the correspondent. *Coal Age* will gladly give space for the publication of such data, which will prove most beneficial to the coal industry in the present need of the country. We hope for a generous response to this timely inquiry.

EXAMINATION QUESTIONS

Miscellaneous Questions

(Answered by Request)

Ques.—How many aircourses 5 x 4 ft. will be required to give the same sectional area as one 8 x 10 ft.? Which will pass the more air, and why?

Ans.—The sectional area of each of the smaller airways is $4 \times 5 = 20$ sq.ft., while that of the larger airway is $8 \times 10 = 80$ sq.ft. The number of smaller airways required to give the same sectional area as the larger ones is, therefore, $80 \div 20 = 4$ airways.

Assuming that each of the four smaller airways has the same length as the longer airway, and that the unit pressure producing the circulation in each of the airways is the same, the larger airway will pass the larger quantity of air. The sectional area, length and unit pressure being the same in each case, the quantity of air in circulation will vary inversely as the square root of the perimeter. In other words, the quantity ratio is then equal to the square root of the inverse perimeter ratio.

In this case, comparing the circulation in the four small airways with that in the large airway, the sum of the perimeters of the four smaller airways is $4 \times 2 (4 + 5) = 72$ ft., while that of the larger airway is $2(8 + 10) = 36$ ft. The perimeter ratio is therefore, in this case, $72 \div 36 = 2$. The larger airway will therefore pass $\sqrt{2} = 1.414$ times the quantity of air passing in the four smaller airways under the same pressure.

Ques.—If a water gage, placed in a door 4 ft. 6 in. high and 5 ft. wide, shows a reading of 2.7 in., what is the total pressure on the door?

Ans.—A water gage of 2.7 in. indicates a pressure of $2.7 \times 5.2 = 14.04$ lb. per sq.ft. The area of the door, in this case, is $4.5 \times 5 = 22.5$ sq.ft. The total pressure on the door is, therefore, $14.04 \times 22.5 = 315.9$ lb.

Ques.—With a water gage of 0.4 in. we are producing 35,000 cu.ft. of air per min. What quantity will we get with a water gage of 0.9 in.?

Ans.—For the same condition in the mine or airway, the quantity of air in circulation varies as the square root of the pressure or water gage. In other words, the quantity ratio is equal to the square root of the water-gage ratio. In this case, calling the required quantity of air circulated by 0.9 in. of water gage x, we have

$$\frac{x}{35{,}000} = \sqrt{\frac{0.9}{0.4}} = \sqrt{2.25} = 1.5$$

$$x = 1.5 \times 35{,}000 = 52{,}500 \text{ cu.ft. per min.}$$

Ques.—What should a mine foreman do when he employs a new man?

Ans.—When employing a new man, the foreman should examine his credentials to ascertain where he has worked previously, and find out what are his experience and capabilities. Before permitting him to proceed to work, the foreman must be assured that the man is able to take care of himself in the mine and instruct him in regard to the rules and regulations that must be observed.

Ques.—What are the principal causes of mine fires in coal mines, and what precaution should be taken to guard against them?

Ans.—Mine fires occur most frequently as the result of lack of care in the work of blasting. Frequently, a gas feeder will be ignited by a blast and will not be discovered until the men enter the mine for work, or the fireboss makes his morning examination. By that time, the coal has become ignited, and the fire may have gained considerable headway. To avoid this condition, where blasting is done in mines generating gas, it is necessary that an examination be made following the firing of shots in the mine.

In mines where the coal is highly inflammable, and much dust accumulates in the working places, there is liability of spontaneous combustion taking place, especially if the fine coal and slack is stored in the waste. To avoid this difficulty, all fine coal and dust should be loaded out of the mine.

Many fires occur in mines owing to the careless use of open lights, or from the improper wiring of electric installations. To avoid such happenings, mine stables, tool shanties, and all other buildings should be constructed of noninflammable material. Concrete should be used wherever this is possible. Strict regulations should be enforced in regard to the use of open lamps and torches, which should never be permitted in mine stables or where hay or other combustible supplies are being handled or taken into the mine. All electrical installations should be made by a competent electrician and safeguarded in every practicable manner.

Ques.—What method of ventilation lessens the danger of an explosion and reduces friction? State your reasons.

Ans.—Splitting the air current in such a manner that each district of the mine will be ventilated by a separate air split reduces the danger of an explosion of gas or dust occurring in the mine, because the quantity of air passing in each district can then be regulated according to the need. Each district will be supplied with pure air direct from the main intake airway, instead of being ventilated by the return air from other districts, which would be more or less laden with gas.

Also, splitting the air current reduces the velocity of the air at the working face, and there is less danger of the flame of safety lamps being blown through the gauze. Should an explosion occur in one district, it is not as liable to be carried into another district as when the entire mine is ventilated by a single air current.

Splitting the air current reduces the frictional resistance by reducing the velocity with which the air is traveling. As a result, a larger quantity of air is circulated with the same power.

COAL AND COKE NEWS

Harrisburg, Penn.

Although the new anthracite wage scale, the highest ever paid, has been in effect only since the first of the month, there is already a rush of men back to the mines from munitions plants and other industries from all over the East. It is believed with the war nearing its close, there will be a continuous rush to the collieries and that by the beginning of next year the operators will again have nearly their normal forces. Since the outbreak of the war 30,000 men have left the coal regions.

Uniontown, Penn.

Coal and coke production in the Connellsville region is believed to have touched its lowest level by reason of the influenza epidemic for the week ended Nov. 2. Figures issued by Manager of Production W. L. Byers place the week's coal output at 655,227 tons, 30,925 tons below that of last week and a drop of 94,157 from the record production of Oct. 12. Conservatively the influenza epidemic in three weeks' time cut 200,000 tons from the output of this region.

An apparent listless market for coal for fuel purposes only has resulted in the machinery of the production campaign here being concentrated on byproduct coal and beehive coke. An inquiry by a local brokerage agency for fuel coal to several consumers in widely separated sections brought back the reply of a surplus stock, and other brokers make similar reports.

Much significance in that respect is attached in some quarters to a recent order of the railroad administration substituting open-top cars for box cars by the Pennsylvania Railroad company to team track loaders in this region. The order brought a strong protest from operators of that class and the date of its effectiveness was advanced to Nov. 12.

The railroad order cuts 75c. per ton from the fixed price of the team trackers' product and means their virtual elimination from the industry, they say. To the fixed price of $2.35 a ton the fuel administration permitted 75c. per ton to be added to cover the expense of hauling to the railroad siding. The order places the team tracker in the same class as the tipple loader, but the former class of operator must now bear the expense of hauling from the mines to the railroads.

The team trackers openly charge that the order was made at the instance of the fuel administration because there was no longer any great demand for coal of that quality. That charge has been denied by the regional fuel administration and the Pennsylvania Railroad company accepts responsibility. It will without doubt discourage production by the team track loaders.

Charleston, W. Va.

With more men available for work in the mines as a result of an improvement in the influenza situation in the district, and with the Baltimore & Ohio able to furnish more cars than has been the case for the last few months, production was increased somewhat in the Fairmont region during the week ending Nov. 2. So long, however, as cars are placed after the usual hour for beginning work, it will be difficult for the mines to mine coal to their capacity and to load promptly. There appears to have been a pronounced improvement in the power supply for the mines of the region during the last few days.

The hold the influenza epidemic has on the mines of the Upper Potomac region has not prevented an increase in production during the last week of 7 per cent. over the preceding week. The total output was 39,325 tons. In the western Maryland field there was an even greater percentage of increase, amounting to 26 per cent. There have been frequent appeals for more physicians and nurses in the Upper Potomac region as a means of combating the further spread of the influenza.

October coal production in the Pocahontas and Tug River districts amounted to 2,034,245 tons. Of the total tonnage produced 1,829,242 tons were shipped, that being the largest record of the present calendar year. When the fact is considered that 8000 miners were doing the work usually done by 13,000, and that there was a further hindrance of operations through influenza, both as to the mines and as to the railroads, the performance is considered notable.

Mines in the Thacker field of West Virginia suffered heavily from the blighting effect of influenza during the week ending Nov. 2. It is estimated that there was a loss in production for that period of not less than 45 per cent.

The influenza epidemic made itself more severely felt in the New River and Winding Gulf districts last week than at any time during October, other unfavorable circumstances also combining to limit the amount of coal mined. As nearly as can be determined the influenza was responsible for about 15 per cent. of the loss in the New River and Winding Gulf fields but late placements also affected production. In addition to such trouble some of the mines found it difficult to secure enough power to operate during a part of one day last week.

Tonnage mined in the Kanawha district during the week ending Nov. 2 was 18,271 less than during the week ending Oct. 26, only 162,097 tons being mined as against 180,368 for the preceding week. Practically the entire decrease was due to labor shortage, the loss in hours from that cause being 1013. Sickness among the miners of course kept many men out of the mines. Power was low for a day or so last week and that also affected production. That the car service was satisfactory is shown by the fact that only 36 hours were lost from that cause.

Birmingham, Ala.

Coal production in Alabama for the week just past will show much improvement over the output for the two weeks previous. The epidemic of influenza, which was demoralizing to the operators and the men, has spent its force and is on the wane, according to the city health officer of Birmingham. There are more men at work during the present week than at any time since the middle of last month, and the output figures will be affected accordingly.

Production Manager Sellheimer is confident that from now on the coal production will show marked increase, and that the losses of the past few weeks will be recovered. Outputs equal to those of July and August are expected within two weeks, and when developments now under way are ready for operation, still further increases in production are looked for. Railroad Administration officials are informed that there will be a larger output at the mines from now on, and are redoubling their efforts to supply the demand for cars with an adequate number.

Coal producers in the western part of Jefferson County and in Walker County feel somewhat better over the prospects of an early service on the Warrior River. In addition to the equipment formerly owned by the New Orleans and Alabama Transportation Co. and that of the Pratt Consolidated Coal Co. and the DeBardeleben Coal Co., there will be considerable new equipment placed in the service.

Coke supplies of the Birmingham district are picking up a little as coal production increases. A. H. Carpenter, coke production manager, is surveying the entire district, and is working on plans to bring about a better and clearer output of coke in the Birmingham district.

Victoria, B. C.

An increase of 75c. a ton in the selling price of coal in British Columbia was authorized by Nichol Thompson, Pacific Coast representative of the Fuel Controller, on Nov. 1. Coal for domestic uses, therefore, now costs $9.75 a ton in this Province. The further advance is the direct result of the raise of 75c. a day in the wages of the coal miners of British Columbia, which was demanded by them and granted by the officials of the Fuel Control Department a few weeks ago.

Vancouver City proposes to appoint a Fuel Administrator under the terms of an order-in-council passed by the Dominion Government authorizing both Provincial and Municipal officers to work with the Fuel Controller in fixing prices, regulating distribution and in the discharge of the many other duties of the department. Up to the present the Provincial Government has not named a Fuel Controller for this section of Canada, but Mr. Thompson is acting in the interim and it will be the duty of Vancouver's representative to protect the citizens of that city against unduly high prices and, in the event of a shortage of fuel this winter, which does not seem likely to occur, to see that the available resources are fairly allocated.

The total production of coal for the Province of British Columbia for the month of September was 164,460 tons, or a decrease of 75,777 tons as compared to the August output. This is the first month of this year that has shown a decline, and it is to be explained to a large extent by the month's strike of the miners of the Fernie and Michel collieries in the Crowsnest Pass Field. This is responsible for a loss of at least 50,000 tons, the August return from these mines being 78,971 tons as against 17,784 tons for the month under review. There also should be taken into consideration Labor Day, five Sundays, and a 30-day month, as well as the Nanaimo accident, in which some sixteen miners were lost when the hoisting cable in No. 1 shaft, Protection, Western Fuel Co., broke and let a descending cage fall.

Seattle, Wash.

A great scarcity of men is being experienced in the coal mines of Washington, and a systematic search for those who have left the occupation in recent months to enter other work is being made by officials of organized labor and where found the miner will be induced to return to the coal mines. Between 1300 and 1500 coal miners have left the mines in this state since the first of the year, and many of these have gone into shipyards and other industries where the pay is larger. But it is pointed out that now that the Macey board has in its adjustment of the shipyard wage scale throughout the country virtually lowered the wages here, that coal miners at their pay are now able to greatly exceed the earnings of the shipyard worker and some miners may return on this score.

The withdrawal of 1500 men from the coal mines of the state has been seriously affecting coal output, and it is stated that estimates since July 1 are being revised with this element given due consideration; and the conclusion reached by operators is that Washington will not exceed its output of last year and may fall considerably below. To keep pace with consumption the mines of the state must produce 5,000,000 tons of coal this year. Last year the production was a little more than 4,000,000 tons.

Martin J. Flyzig, president of District No. 10, U. M. W. A., has received a list of over 200 coal miners of the state who have left the mines for other employment and his organization is now making a systematic canvass to locate these men. It will be pointed out to them that it is a patriotic duty to return to the mines and failure to induce them to take up this work again will result in their names being returned to the Government. What further action the Government will take is not indicated in the letter sent by the Government employment bureau, but it is asking that all details regarding each case of refusal be secured.

Edmonton, Alta.

C. W. Peterson, Deputy Fuel Controller for Canada, who has been traveling through the West looking into the coal situation, states that there is no cause for panic. He held a conference with the coal dealers of Winnipeg and was gratified to learn of

the manner in which the people of that city were taking to Alberta coal, the prejudice which lately existed against it having been removed by the publicity campaign and the satisfactory results obtained from its use.

The normal importation of anthracite to the head of the Lakes is about 500,000 tons, but the allotment this year is reduced to 275,000 tons, out of which Western Ontario is allotted approximately 70,000 tons, which would leave 205,000 tons available for Manitoba and Saskatchewan.

The tonnage of anthracite to be replaced by Alberta lignites is about 270,000 tons and up to Sept. 1 increased shipments had been made from the Alberta lignite mines to Manitoba and Saskatchewan amounting to 267,000 tons, so that, allowing for the difference in heating power on a basis of three tons of lignite to two of anthracite, the situation was well in hand.

As increased shipments of lignite to points in Alberta for the period up to Sept. 1 were 112,000 tons as compared with last year, it is clear that the basis on which the winter is started is equal to that of last year. Everything, however, depends on the normal winter output of lignite being maintained in Alberta. The present epidemic has had the effect of closing a number of mines, notably in the Drumheller district. If this condition should last for any considerable period the effect may be very unfortunate, as the prairie country is absolutely dependent on current shipments from Alberta. Early in the season complaints were received from the fuel administrators of Manitoba and Saskatchewan to the effect that the quality of shipments of lignite was in some cases far below standard and that inferior grades had been offered to the public under false designations. This led to regulations being prescribed by the Fuel Controller and ratified by order-in-council establishing a system of inspection at the Alberta mines.

PENNSYLVANIA

Anthracite

Hazelton—Although handicapped by a 25 per cent. shortage in labor as a result of wartime conditions, the G. B. Markle Coal Co., largest anthracite producer in the world, has exceeded its former record of 1,500,000 tons mined in the past fiscal year, which ended Nov. 1. The output is nearly 100,000 tons more than during the previous twelve months.

Alden—Because all the shaft engineers are ill with influenza the Alden Coal Co. was unable to operate its colliery on Nov. 7, but is making an effort to have sufficient number of engineers on hand to get the colliery in operation as early as possible. The influenza is playing havoc with the employees of this company, as out of 750 employees only 292 reported for work on Nov. 4. It is thought that many of these were idle, because of the illness of themselves or of that of some member of the family.

Bituminous

Uniontown.—Reports made to the fuel administration by operators show that during the period of the saloon closing order, the averaged output per man was increased one ton per day. Another operator not affected by the epidemic reported a normal labor supply the day after pay day, a most unusual record in this region.

Pittsburgh — The influenza situation in central and western Pennsylvania is improving rapidly and the reduced outputs of the mines increasing. The betterment is slow, however, due to the weakened condition of the men following the disease. It will probably be at least two weeks before all the men are at work and able to do a normal day's work.

WEST VIRGINIA

Bluefield—With the installation of additional machinery, the Roberts Coal Co. at Glamorgan is making much progress in its efforts to increase production. R. R. Roberts is the general manager.

Bluefield—A new opening has been driven by the Norton Coal Co. at Norton into a 6-ft. vein. Work is progressing on the grading for a new tipple. The company has also had built 25 additional dwellings for miners.

Norton—As a means of increasing its output the Hawthorne Coal Co. has put up a new tipple. Because of the large number of additional miners needed, it has also been arranged to build 60 houses, 50 of which have been completed. M. Presley is the superintendent in charge.

Morgantown—Fully 50 per cent. of the miners in the Monongalia field were off during the greater part of the week ending Nov. 2, with influenza, according to a personal investigation made by C. F. Ice, chief inspector in the Fairmont region. As a result operations were materially crippled in that section.

Wheeling—N. J. Virgin and J. J. Herbert, well known mining men of Moundsville, W. Va., formerly with the Parrs Run mine of the Mineral State Coal Co., have leased and will operate the Schaub mine, owned by the Schaub Bros. & Howard Coal Co. The name of the new firm will be the Virgin-Herbert Coal Co.

Bluefield—Extensive improvements have been made by the Virginia Iron, Coal and Coke Co. Not only has a large and modern tipple been put up, but many new houses have been erected for miners. With the installation of mining machines the company is also arranging to speed up production as much as possible.

Dunbar—A new colliery is being built by the Stonega Coal and Coke Co. at Dunbar, on the Roaring Fork Division of the Interstate R.R. The mines are to be electrically equipped throughout, all machinery having been purchased. With an ultimate capacity of 1500 tons a day, the company expects to begin the shipment of coal early next year. The general manager of the company is R. E. Taggart.

Elkins—Among the newest operations at Adrian, which has become one of the principal coal-producing points on the Coal & Coke during the last year, is that of the Miller Coal Co., whose plant was only recently completed and put in commission. The plant includes a modern tipple. About two cars of coal a day are now being shipped, but this will probably be increased as soon as the plant is in full operation.

VIRGINIA

Clinchfield—The International Coal Products Co., of which Charles H. Smith is president, will build a plant at this place to distill coal to recover totuol, benzol and other coal tar products. The Government will purchase the distilled products. The Clinchfield Carbocoal Corporation will operate the plant.

INDIANA

Boonville—William R. Tapper wishes to develop a strip mine and is seeking a right-of-way from the Southern Railway Co., two miles south of Boonville. Condemnation proceedings have been brought by Mr. Tapper against the Big Four Coal Co. and adjacent property owners to secure the switch from the Southern Ry. The Big Four Coal Co. is resisting the right-of-way.

ILLINOIS

Bethalto—The reopening of a mine here by a company composed mostly of residents of East St. Louis has disclosed that there is a vein of sufficient thickness to be commercially profitable, and of unusually high quality. State authorities have found that the coal tests four points higher than other Illinois coal for steam and heating purposes. The vein has a roof of limestone.

Shelbyville—The Tower Hill Coal mine at Tower Hill, near here, which has been operated for a year under the stimulus of high prices, has now been closed down permanently. Officials of the company say they have been operating at a loss for several months and working conditions have become dangerous because of the settling of the earth. Most of the 130 miners who have been employed in the mine will move to other localities.

Belleville—For the purpose of increasing the production at the Avery mine here, a joint production committee has been created, composed of three representatives of the company and three representatives of the miners. The company representatives are John Green, Carl Heidinger and John Meyer. The miners' representatives are Peter Boatman, Joseph Lawton and Herman Weber. Any question upon which the committeemen are unable to agree will be referred to the Fuel Administration.

TENNESSEE

Briceville—The tipple and boiler house of the Cross Mountain Coal Co. of this place caught fire on the night of Nov. 4 and burned down completely. This forces the discontinuance of loading from the Cross Mountain and Volunteer mines. A temporary tipple is being built and it is hoped that coal will soon be dumped. The tipple was a complete loss, together with its equipment. The boilers were not seriously damaged although the building was a complete loss. Steam and power were in use within 18 hours after the fire. The Cross Mountain Coal Co. expects to erect a modern tipple to replace the one destroyed.

Personals

James L. Brown has been appointed Overman at No. 7 Mine, Canadian Collieries (D) Ltd., vice Robert Brown.

Arthur C. James, statistician of the Pennsylvania Department of Mines, has been appointed to Chief Clerk of the Department. **M. H. Irwin** has been appointed to succeed Mr. James.

John G. Barbour, of Uniontown, Penn., has resigned as fuel director for Fayette County on account of the press of other work. Mr. Barbour's successor will be named from a list submitted by him at the request of Administrator Garfield.

Floyd W. Parsons, editor of "Coal Age," is one of a party of trade paper editors and publishers which sailed on Oct. 26 for England on a tour of inspection of British industry under war conditions. The trip, which is under the auspices of the British Government, will take about six weeks and will include a visit to the battle areas in France.

Sheldon Smillie, at one time superintendent for the Vinton Collieries Co., at Vintondale, Penn., and then assistant and later chief engineer for the Indiana Division of the Rochester & Pittsburgh Coal and Iron Co., has been placed in charge of the Pittsburgh office of the Wood Equipment Co. of Chicago. Mr. Smillie's mining and engineering experience make him well fitted to handle the company's product, which consists of the pneumatic rotary dump and other devices for mine car handling and control.

Obituary

Joseph Hanford, who for a number of years was superintendent of the Elkins Coal and Coke Co. at Bretz, W. Va., died Nov. 4 from pneumonia. The deceased is survived by his widow, two daughters and a brother.

Arden L. Talbott, manager and part owner of the Bell Coal Co., which operates a mine at Reynoldsville, W. Va., died Nov. 1 from injuries he received when struck by a trolley car. The deceased leaves a widow and three children.

Cyrus Echard, one of the pioneer coal and coke operators of Fayette County, Pennsylvania, died recently in Connellsville, Penn., aged 71. The deceased several years ago organized the Echard Coal and Coke Co., of which he was preseident. He leaves a son, Dr. Thomas E. Echard, of Connellsville.

Benjamin L. Flynn, general superintendent of the various operations of the Logan Mining Co., of Logan, W. Va., died on Nov. 1 of influenza. Mr. Flynn, who was well known in the Logan County field, is survived by his widow and three young sons. He was a Knight Templar and a 32nd degree Mason.

Coming Meetings

Kentucky Mining Institute will hold its winter meeting Dec. 6 and 7, at Lexington, Ky. Secretary, Charles W. Strickland, Huntington, W. Va.

American Society of Mechanical Engineers will hold its annual meeting Dec. 3-6 in New York. Secretary, Calvin W. Rice, 29 West 39th Street, New York City.

Coal Mining Institute of America will hold its annual meeting Dec. 4 and 5 in Pittsburgh, Penn. Secretary H. D. Mason, 911 Chamber of Commerce Building, Pittsburgh, Penn.

Publications Received

Annual Report of the Department of Public Works of the Province of Alberta, 1917. Unillustrated, pp. 226, 6½ x 10 inches.

Monthly Statement of Coal-Mine Fatalities in the United States, July, 1918. Compiled by Albert H. Fay. Unillustrated, 27 pp.; 6 x 9 inches.

Saving Coal in Boiler Plants. By Henry Kreisinger. Department of the Interior, Bureau of Mines. Technical paper 205. Illustrated, 24 pp., 6 x 9 inches.

How to Improve the Hot-Air Furnace. By Charles Whiting Baker. Department of the Interior, Bureau of Mines. Technical Paper 208. Unillustrated, 20 pp., 6 x 9 inches.

Boiler and Furnace Testing. By Rufus T. Strohm. Engineering Bulletin No. 1. United States Fuel Administration, Bureau of Conservation. Illustrated, 20 pp., 6 x 9 inches.

Twenty-fourth Annual Report of the Inspection of Coal Mines and Coal Production, State of Kansas. From Jan. 1, 1916, to Dec. 31, 1916. Unillustrated, pp. 243. 6 x 9 inches.

Economic Operation of Steam Turbo-Electric Stations. By C. T. Hirshfeld and C. L. Karr. Department of the Interior, Bureau of Mines. Technical Paper 204. Illustrated, 29 pp., 6 x 9 inches.

Efficiency in the Use of Oil Fuel—A Handbook for Boiler-Plant and Locomotive Engineers. By J. M. Wadsworth. Department of the Interior, Bureau of Mines. Illustrated, pp. 86, 5 x 7 inches.

Suggestions for Improved Methods of Mining Coal on Indian Lands in Oklahoma. By J. J. Rutledge and Daniel Harrington. Department of the Interior, Bureau of Mines. Technical Paper 154. Illustrated, 36 pp., 6 x 9 inches.

Methods for Routine Work in the Explosives Physical Laboratory of the Bureau of Mines. By S. P. Howell and J. E. Tiffany. Department of the Interior, Bureau of Mines. Technical paper 186. Unillustrated, pp. 63, 6 x 9 inches.

Use of the Hydrogen-Volatile Matter Ratio in Obtaining the Net Heating Value of American Coals. By A. C. Fieldner and W. A. Selvig. Department of the Interior, Bureau of Mines. Technical Paper 197. Illustrated, pp. 11, 6 x 9 inches.

Condensed Catalogues of Mechanical Equipment. With classified Directory and Engineering Data Section. Eighth annual volume, 1918. The American Society of Mechanical Engineers, New York, N. Y.. Illustrated, 812 pp., 6 x 9¼ inches.

Water-Gas Manufacture with Central District Bituminous Coals as Generator Fuel. By W. W. Odell, U. S. Bureau of Mines, and W. A. Dunkley, State Geological Survey Division. Coöperative Mining Series Bulletin 22. State of Illinois, Department of Registration and Education; Division of the State Geological Survey. Illustrated; 24 pp.; 6 x 9 inches.

List of Fuel and Petroleum Statistics. Issued by the Statistical Clearing House, Central Bureau of Planning and Statistics, Washington, D. C. October, 1918. Bulletin, 46 pp. The purpose of this bulletin is to show the principal source of statistics on fuel and petroleum. It includes both original and secondary sources and the various offices in Washington from which the tabulations may be secured by properly accredited persons.

Trade Catalogs

The Thew Underground Mining Shovel. Thew Automatic Shovel Co., Lorain, Ohio. Bulletin No. 29. Pp. 14; 8½ x 11 in.; illustrated. Describes and illustrates the essential features of an underground mining shovel.

"Come Again." Crescent Belt Fastener Co., 381 Fourth Ave., New York. Illustrated, 24 pp., 5½ x 7½ in. Treats the subject of belting in a humorous way, and strikes at some of the old-time methods of belt-joining.

Nonpareil High-Pressure Blocks and Cement. Armstrong Cork Co., Pittsburgh, Penn. Booklet. Pp. 20, 5½ x 7½ in.; illustrated. Describes insulating material for minimizing the loss of heat from steam drums, feed water heaters, internally fired and locomotive type boilers, tanks, breechings, etc.

Giant Trucks. Chicago Pneumatic Tool Co., Chicago, Ill. Illustrated, 32 pp., 9 x 12½ in. Catalog No. 344. The chief claim made for these motor trucks is that they operate on low grade fuels. The vital features of construction are described and the specifications for the various models are given in detail.

Coppus Turbo Blower. Coppus Engineering and Equipment Co., Worcester, Mass. Catalog. Pp. 52, 5½ x 8¾ in., illustrated. Describes the Coppus blower for undergrate draft and other industrial purposes, and enumerates the advantages of mechanical over natural draft. Valuable tables and data are given concerning forced draft apparatus.

Facts. The Cutler-Hammer Mfg. Co., Milwaukee, Wis. Booklet. Pp. 8, 8½ x 11 in., illustrated. This booklet, which is printed in two colors, illustrates and describes the Dean valve control and its application to large valves. Special emphasis is laid on the fact that by the application of this control to water mains at strategic points a great deal of the damage caused by bursting water mains may be averted.

Recent Coal and Coke Patents

Mine Door. J. J. Body and M. L. Johnson, Dante, Va., 1,255,697. Feb. 5, 1918. Filed Aug. 15, 1917. Serial No. 186,389.

Grate. W. Fisher, New Orleans, La., 1,255,727. Feb. 5, 1918. Filed Nov. 8, 1916. Serial No. 130,237.

Process of Burning Solid Fuel. O. b. Evans, assignor to United Gas Improvement Co., Philadelphia, Penn., 1,267,646. May 28, 1918. Filed Jan. 3, 1916. Serial No. 69,730.

Discharge Apparatus for Ash Conveyors. A. Girtamer and R. H. Miller, assignor to American Steam Conveyor Corporation, Chicago, Ill. 1,275,015. Aug. 6, 1918. Filed June 25, 1915. Serial No. 36,195.

Mine Car Running Gear. C. R. Waid, Birmingham, Ala., 1,275,188. Aug. 6, 1918. Filed Feb. 14, 1916. Serial No. 78,128.

Dump Car. F. A. McRae, Montreal, Quebec, Can., 1,274,732. Aug. 6, 1918. Filed July 3, 1917. Serial No. 178,518.

Coal Mining Machine. I. Rudai and A. Szarka, Vestaburg, Penn., 1,274,939. Aug. 6, 1918. Filed May 6, 1918. Serial No. 232,923.

Fuel Support for Furnaces. W. J. Kunz, Milwaukee, Wis., 1,274,563. Aug. 6, 1918. Filed Jan. 24, 1917. Serial No. 144,128.

Miners' Lamplighter. M. Hendler, assignor to Dewar Mfg. Co., Wilmington, Del., 1,274,544. Aug. 6, 1918. Filed April 12, 1913. Serial No. 760,629.

Mining Machine. C. E. Davis, assignor Goodman Manufacturing Co., Chicago, Ill., 1,274,516. Aug. 6, 1918. Filed May 10, 1915. Serial No. 26,990.

Coal Pusher. I. Lemay, Sault Ste. Marie, Ontario, Can., 1,275,708. Aug. 13, 1918. Filed Nov. 26, 1917. Serial No. 203,916.

Gas Producer. A. M. Taylor, assignor General Chemical Co., New York, 1,275,789. Aug. 13, 1918. Filed Feb. 10, 1916. Serial No. 77,372.

Fire Box for Locomotives. H. D. Sawyer, Revere, Mass., 1,275,763. Aug. 13, 1918. Filed Jan. 13, 1911. Serial No. 602,432.

Industrial News

Nelsonville, Ohio—The Brush Fork Coal Co. has increased its capital from $10,000 to $20,000.

Massillon, Ohio—The capital of the Maple Leaf Coal Co. has been increased from $10,000 to $100,000.

Murray City, Ohio—The authorized capital of the Globe Coal Co. has been increased from $10,000 to $50,000.

Columbus, Ohio—The authorized capital of the Minerton Coal Co. has been increased from $25,000 to $50,000.

Manchester, Ky.—The Horse Creek Coal Co., capital $2000, has filed amended articles increasing its capital to $24,000.

Toledo, Ohio—The Rich Hill Coal Co. has been incorporated with a capital of $50,000 by W. P. Hubbs, C. M. Hubbs, G. M. Colgan, Elmer E. Davis and V. H. Weaver.

Bellaire, Ohio—The Bull Run Coal Co. has been chartered with a capital of $20,000 by Sam Zumpano, Antonio Gatto, Grace Gatto, Sanna Pizzino and Carmelo Pizzino.

Thurber, Tex.—The Texas & Pacific Coal Co. has recently filed notice of an increase in its capitalization from $4,000,000 to $5,000,000, to provide for proposed expansion.

Akron, Ohio—The H. K. M. Coal Co. has been incorporated with a capital of $50,000 by Adolph Hauer, Josef Manncz, Frank M. Kobetitis, William Boer and Emanuel Weiss.

Murray City, Ohio—The Owl Creek Coal Co. has been chartered with a capital of $36,000 by J. W. Green, E. W. Davis, Vance Webb, Charles Schulz and L. P. Mooney.

Syracuse, N. Y.—The Solvay Process Co. is having plans prepared for the construction of a large new coal thawing plant to be located at its works at Indiana Harbor, Ind.

Youngstown, Ohio—The Essential Coal Co. has been chartered with a capital of $100,000 by H. H. Miller, W. H. Smythe, W. R. Rose, Clinton J. Wall and N. C. Franklin.

Birmingham, Ala.—The Sellers Coal Co. has been incorporated with a capital of $10,000 to engage in general coal-mining operations. E. M. Sellers is the principal incorporator.

Philadelphia, Penn.—The Girard Estate, Lafayette Building, has had plans prepared for the construction of new coal pockets, about 20 x 115 ft., at Twentieth Street and Oregon Avenue.

Binghamton, N. Y.—The Powell Coal Co., 29-31 Clinton St., is planning for the immediate erection of a new one-story office building, about 30 x 55 ft., at 115 Clinton St., to cost $5500.

Dayton, Ohio—The Rice Hocking Coal Co. has been incorporated with a capital of $100,000 to mine and sell coal by W. P. Rice, J. W. Rice, H. D. Rice, J. M. McGhee and Majorie Wise.

Louisville, Ky.—The St. Bernard Mining Co. is again operating its mine at St. Charles, Ky., which was down due to 78 men being ill of influenza. Several deaths occurred in the camp.

Louisville, Ky.—The Gordon-Miller Coal and Coke Co. is planning for the erection of a new power plant at its properties for operation, and the installation of electrically driven machinery.

New Straitsville, Ohio—The Thistle Coal Co. has been incorporated with a capital of $50,000 by Frank E. Kramer, George W. Hite, David Moodie, Jr.; David Moodie, Sr., and Marion W. Bradshaw.

Youngstown, Ohio—The R. L. Culbertson Coal Co. has been incorporated with a capital of $500,000 by R. L. Culbertson, W. A. McCoy, E. B. Culbertson, J. W. Morgan and Earl B. Stilson.

Louisville, Ky.—Harlan coal operators have sent out bulletins calling attention to a 5c. per ton increase in the Federal allowed price on run-of-mine and prepared sizes from Harlan County.

Oneida, Tenn.—The Pemberton-Hibbler Mining Co., capital $50,000, has been incorporated by D. McDonald, Robert Hibbler and others to develop 1200 acres of coal land in Scott County.

Thornton, Ky.—Announcement has been made to the effect that the Elkhorn Collieries Co. will erect a new hotel, church, school and also a Y. M. C. A. building, work to start shortly after Nov. 1.

Colly, Ky.—S. T. and B. F. Wright and associates are negotiating for the acquirement of about 1000 acres of coal properties on Colly Creek under lease, and are planning for immediate development work.

Murray, Ohio—The Owl Creek Coal Co., of Murray, Ohio, has been incorporated with a capital stock of $36,000 by Vance Webb, Charles Shultz, E. W. Davis, Lewis Green, L. P. Mooney and J. W. Green.

Volga, W. Va.—J. T. Herbert and W. M. Miller, Cleveland, Ohio, and associates, have acquired approximately 300 acres of coal properties in Upshur County, W. Va., and are planning for immediate development.

Indian Head, Md.—The United States Government, Navy Department, has had plans prepared for the construction of a new coal storage basin at the local Government station, to cost approximately $125,000.

Buffalo, N. Y.—The General Anthracite Co. has been incorporated with a capital of $10,000 to engage in a general coal business. J. L. Ley, M. E. Sullivan and J. H. Watson, Buffalo, are the incorporators.

Middlesboro, Ky.—The Benite Coal Co. has been incorporated with a capital of $25,000 to operate coal properties in the Middlesboro section. S. E. and Samuel Bennett and W. M. Young are the incorporators.

Charleston, W. Va.—The Charleston Coöperative Coal Co. has been incorporated with a capital of $96,000 to operate coal mines in Kanawha County. Eugene J. and F. Fried and D. W. Dunbar are the incorporators.

Fontanet, Ind.—The Fontanet Coal Co. has been organized with capital of $30,000 to transact a general mining business. The directors are George H. Funk, S. J. Gregory, Fred B. Funk, Samuel Jaffee and John H. Gallagher.

Dayton, Ohio—Kentucky Hills Mining Co. has been incorporated with a capital of $25,000 to mine and sell coal. The incorporators are John A. Murphy, J. Francis Murphy, D. W. Allaman, R. B. Retter and D. A. Eichelberger.

Washington, D. C.—Effective Nov. 11, greater leniency is to be permitted in the use of electricity for signs and other of the less essential uses. Much of the jurisdiction in the matter has been vested in the state fuel administrators.

Pittsburgh, Penn.—The Pittsburgh-Midland Coal Co. has been incorporated under Delaware laws with a capital of $50,000 to engage in general coal-mining operations. L. A. Irwin, W. G. Singer and M. L. Rogers are the incorporators.

Covington, Ky.—The Murphy-Daugherty Coal Co. has been incorporated with a capital of $100,000 to develop coal properties in the Covington district. John T. Murphy, E. H. Daugherty and Martin Brown are the incorporators.

Scranton, Penn.—The Price-Pancoast Coal Co., Board of Trade Building, has completed arrangements for the erection of a new one-story electric plant, about 80 x 100 ft. at its properties at Throop, Penn. The structure will cost about $75,000.

Middlesboro, Ky.—The Benito Coal Co., which recently filed notice of incorporation with a capital of $25,000, is planning for the immediate development of about 631 acres of coal properties in the Evarts section. Samuel Bennett is president.

Louisville, Ky.—R. L. Watson, manager of the Byrne & Speed Co., Louisville, reports that he has on hand easily a month's supply of domestic coal in the company's local yards, and figures that most of the other retailers are in about the same boat.

Pittsburgh, Penn.—The Pennsylvania Lines West of Pittsburgh has awarded a contract to the Roberts & Shaefer Co., McCormick Building, Chicago, Ill., for the construction of a new coaling station at Mingo Junction, Ohio, of 700 tons capacity.

Philadelphia, Penn.—The Midvale Steel and Ordnance Corporation, Widener Building, has awarded a contract to the R. H. Beaumont Co., Drexel Building, for the installation of new coal- and ash-handling equipment at its Nicetown works to cost about $35,000.

Philadelphia, Penn.—Mortenthaler Brothers has awarded a contract to William F. Krelle & Co., Twenty-sixth and Oxford Sts., for the erection of a new concrete and steel trestle at its coal yards at Wolf and Swanson Sts. The structure will cost about $7000.

Morgantown, W. Va.—The Hice Coal Co. has been incorporated with a capital of $10,000 to develop coal properties in the vicinity of Morgantown. James R. Moreland, Morgantown; H. C. Kifer, Manor, Penn.; G. C. M. Hice and S. B. McNeill, Brooklyn, N. Y., are the incorporators.

Lynch, Ky.—The United States Coal and Coke Co. at a cost of $100,000 will build reinforced concrete bins, one story high, 45 x 60 x 132 ft. and 45 x 45 x 20, to take care of production awaiting shipment. The construction work will be handled by N. N. Eavenson, of Gary, W. Va.

Charleston, W. Va.—The Capital Issues Committee has granted approval of the proposed issue of securities for $150,000 by the Eagle Byproducts Co., the proceeds to be used for extensive additions to its byproduct coal plant to increase the present capacity to approximately 1500 tons daily.

St. Mary's Falls Canal, Mich.—Statistics compiled under the direction of Col. F. W. Alstaetter, Corps of Engineers, U. S. Army, show that during the month of October 3,087,728 net tons of soft coal and 403,510 net tons of hard coal passed through the Sault Ste. Marie, Michigan and Ontario canals.

Hickman, Ky.—Rains during the past few days and higher water in the Ohio are expected to result in a larger volume of western Kentucky coal moving South via the Ohio and Mississippi. The river has been so low all summer that even small boats had much trouble, and small tows were forced to double trip at numerous points.

Lynch Mines, Ky.—The United States Coal and Coke Co., Carnegie Building, Pittsburgh, Penn., has completed arrangements for the construction of a new reinforced-concrete coal bin, one-story, about 45 x 60 x 132 ft., at its local properties. The structure is estimated to cost $100,000. N. N. Eavenson, Gary, W. Va., is the contractor.

Columbus, Ohio—Announcement is made by A. H. Smith, regional director of railroads, that F. B. Sheldon, heretofore general manager of the Toledo & Ohio Central, the Kanawha & Michigan and the Zanesville & Western railroads, has been made federal manager of the above-mentioned lines. His headquarters will continue at Columbus.

Fairmont, W. Va.—The Domestic Coke Corporation has awarded a contract to the H. Koppers Co., Pittsburgh, Penn., for the installation of a battery of 60 coke ovens at its properties. The new plant will be located on a 45-acre site and it is proposed to produce about 450 gal. of toluol and 13½ tons of ammonia sulphate daily for Government use.

Charleston, W. Va.—The Kanawha Collieries Co., recently incorporated with a capital of $100,000, has taken bids for the installation of mining machinery, etc., for the development of approximately 1200 acres of coal properties in the vicinity of Swiss, W. Va. It is proposed to have a capacity of about 1000 tons daily. William G. Conley is president.

Washington, D. C.—To combat extortionate prices being charged for storing of coal in the District of Columbia, the fuel director for the District has issued an order, which reads: "All retail coal dealers are hereby directed to arrange for and store all coal delivered by them to residences, whenever requested by the purchaser, at a cost not to exceed 75c. a ton."

Uniontown, Penn.—Work has been commenced on developing a 90-acre tract of coal along the Monongahela River by the Gallatin Coal Co., consisting of Frank B. Hess, A. Q. Davis, of Uniontown, and James Baird, of Brownsville. Operations are expected to be commenced Jan. 1. Shipments will be made exclusively by river. Both Mr. Hess and Mr. Davis are interested in several other coal companies.

Henderson, Ky.—The Audubon Mining Co., operating at this point, and formerly owned by Henderson capital, has passed into the hands of a Nashville syndicate of capitalists, who for the present will operate the company under the old title. The same interests recently purchased the Uniontown Mining Co., at Uniontown, Ky. W. L. Hughes, manager of the Audubon company, will continue in charge of operations.

Charleston, W. Va.—Webster County coal lands, almost a virgin field, will undergo development if present plans of Philadelphia capitalists are carried out, the Beaver Run Coal Co. having been organized with a capital of half a million to operate mines near Holly, W. Va. The incorporators are H. Chester Johnson, Horace S. Glazier, Charles F. Pike, J. R. Ives, all of Philadelphia, and John M. L. Black, of Villa Nova, Penn.

Uniontown, Penn.—Sections of double tracks between Uniontown and Morgantown, W. Va., are being placed by the Baltimore & Ohio Railroad Company to care for the increased coal and coke traffic from the West Virginia field. The improvements were commenced last week and will continue for a period of a year or more. For some time past the Baltimore & Ohio has been strengthening its lines at different points to handle the heavy traffic.

Burgettstown, Penn.—The coal department of the American Zinc and Smelting Co. will install at its Langeloth mine, Slovan, Washington County, Pennsylvania, a complete new equipment for coal preparation. The structure will be of steel and will include shaking screens, picking tables and loading booms. C. L. Miller & Co., of Scottdale, Penn., will furnish the equipment. Baton & Elliott, of Pittsburgh, Penn., are the engineers. The work of installation will be under the direction of R. E. Bucknam, superintendent of the mine.

Lexington, Ky.—R. A. Hord, secretary of the Hazard Coal Operators Exchange and Deputy U. S. Fuel Administrator for eastern Kentucky, reports that coal mining operations as late as Nov. 7, were still handicapped by the influenza epidemic to the extent of at least 50 per cent, if not more. While conditions are clearing up somewhat in some sections others are showing an increase in the number of cases, resulting in miners becoming panicky and crippling production. With more nurses and doctors pouring into the fields he expects conditions to mend soon.

Chattanooga, Tenn.—The Suck Creek Co. has been organized to engage in the development of coal mines in the Signal Mountain territory. It is understood that a large tract, comprising several thousand acres, has been acquired under lease, and that the company is planning for immediate development. It is proposed to handle the product by incline to the Tennessee River, near the mouth of Suck Creek, and thence to Chattanooga, a distance of about three miles, in barges. Richard Hardy is president; Z. C. Patton, Jr., vice president; and George Killian, secretary and treasurer.

Uniontown, Penn.—Ninety acres of the Pittsburgh vein of coal fronting the Monongahela River have been acquired by Frank B. Hess and A. Q. Adams, of Uniontown, and James Baird, of Brownsville, who have organized the Gallatin Coal Co. to develop the tract. Work is now being rushed preliminary to opening a mine, and the company expects to commence operations by Jan. 1. Shipments will be made exclusively by river. Messrs. Davis and Hess own the Provins coke plant at Waltersburg, this district, and are also interested in the Davis Fuel Co. of Morgantown, a brokerage concern.

Toledo, Ohio — Indications point to a rather early closing of the lake season, because of the fact that the tonnage required for the Northwest has been moved and also because of a shortage of labor on the docks of the upper lake ports. So it is unofficially stated that shipments of coal from the mines for lake traffic will stop Nov. 15, and that all vessels will leave on their last trip Nov. 23. During the week ending Nov. 2 the Hocking Valley docks loaded 140,564 tons as compared with 259,572 tons during the previous week. The total loaded during the season amounts to 4,634,569 tons. During the same week the Toledo & Ohio Central docks loaded 65,000 tons as compared with 78,000 tons the previous week, making 2,017,075 tons for the season.

Washington, D. C.—Bituminous coal-producing companies over the country were called upon by J. H. Wheelwright, president of the National Coal Association, to contribute at least one-quarter of 1 per cent. of their capital stocks to the $170,500,000 United War Work Campaign Fund, the nation-wide drive for which begins Monday, Nov. 11. In addition, Mr. Wheelwright expressed the hope that all employees of bituminous coal-producing companies, estimated at more than 600,000, would give a day's pay during November to the fund. Representatives of the miners in the bituminous fields were urged to cooperate with the local war work campaign committees in "soliciting each employee to sign a pledge, the amounts thus pledged to be collected and turned over to either the local, state, or national campaign committee."

Charleston, W. Va.—Because of the restrictions placed upon them as to the territory into which they can dispose of their coal, producers in Zone "L," which includes the plants shipping over the Kanawha & Michigan, Kanawha & West Virginia Ry. and the Coal & Coke Ry. west of Dundon, have asked for a modification of the present zone limits prescribed by the Zone Permit Bureau on Oct. 10. With the present restrictions in force a limited portion of Ohio and the lower peninsula of Michigan for lump coal is the only territory into which the producers alluded to can ship. Under the new ruling, existing contracts for malleable lump coal and steam mine-run are in effect abrogated. Before the new ruling went into effect the producers in Zone "L" were permitted to ship to Ohio, Indiana and southern Michigan. Should the Zone "L" producers be able to secure a modification of the October 10 ruling this territory would be restored to them.

Washington, D. C.—A new order by the Federal Fuel Administration, effective Nov. 11, states that "the use of light generated or produced by the use or consumption of coal, oil, gas or other fuel, for illuminating or displaying advertisements, announcements or signs on the exterior of any building, or on any billboard, or other structure for the display of advertisements, announcements or signs, and the use of such light for the external ornamentation of any building or structure, or for illuminating or displaying any window in any shop or store, when such shop or store is not open for business, shall be entirely discontinued on Monday, Tuesday, Wednesday and Thursday of each week in New England, and in the States of New York, Pennsylvania, New Jersey, Delaware, Maryland, and in the District of Columbia, and shall be entirely discontinued on Monday and Tuesday of each week in the States of Michigan and Ohio, and in any state not hereinbefore mentioned, when the Federal Fuel Administrator for such state shall so order, provided however, that nothing in this regulation shall be construed to prohibit the maintenance in any shop or store window of any lights required by a state law or a municipal ordinance, or for the purpose of safety."

MARKET DEPARTMENT

Weekly Review

Cessation of Hostilities Brings Its Problems to Bituminous Operators—Consumers Well Stocked with Coal—Buyers Conspicuous by Their Apathy—Danger Ahead for Consumers Who Do Not Replenish Their Stocks—Anthracite Situation

IN RESPONSE to the Fuel Administration's campaign for a maximum coal output there was produced during the first seven months of the present coal year (April to October inclusive) 368,858,000 net tons of bituminous coal. This tonnage represents an increase of 42,437,000 net tons over the output of the similar period in 1917.

With the country driving ahead at full blast on a war program, the increased rate of production was far from being sufficient to meet the demands of industry. Industries that were considered unessential to the war program were denied the use of coal, the extent of the stocks that would be accumulated by essential industries was specified by the Fuel Administration, and a zoning system was perfected which had for its object the elimination of the cross-hauling of coal from one mining section to another. These changes, and many others even more radical, were instituted for the sole purpose of enabling the country to concentrate its energies on one thing—the carrying on of a war that would bring about a speedy peace.

Now, 19 months after our entry into the conflict the war has come to an end. Though indications were many that the German war machine was disintegrating, still the end came with a suddenness which for this country was startling. Just as in the beginning our declaration against autocracy found us unprepared for war, so the signing of the armistice on Nov. 10 finds us unprepared for peace. This is evidenced by the fact that we have not, at this writing, passed one bit of legislation looking toward a well-defined reconstruction program.

The cessation of hostilities has, if anything, brought forcibly to the attention of the soft-coal operators the realization that they are confronted by a situation that threatens to become serious. Thanks to the methods pursued by the Fuel Administration, consumers of bituminous coal in almost every section of the country have large reserve stocks on hand. To put it plainly, there is an oversupply of soft coal in the hands of consumers, and many mines that but a short time since were hard put to it to meet their production quota now find that they are unable to dispose of their output. The steel mills and the blast furnaces, for instance, are loaded down with coal, and until they can utilize their large stocks in the manufacture of peacetime products they will not come into the market for additional supplies.

The foregoing is true of almost every other industry. Buyers who a month or so ago were eager, even clamorous, to obtain a meager tonnage, are running along from hand to mouth in the hope of a break in the market that will enable them to buy fancy grades below the present Government prices. However, there is more than a possibility that these schemes will miscarry. As industries one after the other return to the manufacture of their pre-war products, and plants that were not permitted to function, or that were curtailed, resume full-time operations the shortage which now exists on paper in the Fuel Administration records may become a sad reality. Weather conditions, too, up to the present have aided those who are laying low on their purchases, and the mine workers have given of their best because they did not desire to interfere with the country's war program. Who can tell how long these favorable conditions will continue?

A quite different aspect is presented by the anthracite market. In fact, reverse what has been said of soft coal and the hard coal situation stands revealed. A shortage of labor during the entire war period, and an influenza epidemic to cap the climax, as it were, has brought the output of anthracite from April 1 to date behind the total production for the corresponding period of 1917. Estimates place the 1918 production from April 1 to November 2 at 60,588,000 net tons and 1917 production at 60,839,000 net tons. However, the discontinuance of munitions manufacture and the shutting down of other strictly war-work industries will doubtless lead to the return of many mine workers (particularly since the new wage increase in the hard coal industry has gone into effect) and before long it is possible that the output of anthracite may show the eagerly awaited upward trend.

WEEKLY COAL PRODUCTION

The production of bituminous coal during the week of Nov. 2, as in the preceding four weeks, continued on the downward grade, estimates placing the output (including lignite and coal made into coke) at 10,965,0d0 net tons, a decrease compared with the preceding week of 3 per cent. and but 0.6 per cent. over the corresponding week of 1917. The average production per working day during the current week is estimated at 1,828,000 net tons as against 1,885,000 net tons during the week of Oct. 26 and 1,816,000 net tons during the week of Nov. 2 of last year.

This is the nearest approach to the level of 1917 since last February and indicates that, unless production soon increases, the probability of a shortage, largely overcome by the record-breaking output of the past few months, will again be before the country. The epidemic of influenza still continues in some of the fields and to this, together with the unexpected warm weather generally, is attributed a temporary lull in the production and transportation of coal and in the previous strenuous industrial demand.

The production of bituminous coal from April 1 to date is 368,858,000 net tons as against 326,421,000 net tons in 1917, an increase of 42,437,000 net tons or 13 per cent.

Anthracite production continued to fall during the week of Nov. 2, estimates placing the output at 1,500,000 net tons as compared with 1,714,000 net tons during the week preceding, a decrease of 214,000 net tons or 12.5 per cent. The current week's production fell even further behind the corresponding week of 1917, the decrease amounting to 547,000 net tons, or 27 per cent. The daily average during the week ended Nov. 2 is estimated at 250,000 net tons as compared with 331,000 net tons, the daily average for the coal year to date and as against 332,000 net tons, the daily average for the coal year 1917. For the first time the production from Apr. 1 to date falls behind the total production for the corresponding period of 1917, estimates placing the 1918 production from Apr. 1 to Nov. 2 at 60,588,000 net tons and 1917 production at 60,839,000 net tons.

Carriers' reports for the week of Nov. 2 show a decrease in shipments from all districts compared with the preceding week with the exception of Cumberland-Piedmont and Somerset, Fairmont, Tennessee and Kentucky, the Illinois, Indiana and western Kentucky district and the districts west of the Mississippi River. In these fields the increase is slight while decreases during the week occurred in central and western Pennsylvania, Ohio, the district including northeast Kentucky and the high and low volatile fields of southwest Virginia and Alabama. All fields, however, report an increase in shipments for the coal year to date over the corresponding period of 1917.

Bituminous coal dumped at lake ports during the week ended Nov. 2 is estimated at 826,224 net tons, a decrease compared with the week preceding of 20 per cent. This tonnage, while low, did not fall behind the requirements outlined by the United States Fuel Administration for this period of the year, and it is now certain that the original lake program will be met before the end of November.

Shipments of bituminous coal to New England during the week ended Nov. 2 are estimated at 473,932 net tons, an increase over the shipments of the week preceding of 7 per cent. This increase is attributed mainly to extremely heavy movement of tidewater shipments during the current week, exceeding the performance of the week preceding by approximately 21 per cent., while rail receipts declined 21 per cent. Shipments also increased from all harbors and with the exception of Hampton Roads exceeded the weekly average for the coal year to date. Rail receipts as well as the total coal to New England fell behind the weekly average.

Tidewater shipments of bituminous coal from all harbors during the week ended Nov. 2, estimated at 819,761 net tons, are

approximately the same as the shipments during the week of Oct. 26 and fell behind the weekly average for the coal year to date by approximately 8 per cent. Shipments during the week of Nov. 2 increased slightly from Baltimore, while shipments from New York, Philadelphia and Hampton Roads fell slightly behind. Compared with the weekly average, Baltimore was the only port reporting an excess.

The operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania report production of beehive coke during the week of Nov. 2 at 339,139 net tons and the operation of their plants at 73.1 per cent. as against 73.9 per cent. during the week preceding. A slight improvement was noted during the week in labor conditions.

The production of beehive coke in the United States for the week ended Nov. 2 is estimated at 558,000 net tons, a decrease of 6 per cent. compared with the week preceding and 4 per cent. compared with the corresponding week of 1917. The daily average is estimated at 93,000 net tons as against 99,000 net tons during the week of Oct. 26 and 97,000 net tons during the week of Nov. 2 of last year. For the calendar year to date beehive coke production is estimated at 26,104,758 net tons as against 28,186,100 net tons during the same period of 1917 or a decrease of 2,081,342 net tons or 7.4 per cent.

The production of byproduct coke in the United States during the week ended Nov. 2 is estimated at 577,006 net tons, as compared with 434,881 net tons during the corresponding week of 1917, or an increase of approximately 33 per cent. The production during the current week was brought about by the operation of the byproduct plants at 89.6 per cent. of their full time. Out of a total loss of full time of 10.4 per cent. 1.1 per cent. is attributed to lack of coal, 1.2, per cent. to labor shortage, 6.3 per cent. to repairs to plants and 1.8 per cent. to other causes.

Operating conditions failed to equal those of the preceding week in Illinois, Maryland, Minnesota and Ohio. In Illinois, the output of the plants was limited by both shortage of coal and repairs to plants, in Ohio by repairs to plants and other causes, in Maryland by shortage of labor, and in Minnesota by other causes. No material improvement was reported by the operators in any of the states.

Recalculation of even capacity causes an increase in capacity to be reported for certain states.

For the calendar year to date, the production of byproduct coke is estimated at 21,365,278 net tons, as compared with 18,830,410 net tons, or an increase of 13.4 per cent. The total production of beehive and byproduct coke, for the calendar year to date, estimated at 47,500,000 net tons, is but slightly in excess of the total production during the corresponding period of 1917. Of this 1918 total, approximately 45 per cent. is byproduct coke and 55 per cent. beehive, while during 1917, 40 per cent. of the total production was byproduct and 60 per cent. beehive.

Atlantic Seaboard

BOSTON

Heavy dull market. Steam plants stuffed with coal. Enough to last until April, in most cases. Cancellations general. Many consumers have difficulty with hot coal. Buyers feel that prices are sure to be lower in the spring. Hampton Roads dispatch fair. Something of a problem to place coal arriving at this end. "Storrow coal" at Baltimore shut off. Same action likely to be taken at New York piers. All-rail movement still further reduced. Few box cars now coming through. Rumored that New England Fuel Administrator may soon relinquish active handling of bituminous. Recent raising of limits for greenhouses, etc., has effect only locally and to very small degree. Railroads well stocked. New England holds no encouraging sign for operators who hope for full mining this winter. Anthracite receipts about on October level. Rail receipts slightly off, but water deliveries somewhat improved. Surplus of broken and pea being worked off very slowly. Latest advance accepted with little comment.

Bituminous—The trend of the war is having its effect on the market. Only a few weeks ago a large number of buyers were ready to take on extra supplies beyond the permissible stock limits imposed by the fuel authorities, and only the very rigid embargoes in force prevented them from doing so. Now all this is changed. The average steam-user is quite content with his present reserve and is indifferent to coal shippers who plead their good service under other conditions in order to move coal for which there is today only a restricted and dull market.

One of the natural consequences of such a situation is the number of cancellations of contracts entered into in good faith last spring and for the most part through regular channels. In the great anxiety to get shipments forward many buyers availed themselves of the service of the Fuel Administration, especially during August and September, not foreseeing that the same reasons which made possible volume shipments through the fuel authorities would shortly make way for similar deliveries through trade channels. The net results is that many consumers have had their storage so completely filled with coal requisitioned by or through state administrators that they are now utterly unable to take on deliveries due them on contracts from shippers and distributors who have been their regular sources of supply.

While the number of loadings for New England are much less than normal, the present dispatch at Hampton Roads is more satisfactory than for several weeks. Barges recently at the piers for New England destinations have been detained but three or four days on the average. For reasons already stated it becomes more and more of a problem to place cargoes at this end, even where choice grades of Pocahontas and New River are concerned, and storage at the various rehandling plants is being taxed to capacity. Distributors who are without such facilities are obliged to allow the coal to move offshore or on Government requisitions.

Coal that latterly has been moving to Mr. Storrow's order at the Baltimore piers has now been shut off, it is understood, because the placing of it at this end caused increasing embarrassment. Similar action is likely to be taken soon with respect to "Storrow coal" at Port Reading and South Amboy. Even on Long Island Sound it is difficult to find buyers willing to accept water deliveries on current freights while all-rail coal can be had as freely as now. Those with regular connections are finding no difficulty at all in getting rail coal forward from regular sources of supply.

Receipts at the five New England gateways continue to show a marked falling off The October daily average, railroad fuel included, was 507 cars, but the average daily movement for the first five days in November was but 438 cars, both commercial and railroad supply coal having dropped off to a notable extent. As compared with the month of August present all-rail receipts of bituminous are but 58 per cent.

The railroads in this territory are particularly well stocked. Both the Boston & Maine and the New Haven have reserve supplies in excess of those a year ago and correct receipts are more than ample. In many cases contractors have been urged to place the coal elsewhere, so assiduous have the fuel authorities shown themselves to dump coal on the railroads. A large number of cargoes have been absorbed in this way that would otherwise have found market only with greatest difficulty. Certainly the operator who looks in this direction to keep his mine running at the present pace through January, February and March is headed for disappointment.

It appears that prior to Oct. 1, receipts of bituminous in New England were but 15,897,748 net tons, against the 18,000,000 net tons agreed upon last spring as a six months' quota on the basis of 30,000,000 net tons for the 12 months from Apr. 1. In other words, this territory absorbed 2,100,000 net tons less than quota during the first six months. Add to this the receipts for October, about 1,330,000 tons, and every nook and cranny has been stuffed. There were many coal men last spring who believe that New England's requirements were being overdrawn, and the outcome proves the correctness of their position.

Anthracite—Very little change is noted in the receipts of anthracite. The October average all-rail was 414 cars daily of domestic sizes, while for the first five days of this month the average was but 359. It is fair to say, however, that this latter period included coal started from the mines during a week of generally light production. Water deliveries are somewhat improved. New York loading conditions are better than during October, although the proportion of stove and chestnut is still small.

The surplus of broken and pea continues an awkward problem for retail dealers. An order of the Boston Fuel Committee was issued Nov. 4 recognizing an oversupply of these sizes and directing that until further notice each sale and delivery of egg should include an equal quantity of broken, and each sale and delivery of stove or nut should include an equal tonnage of pea. Could this be carried out in every case it would doubtless be a distinct help, but there are dealers who have less broken and pea than other sizes. Moreover, there are cargoes of stove and chestnut or all chestnut coming forward on special requisition to be distributed through local boards, and the dealer who insists upon mixtures including pea coal is promptly reminded that lots of straight stove or chestnut can be had for the mere asking. No army officer or fuel authority anywhere but always takes pains to requisition stove and chestnut, leaving other sizes to the rest of the community.

NEW YORK

Anthracite receipts far below requirements, and consumers are urged to use the smaller sizes wherever possible. Fuel Administration allows retail dealers to increase prices 95c. Mayor Hylan told to stop survey and keep hands off. Dumpings show decrease. Bituminous in good shape, with coal moving freely.

Anthracite—Receipts of domestic sizes of anthracite continue to be just about enough to meet immediate requirements. No dealer receives sufficient to take care of the needs of his customers while nearly all dealers have more than enough Buckwheat No. 1 and the smaller coals than they require.

The new price schedule announced on Nov. 7 was a surprise to some producers and shippers who looked for a larger advance in view of the wage increase granted the mine workers. While the operators are given an advance of $1.05 per ton at the mine, local retail dealers have been permitted to increase their delivery price 95c. per net ton. The new price will not affect those who buy in 100-lb. lots or less; who will continue to pay at the rate of 60c. for 100 lb. when the coal is called for at the peddler's cellars and 70c. for 100 lb. when delivered at homes. In yards or coal pockets with facilities for handling coal rapidly small consumers will be able to buy coal at 55c. for 100 lb. on the cash-and-carry basis.

Dumpings of anthracite at the local docks for the week ended Nov. 8 show a falling off from the figures for the previous seven days. The reports show that there were 4997 cars dumped as compared with 6425 cars the previous week, a decrease of 1328 cars, a considerable number with conditions as they now exist.

The local situation has been aggravated some by a strike of men employed on railroad tugs. Upward of 800 men quit work and refused to go back until the Federal authorities intervened and promised the strikers arbitration of their demands, one of which was an 8-hour day. While this trouble existed shipments were further delayed by a strike of coal loaders at some of the docks.

There is no stove or chestnut coal to be had and a small tonnage of egg is available. Broken and pea are in fairly good shape and consumers of the domestic sizes are being urged to use either Buckwheat No. 1 or the smaller sizes of anthracite by mixing them with the larger coals. However, the situation is not alarming. The dealers are not being urged to make deliveries, which only makes stronger the belief that consumers are well supplied.

The allotment of domestic sizes for New York City of the 1918-1919 season has been reduced 4557 tons according to an announcement made last week, which leaves the allotment now at 8,001,418 tons. This deducted tonnage, together with deductions from other communities throughout the state, will be divided among other towns and cities in New York State.

There is an abundance of Buckwheat No. 1 and the smaller coals to be had. Household consumers are being educated in their use. Rice is not so much in evidence as buckwheat, barley or culm.

Mayor Hylan, who ordered the Police Department to make a coal survey of the factories and homes in Greater New York, received a rebuke when he received a telegram from Dr. Garfield to stop interfering with the distribution plans of the Government. The Mayor was informed that State Fuel Administrator Cooke was in charge of the coal situation here. The Mayor's plan did not find favor with Mr. Cooke or the trade, and the former took the matter up with Dr. Garfield. However, despite Dr. Garfield's telegram the police started the survey.

Current quotations, per gross ton, f.o.b., tidewater, at the lower ports are as follows:

	Circular	Individual		Circular	Individual
Broken	$7.80	$8.55	Buck	$5.10	$5.90
Egg	7.70	8.45	Rice	4.65	5.10
Stove	7.95	8.70	Barley	4.15	4.30
Chestnut	8.05	8.80	Boiler	4.60	
Pea	6.55	7.30			

Quotations for domestic coals at the upper ports are generally 5c. higher on ac-

count of the difference in freight rates. Prices in Buckwheat No. 1 and the smaller sizes of anthracite coal are not fixed by the Government.

Bituminous—The peace rumors have had a telling effect on the bituminous situation. With the market apparently well supplied and the New England situation in good shape, shippers are looking into the future, while consumers are not anxious to have large shipments added to their stocks already on hand. There is a sufficient supply of commercial coals here for all immediate needs and manufacturers are more particular now as to what they receive than formerly, inasmuch as most of them have good sized stocks on hand.

With the discontinuance of Lake shipments this week and the reported decision of the New England Fuel Administrators that those states can get along with more than two million tons less coal than was originally allotted to them, shippers see the market overstocked with coal within the next few weeks unless weather conditions become such as to cause a heavy consumption.

Current quotations, based on Government prices at the mines, net ton f.o.b., tidewater at the lower ports, are as follows:

	Mine Gross	F.o.b. N. Y. Gross
Central Pennsylvania:		
Mine-Run, prepared or slack	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of Mine	3.08	5.23
Prepared	3.36	5.51
Slack	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite price increase announced. Delay of week causes dealers to lose. Retail prices increased. Receipts at very low ebb. No stove or nut for sale. Mild weather helps the situation. New zoning system coming. Steam coals quiet. Some washeries shut down. Bituminous easy. Better grades still scarce. Lower prices likely on some grades.

Anthracite—The increase of $1.05 per ton in the mines prices of coal has now gone into effect. Owing to the increase dating from Nov. 1, and not being announced until a week after that date, the retail men have suffered quite a loss. It is true the shipments have been light, and it looks as if the shipping companies were endeavoring to help out the coal men by giving them as little coal as possible. The retailers were in the peculiar situation of wanting coal very badly yet afraid they might get it, with the consequent loss in the retail price.

Everywhere the question is asked as to the cause of the delay between the time of announcing the wage increase and the new mines prices. All sorts of rumors are afloat, and one most frequently heard is that the variance of opinion between the operators and the Government as to the new prices was such at times that only a threat to go before Congress and ask for Government control of the mines finally induced an agreement. Another serious point of contention was the individual differential of 75c. A number of the smaller operators claimed that without this difference they would be compelled to close their mines. Once more they have won their point. Another report is that the Government put forth a plan to pool all coal and then distributed at a flat price.

With the new wholesale prices in effect from Nov. 1 representative retail prices are about as follows.

	Egg	Stove	Nut	Pea
Company shipments	$10.25	$10.50	$10.60	$9.00
Individual shipments	11.00	11.25	11.35	9.75

Broken coal also shared in the increase, but as the tonnage of this size used in the domestic trade is negligible it is not deemed worth while to quote on it. All of this coal is made on special order and sold for manufacturing use and buyers will of course be compelled to pay the $1.05 over the old circular of $5.95 for company coal and 75c. increase for individual shipments.

The trade has never before gone through a week similar to the present. It has been many months since the receipts have been so small. The stocks in the yards are also at a low ebb. The city is practically without stove and chestnut, except, of course, what is stored in the bins of the householders.

In a day or two the new zone system as worked out by the local fuel administration is to be announced to the shippers. It appears that this city's increased quota is not to be divided proportionately among the dealers, but to each zone, the zones being designated by a number.

The steam coal market is not strong by any means and there are some who claim the recent loss of that tonnage due to the idleness of the mines on account of the epidemic is all that saved the situation from becoming serious to some shippers. Some operators report buckwheat comparatively free and none can be found who will say that it is scarce. All seem fairly comfortable on rice. Barley and culm are a dead issue. The washery and river people are at their wits' ends and many have ceased work. The market for spot coal for the latter two sizes is so poor that when orders are not in hand and operators have no storage capacity, it is being thrown on the banks.

The prices per gross ton f. o. b. cars at mines for line shipment and f. o. b. Port Richmond for tide are as follows:

	Line	Tide
Broken	$5.95	$7.30
Egg	5.85	7.20
Stove	6.10	7.45
Nut	6.20	7.55
Pea	4.80	6.05
Buckwheat	3.40	4.45
Rice	2.90	3.80
Boiler	2.70	3.70
Barley	2.40	3.30
Culm	1.25	2.15

The foregoing prices cover company coal. Individual shipments on sizes broken to pea inclusive are 75c. higher. Steam sizes are sold at market prices.

Bituminous—The situation continues to be very easy. Plenty of coal is reaching the market. As is to be expected, the better grades are hard to get and some concerns are now in position where they will only take the quality suited to their particular need. As yet there seems to have been no deviation from the Government prices, but if open weather continues for any great length of time there is no reason why sales should not be made less than the Government price. At least that is the expectation in some quarters, as some grades are even now finding difficulty in making the market at the full Government figure.

BALTIMORE

Receipts of bituminous light, but little feverish anxiety is shown by consumers, who seem to feel that the end of the war will in some strange way bring relief. Hard coal scarce and people turn to substitutes.

Bituminous—While the receipts of bituminous here continue below normal, despite the effort of the Baltimore & Ohio R.R. to increase the haulage by assigning additional locomotives to the coal fields, the consuming public has assumed a sudden new attitude. Although many industries are seeing their small stocks constantly dwindling, the best posted coal men here say there is no excitement over the prospects of a serious shortage, and that many consumers are looking for the sudden termination of the war to bring them relief all at once in some mysterious manner.

During the past week the jobbers here continued to discuss the ruling which gave mines a right to bill direct on requisitioned coal, and a new phase in a supplemental order which will allow such mines to collect a reconsignment charge of 15c. a ton, while refusing them the right to collect the 15c. as a jobber's commission. The fact that the order then provides that any mine charging 15c. a ton for rebilling will automatically cut out the collection of a jobber's commission by anyone also stirred the trade. The executive committee of the national jobbers was summoned to Cleveland to discuss the situation.

A local feature here the past week was an embargo against the Canton coal pier for three days because shipping board and local public service corporation coal had clogged the terminal. During that time the harbor trade, which had no coal on hand, was hard hit by the embargo.

Anthracite—Hard coal continues scarce. The fact that the trade here is not getting enough hard coal and is not even getting the high-grade lump bituminous as a domestic substitute, as promised and urged by both the local and national fuel administrations, is causing a search for other substitutes. Among the latest is a call for reclaimed coke. Several dealers have already taken up this idea and through it may come some measure of protection to the small half ton, peck and bushel trade, which is without coal for the most part and with little prospect of getting any such fuel.

Lake Markets

PITTSBURGH

Lake shipments practically finished. Spread of influenza checked. Market firm.

Last week practically concluded lake shipments of coal from the Pittsburgh district, there being only a little belated movement this week. If it had not been for the extra demands made on the district since July, it would have been possible to complete the district's quota, as originally set, by about Oct. 15, and the coal thereby released could have been used for stocking purposes. The coal lately released from the lake movement is being distributed to essential industries and to railroads and to "semi-essential" industries. For several weeks past there has been an increased supply to retail dealers. On the whole the coal situation is a fairly satisfactory one, provided there are no great transportation difficulties in the winter.

While the full effects of the influenza epidemic are still felt in curtailment of working forces, the situation as to the progress of the disease is regarded as decidedly promising. The matter is well in hand now, with a fair supply of medical help and nurses. Much of the present absence of workmen is attributed not to their having the disease, but to their having sore arms from inoculation or to their having sickness in the family. Production is about 40 per cent. below rated capacity, based on full labor and car supplies, but the curtailment from rates previously attained is much less. Maximum production of the Pittsburgh district averaged about 1,150,000 tons a week and it is estimated, in advance of specific reports, that production is now running but little under a million tons a week.

BUFFALO

Bituminous plenty. Prospect of no further shortage. Jobbers taking courage, for free coal is appearing. Conditions at mines improving. Anthracite still scarce. Lakes close early.

Bituminous—The appearance of more and more unsold coal on the market has given consumers courage. The war situation has held up buying, as purchasers expect prices to go lower. This will surely be the case if the jobbers continue to get telegrams offering coal at the mines. Grain men say that wheat would drop to a low price if it was not held up by Government, so coal shippers and especially consumers are asking if the same is not likely soon to be the case with coal. While the over supply of coal is not large, it is ample enough to make a change in market conditions.

Already the Government has dropped the zone restriction which kept Ohio coal away from Buffalo, and there is a rumor that all zones will be given up so far as the bituminous trade goes. This encourages the jobbers, who are never wanted unless there is a shortage. Telegrams are coming in from the mines, asking jobbers if they cannot dispose of loaded cars of coal for which there is no consignee.

Anthracite—The conditions do not change. Consumers are demanding coal which the distributors are unable to provide. The apparent shortage is likely to continue most of the winter, for nobody will be satisfied until his whole winter's coal is in. When the lakes are closed the supply is likely to be increased materially, but as this is not assured the consumer is anxious. Buying of bituminous lump and anthracite buckwheat is increasing, as together they can be used in a furnace if handled properly. The work of the local fuel administrators is almost entirely confined to the anthracite trade. All industries and others that can use soft coal are directed to do so, and the entire anthracite supply is turned into the house trade.

CLEVELAND

Although the influenza epidemic has abated considerably in eastern and southern Ohio coal-mining regions, car supply continues in excess of demand. The Great Lakes season has been shortened 14 to 21 days, but in spite of the earlier closing the Northwest will get every ton of bituminous desired. Decreased lake shipments are making up for lost production. Bituminous for industrial and domestic purposes becomes more plentiful every week.

Bituminous—Talk of peace has served to narrow the local coal market, but except under out-of-the-ordinary conditions prices have not sagged under the Government maximum. A few small blocks of low-grade coal—probably not more than five or six—have been marketed here in the past few days at 50 to 75c. a ton under the maximum. As against this, several operators report good-sized sales of high-grade No. 8 coal at the full Government price.

The consensus of opinion among better informed operators is that demand for coal will show a marked and steady decline from now on, but that prices, while sagging, will not break. Not much of a reduction is anticipated for months, in fact.

Labor, operators point out, has a scale that will not expire until April 1, 1920. Railroad rates cannot be expected to be reduced much, if at all, for some time. Only in supplies can lower costs be looked for. The upshot, with decreased demand and continued high cost of operation, it is feared, will be closing of the less efficient mines and about three-day-a-week operations at the larger and better manned mines until the period of readjustment is passed. Some operators hope that a larger export coal demand than foreseen will tide them over. Others are urging that once the present maximum Government prices are removed—they figure they die legally at the technical ending of the war—the Government institute minimum prices for a while.

Anthracite—Anthracite coal conditions seem even worse than usual in contrast to the greatly improved situation in bituminous. Receipts have dropped from 75 to 90 cars a week to 50 to 60. Lake shippers are making more complaint than retailers, for the Northwest's quota is not more than 60 per cent. net, it is claimed.

Lake Trade — The unexpectedly early peace movement which, with the lack of ocean tonnage, has eliminated the planned late lake season, has pushed the end of the lake coal season even nearer than first apparent, and every move of the lake trade now is made with the view of ending shipments Nov. 23. Some coal will be dumped after that date, but the pooling operations will not take care of it and the shipper must take care of it at both ends of the route. The official statement of the Coal and Ore Exchange, of Cleveland, which has had charge of the Great Lakes pool, is that up to Nov. 1 the lower lake docks had dumped 25,633,000 tons of bituminous. This leaves 2,367,000 as November's share of the 28,000,000 tons wanted by the Northwest, and the month's quota on the schedule is only 2,400,000 tons. Coal is coming forward much slower, and the dumping is at the rate of not over 900,000 tons a week. How much better the Northwest's coal has gone forward this season can be seen from the total of 1917 shipments—only 26,828,759 tons for a season that extended until the middle of December as against 25,633,000 tons for this year up to only Nov. 1.

DETROIT

Inquiry from buyers has eased off very materially in the steam trade as well as in thecase of retailers. Anthracite is still sought. Lake trade is shrinking.

Bituminous—Inertia seems to have become a prominent feature of the coal trade in Detroit in the last few weeks. Buyers who were clamoring recently to be supplied with coal now appear to present an attitude verging on indifference. The situation affords little encouragement to jobbers and wholesalers, whose efforts to stimulate business are only moderately successful.

Industrial plants and the larger users of steam coal seem to have accumulated stocks as large as they care to hold at this time, and the situation as regards buying by retailers is almost the same. Jobbers say that both the retailers and the steam coal users have been following the advice of the Fuel Administration in stocking any kind of coal obtainable and have not always bought with discretion. The result is many retailers have heavy stocks of mine-run and are finding their customers want something else, while a good deal of domestic lump and other prepared sizes is distributed about in storage piles of industrial plants.

Anthracite—Despite the increase in receipts of anthracite in October, distribution of an initial allotment to household consumers is still far from complete. Several thousand baseburner owners are still waiting for the two tons allowed them as the maximum for starting the winter. Complaint is made that many owners of hot-air furnace heaters are holding back apparently in expectation of getting anthracite, without taking the bituminous, which the Fuel Administration makes obligatory.

Lake Trade—Vessel capacity for movement of coal to the head of the lakes is being offered in greater amount than can be accommodated by cargoes. The close of the coal shipping season is forecasted for about Nov. 23, though one large shipper is reported to be planning a later movement, providing ships are obtainable. Soft coal shipments through St. Marys River canals in October amounted to 3,193,378 tons, a new record for one month.

COLUMBUS

With the report that Germany has signed the armistice and that the war is practically over, coal men are looking about to see what will happen. The demand for steam tonnage has been curtailed to a large degree. The lake trade will soon be over.

Operators as well as jobbers believe that the war is now entirely over, except the signing of peace, and as a result the change back to normal conditions will start soon. As a consequence there is a considerable amount of mine-run and screenings on the market. All buyers are limiting their orders because of retrenchment which has now started in earnest. Lump is not so badly affected as mine-run and screenings, as dealers are still in the market for prepared sizes.

Little is doing in the domestic trade as warm weather still curtails orders from householders. Retail stocks are generally good, and many dealers have their storage capacity filled. Retailers are not inclined to buy any more mine-run but are waiting for the so called fancy grades. Stocks in the bins and cellars of consumers are larger than ever before at this time. Retail prices still continue firm at Government levels. Pocahontas is not to be had but there is a larger amount of West Virginia grades arriving.

Some cutting of steam prices is reported, but it is not yet sufficient to demoralize the market. Thin-vein Hocking prices for mine-run and slack are now the same as thick-vein prices, as the 40c. differential has disappeared. Most of the steam plants have stocks to last from six weeks to three months and possibly longer.

The lake trade is still active but indications point to an earlier closing than usual. An unofficial statement fixes the date for the last cargoes to leave lower lake ports at Nov. 23. It is known that requisitions for lake shipments have been generally filled and the Northwest will be fueled.

CINCINNATI

Mild weather has kept down demand, while the influenza has hampered production. Improvement in both respects is expected shortly.

With only one or two frosty nights, the weather continues to be unusually mild for so late in the season, especially after so warm and pleasant a month as October was; and the unexpected phenomenon of a weather market is therefore in evidence, in the face of the general prediction that demand would be in heavy volume during the entire season.

Much of this is due unquestionably to the fact that domestic consumers stored their coal during the summer to an unprecedented extent, so that demand from this source did not amount to much with the first cool weather; while the requirements of heating plants burning steam coal have likewise not been up to a normal volume, both on account of the mild weather and on account of a fair degree of storage accumulations. This, on the whole, has of course been extremely fortunate, because it has permitted the available supplies of fuel to go to essential industries; while, on the other hand, the continued prevalence of influenza in the mining districts has so limited production that had a heavy demand been experienced there would very probably have been a shortage.

Transportation has also been hampered for the same reason, although the supply of cars has been well up to the production at the mines, reduced as indicated. Lack of facilities in the mining districts for caring for large numbers of sick has prolonged the epidemic beyond the period to which it went in the cities, and as it also started later in the remote districts, it will run correspondingly later. Frosty weather and the natural course of the disease are expected to see the finish of the epidemic shortly, however.

LOUISVILLE

Market generally supplied, with demand for all grades of coal draggy, in spite of low production at the mines of less than 50 per cent. of the average year's production.

The coal business is generally dull with producer, jobber and retailer at the present time, there being practically no demand for steam grades or domestic coal. Industrial consumers appear to be well stocked, and not interested in buying, many holding back due to the peace news, which has unsettled the market as some cancellations of war contracts have been reported. Mild weather has resulted in little demand for domestic coal. Local retailers report a month's supply of lump roal on hand, and many are beginning to advertise rather extensively for business. There is a fair demand for the better grades of eastern Kentucky lump, which has been scarce all season due to the fact that producers have been mining and shipping mine-run.

A general report is to the effect that the Northwest and Lake district is loaded up, while Indiana, Ohio and Kentucky appear well stocked. The South is also well taken care of. Local jobbers report that there is no demand for Indiana coal in that state, western Kentucky coal shows a general surplus, while mine-run eastern Kentucky is also representing a surplus, there being plenty of all grades of Hazard and western Kentucky coal on the market. It is reported that other close-by markets are in the same shape, with surplus stocks on hand and no outlet.

A number of eastern Kentucky mining companies will be forced to go back to screening coal again in order to secure a ready market for lump coal, which will sell. However, how they will dispose of the screenings with the market overstocked as it now is represents a serious question.

With normal production the situation would be much more severe. However, influenza is still holding back operations in all sections of the state, there having been but little improvement shown at some points, with the result that production at the present time is between 30 and 50 per cent. of what it has been for the greater portion of the year.

BIRMINGHAM

Market conditions quiet. Demand for higher grades of steam coal fair. Domestic coal scarce, with strong inquiry. Production slowly recovering from the effects of the influenza epidemic. Transportation facilities adequate.

The market for the lower grades of steam coal is rather soft, but there is a fair demand for the better quality of this class of fuel, such as Black Creek and similar grades, and all in all trade requirements are about equal to the production, which is still far below the output maintained prior to the siege of sickness in the camps.

Domestic coal is a very scarce article and a large tonnage of regular steam product is being diverted to domestic dealers for use in filling orders in hand. Many yards which normally had large stocks on hand at this season are practically bare and are dependent on daily receipts to fill orders.

The Brookside-Pratt Mining Co. will shortly resume operations at Carbon Hill, which is a stripping operation on the Jaeger seam, work having been suspended there for several weeks while equipment was being shifted to another tract. The New Castle Coal Co. is preparing to reopen the old No. 4 Mine, at New Castle, and the necessary mine and railroad tracks are now being installed.

Coal production for Alabama for the week ending Oct. 26 was 310,041 net tons, the lowest mark reached since the Government has been recording the output. Sickness has about disappeared from mining camps now and a steady gain is being noticed in production, though several weeks will likely elapse before conditions become normal.

Coke

CONNELLSVILLE

Production continues to decline, but bottom believed to be passed. No great coke shortage. Fuel Administration could fix minimum coke prices.

Production of coke in the Connellsville region and shipments of raw coal have continued to decline, by reason of the epidemic of influenza, but the bottom is now believed to have been passed and rising production is expected to be reported beginning with this week. From the maximum rate of coke production reached this year, which was early in September, the drop has been about 15 per cent. Maximum raw coal shipments were reached early in October, and the decline there has also been about 15 per cent.

Several byproduct interests whose coal receipts from the Connellsville district have been decreased have applied to the Pittsburgh district coal distributor for relief, but except in minor instances it has been impossible for the Pittsburgh district to help out in this manner, as its own production has been curtailed by the epidemic.

Blast furnaces do not appear to be suffering seriously from lack of coke. Pig-iron production in October as a whole was at a rate 1.3 per cent. less than the rate in September, this being attributable in part to influenza among blast furnace workmen and to various other causes, including a few cases of coke shortage.

The final cessation of hostilities will not directly affect the price limit on coke

While pig iron and steel prices generally are set by the War Industries Board, through agreement with the producers, and are reconsidered each quarter, the coke prices are set by the Fuel Administration under the Lever act, and the full powers of the Fuel Administration continue until the President issues his peace proclamation. The Fuel Administration can reduce the present maximum limits, and the law would even seem to give it full power to set minimum prices. This is a matter of interest at this time, seeing that there is now much talk in the iron and steel trade as to the desirability of the Government regulating iron and steel prices generally on their downward course from war time to peace time conditions, so as to avoid a slump. If there were such regulation in iron and steel there would naturally be regulation in coke also.

With decreased production there is no chance of furnace coke coming into the market and offerings of foundry coke have decreased. Offerings of coke screenings from old dumps are about as formerly. The market remains quotable at the set maximum limits, as follows: Furnace, $6; foundry, 72-hour selected, $7; crushed, over ¾-in., $7.30; clean screenings, over ½-in., $5.50, per net ton at ovens.

The "Courier" reports coke production in the Connellsville and Lower Connellsville region in the week ended Nov. 2 at 293,865 tons, a decrease of 8529 tons, and raw coal shipments at 216,237 tons, a decrease of 18,280 tons.

Buffalo—The market is easy and on a par with the bituminous trade. Furnaces are getting all they want and are not obliged to search for coke as they were awhile ago. This district is depending almost entirely on byproduct supplies. More ovens will be put in as soon as they can be built. Fuel coke is more plentiful, and if the price of coal declines, as one dealer already declares it has done, it will not be easy to sell breeze coke at all.

Middle Western

GENERAL REVIEW

No improvement in general market conditions. Operating conditions good. Buyers holding off in hope of a break in the market.

There is no noticeable improvement in general market conditions. As has been the case for over six weeks, however, the higher grade Illinois and Indiana coals remain fairly firm at Government price, but the poorer grades are offered freely at a discount from the Government prices. The mild weather is hindering any improvement in affairs, and orders throughout the territory are being cancelled as readily and as rapidly as they were being placed two or three months ago, when coal was hard to buy.

Operating conditions are good, and fair average tonnage will be produced from the various fields. The influenza is on the wane, and within a few days, at least, will cease to be a factor in the market or the industry, so far as the producing districts of Indiana and Illinois are concerned. The labor supply continues fair, without any radical changes, and will continue so until the cessation of fighting in Europe, after which, no doubt, there will be an improvement. The car supply is more than ample to take care of the requirements of the Mid-West district. To make sure, however, that there will be plenty of cars, one of the big railroads in this territory has discontinued giving empty coal-carrying equipment to the many stone quarries and gravel pits on its lines, and is concentrating these cars at the coal mines depending upon it.

The situation on Eastern coal, brought into the territory via the Great Lakes, is worth mentioning. The concensus of opinion is that in the spring the average dock company will have on hand a considerable tonnage of Eastern coal still unsold. This opinion is backed up by figures from one of the largest railroads serving the docks on the Northwest Lake district. These figures show a decrease of 3000 cars below last year's figures, and the decrease is growing daily. The explanation for this is that a lot of business heretofore going to the docks has been taken by the Illinois and Indiana operators.

So far as the outlook for the immediate future of the coal industry in this district is concerned, not much relief is to be looked for. The few that might perhaps be in the market are holding off, as they believe that the war will be practically over in a very short time, and they are gambling on the idea that there will be a further break in the market as soon as hostilities cease.

CHICAGO

Steam market continues weak. Mild weather has eased up domestic demand. Anthracite situation continues to arouse criticism.

One or two large buyers of steam coal were in the market this week, tempted by low prices rather than any actual need for coal. These purchases were not on a large enough scale to make any material difference in the steam market, which continues weak.

The domestic trade is still a weather proposition, and as a consequence there has been little buying for the past week. As soon as the mild weather stops, there no doubt will be a big improvement, as there has been so little buying on the part of the retail coal dealers that of necessity their coal stock must be reduced to some extent.

The anthracite situation still continues to call down upon the State Fuel Administration the wrath and disgust of the retail trade. From a source considered reliable, it was learned that there is a big tonnage of hard coal in Chicago proper—in fact, about enough to supply the average demands of the city. Irrespective of this, the anthracite cannot be marketed until the many rules and regulations of the local administration have been abrogated.

MILWAUKEE

Coal yards will enter the winter with shorter stocks of anthracite than last year. Dealers looking for an advance in prices. Deliveries of one ton to each consumer ordered.

The coal situation at Milwaukee, while not altogether satisfactory, admits of little fear of a serious famine. The prevalence of mild weather lessens the early fall consumption and contributes to the serenity of those who are still unsupplied with fuel for the winter. There is an adequate supply of bituminous coal, but stocks of anthracite are short when compared with this time last year, the leading dock company being about 150,000 tons behind in this respect. There are still about four weeks of lake navigation left, and it may be that the anthracite situation will be materially improved before cold weather sets in.

A sharp turn downward in temperature is bound to precipitate a stampede on the part of the fuelless, and, to forestall distress, State Fuel Administrator Fitzgerald has ordered dealers to deliver at least one ton of anthracite to each consumer before cold weather sets in, and to follow up the one-ton allotment in rotation and in such quantity as will keep every consumer supplied all winter. Parties using magazine heaters will be given preference over those having hot-air furnaces.

There seems to be a shortage of small sized anthracite and dealers are compelled to substitute egg size for the major part of all nut and stove size orders. The fuel administration advises consumers to break the coal to the smaller sizes if it is impossible for them to burn egg.

Prices current during the latter part of the summer and early fall are still in vogue, but dealers are expecting an advance in conformity with the recent increase in the wages of miners.

October's coal receipts aggregated 98,511 tons of anthracite and 393,252 tons of bituminous, making the receipts for the six months beginning with May 559,939 tons of the former and 3,161,129 tons of the latter. Thus far in November cargo receipts aggregate 25,203 tons of anthracite and 56,257 tons of bituminous.

ST. LOUIS

A continued quiet market, with no favorable weather conditions. A surplus from all fields and prices shot to pieces. Steam and domestic, both country and city, at a standstill and no storage coal going in. Railroad tonnage fairly good. Equipment and transportation good.

The local situation still continues to be an unsolved problem. The prevailing mild weather has upset all plans for an improved market and there is no demand at all for any kind of coal. This is not local, but is general throughout the territory adjacent to St. Louis. The "Buy Early" campaign amounted to far more than anybody expected, and it is not fully known yet as to how it is going to affect business for the next five or six weeks. Domestic business in St. Louis is absolutely at a standstill, some retailers not having their equipment out more than one or two days a week and only part of it then.

Steam plants, and especially those working on war orders, are using up their storage coal, and all other plants are going into their storage coal rather than buy on the open market, inasmuch as prices are all cut now and likely to continue so for some time, in the opinion of the buyer.

This same condition prevails throughout the country towns, and the result is that mines in the Standard field are idle because they have no place to put the coal and the prices are cut to the point where it cannot be sold at much of a profit. Standard 2-in. lump is around $1.75 to $2 and screenings can be bought from $1.25 up. Mt. Olive coal is being cut in some instances, but as a rule is holding up to the $2.55 price for the screened sizes.

In the Standard and Mt. Olive fields the bulk of the coal moving out now is for railroad uses, and this continues good. There is, of course, a decreased production at the mines that are working exclusively on railroad coal on account of the influenza epidemic, which still continues unusually severe in some mining towns.

The scarcity of water that has existed for some time past was relieved the past week by good rains. Equipment is plentiful and transportation good. A large tonnage of Mt. Olive coal, which has been moving to the north, is easing down.

Conditions in the Carterville and Duquoin fields forecast the catching up in the very near future with orders. The mines that have railroad tonnages are holding out best, but the mines working strictly on domestic coal are having a hard time right now. The northern market seems good, but the southern market is gone.

Considerable Carterville coal has been offered in the St. Louis market, and in order to move some of it it has been intimated that the Government maximum of $2.55 would be cut. In the face of this, however, St. Louis is not buying. No coal is moving in and there is no need of it. The dealers are stored to their capacity. Equipment is fairly plentiful and transportation is good.

The inflienza epidemic still prevails in these districts and many mines are shorthanded although none of them at this time are idle on account of no orders and not likely to be so for some little time, anyway.

In the retail circles in St. Louis, the prices are being cut somewhat, but it is not general.

The wholesale prices are, with the exceptions, as noted:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.55@2.75	$2.55@2.75	$2.40@2.70
3x6-in. egg	2.55@2.75	2.55@2.75	2.40@2.70
2x3-in. nut	2.55@2.75	2.55@2.75	2.40@2.70
Washed:			
No. 1	3.05@3.20	3.05@3.20	.....
No. 2	3.05@3.20	3.05@3.20	.....
No. 3	3.05@3.20	3.05@3.20	.....
Mine Run	2.35@2.50	2.35@2.50	2.20@2.30
Screenings	2.17@2.32	2.17@1.32	1.50@1.60

Special preparation on Carterville is 10 cents. extra
Williamson & Franklin Co. rate is $1.10.
Other fields 95 cents.

SEATTLE

Vast amount of Western coal will supply South American countries which are furnishing this country with war supplies.

To expedite the shipments of Western coal to Chile and other South American countries, S. L. Yerkes, assistant general director of distribution for the United States Fuel Administration, is in this city making an investigation of coal mining and shipping conditions.

Coal will be exported to the Southern republics through Seattle, Portland and San Francisco if present plans mature. The coal passing through Portland will come from Utah and Wyoming, and shipments from the two states will also pass through San Francisco. The Washington and Montana shipments will continue to come through Seattle. Already 25,000 tons of Washington coal have been sent to Chile and other Southern countries. The Pacific Coast Coal Co. sent an efficiency engineer south with the first cargo, and his work in directing the change from the use of Eastern and Welsh coals is said to have been highly satisfactory. He showed the Southern consumers the most economical way to use Washington coal. There is no fixed amount of coal that must be supplied, but a great deal will be forwarded. Formerly Chile and other South American countries secured their coal from Australia and Wales. But the war cut that supply off and lack of shipping facilities and the needs in the Eastern states have cut that supply off. The United States is receiving nitrates from Chile and it is necessary that we keep her supplied with fuel. Shipping arrangements have been practically completed.

COAL AGE

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Patriotic Duty of Buyers

By R. Dawson Hall

FINANCIAL troubles and lack of work arise in general from the inactivity of buyers, who make up their minds that prices are high and may soon drop, and then fold their hands and wait for the drop to come. As a result business drags till their prognostication proves true or false. Usually, however, if enough buyers wait, wages and prices actually do fall so as to make the delay profitable to the individual, though quite frequently he suffers more in the collapse that follows than he gains by the decline in price.

So far this delay has been regarded as justifiable except in the matter of labor purchases. A delay in buying labor on the part of an employer is known as a lockout, and is, in general, looked upon as being morally indefensible. Mines and manufactories may be closed down if the operation is unprofitable, or if the product cannot be sold, but it is considered reprehensible to close them down merely for the purpose of making the worker take less for his labor.

In this instance, then, we have ruled that the buyer has a duty to go on buying. He is not allowed to seek a reduction in the price of labor by closing down, but on the other hand he is permitted to refuse to buy the product of labor and thus cause all manner of idleness in the hope of lowering the price of the product and incidentally the wage rate. Eventually, we may class both actions as equally reprehensible, for they have the same result.

We may regard the conspiracy to refuse to *buy* goods, when that refusal is made for the purpose of lowering the price of the goods, as being morally as bad as a conspiracy to refuse to *sell* them, when that refusal is made for the purpose of raising the price above the market.

In law doubtless the conspiracies are equally illegal, but in common acceptance the attempt to lower a price by combination or by abstention from purchase is almost never considered wrong; and the law against it as a conspiracy is not pressed. The public has yet to be made to learn that there is a moral wrong done to the nation every time a man or a group of men delay purchases of material for which they have an actual need. Just what are the duties of the buyer cannot perhaps be set forth in black and white, but it is well for us to take a glimpse at his duties just at the present when conditions are so poised that a few days of inconsiderate and needless abstention from a patriotic duty may wreck the whole financial structure.

In the medieval era the buyer was quite generally a lord and the seller almost always a serf. From these earlier and simpler times we have inherited a viewpoint which gives us little respect for the seller and his rights. Nevertheless he should not be denied trade at the whim of the buyer nor, on the other hand, should he be berated by the would-be purchaser if he fails to supply in a few days on the demand of the buyer what the buyer, had he been reasonably forehanded, could, just as readily, have arranged to receive in installments spread over a period of months.

Patriotism demands of us all at this time that we buy what we want without unnecessary delay. It is well known that there is plenty of demand for labor and material, and any let up in work now must be followed by feverish anxiety to produce later. Why then have a slack period? Rather let us advocate as a patriotic duty, in so far as may be feasible, that "Business as usual" be the motto of the nation.

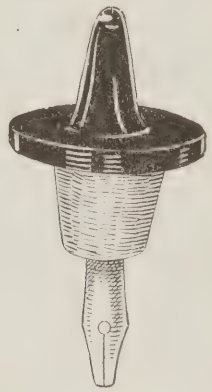
At any time a determination of the buyers to abstain from buying will wreck the market and cause immense distress. By his inconsiderate action the man who abstains from buying is almost as likely to hurt himself as others. Seldom is it advisable and never is it patriotic to hold off from such purchases as we would make at once if we were assured that the price would remain stationary.

IDEAS AND SUGGESTIONS

"Tip" for the Ink Bottle

BY J. A. LUCAS
Ozone Park, N. Y.

In many drawing rooms the draftsmen use small ink bottles that are frequently refilled from the larger ones in which the ink is purchased. These small bottles are thus used for a long time, and the quill which is attached to the stopper becomes soft, and sometimes

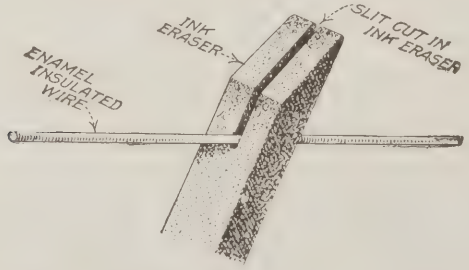


PRACTICAL FILLER FOR INK BOTTLE

is broken, so that it will not reach to the bottom of the bottle. The broken quill may be cut off close to the cork and a large stub pen inserted so that the point will reach the bottom of the bottle when the stopper is in place. After this change has been made the filler will be found to give as good service as a new one and in addition will last considerably longer.

Removing Enamel Insulation from Wire

A scheme for removing the enamel insulation from small magnet wires without the aid of a knife, and one that has been found to work out satisfactorily, is shown in the accompanying illustration. Where this plan is



DEVICE REMOVES INSULATION FROM WIRE

used it is only necessary to cut a slit with a penknife in an ink eraser and then rub the eraser to and fro along the wire in different positions. This removes the enamel and does not nick the copper. It is not desirable to use a knife for this purpose because it will nick, mar or scratch the wire.

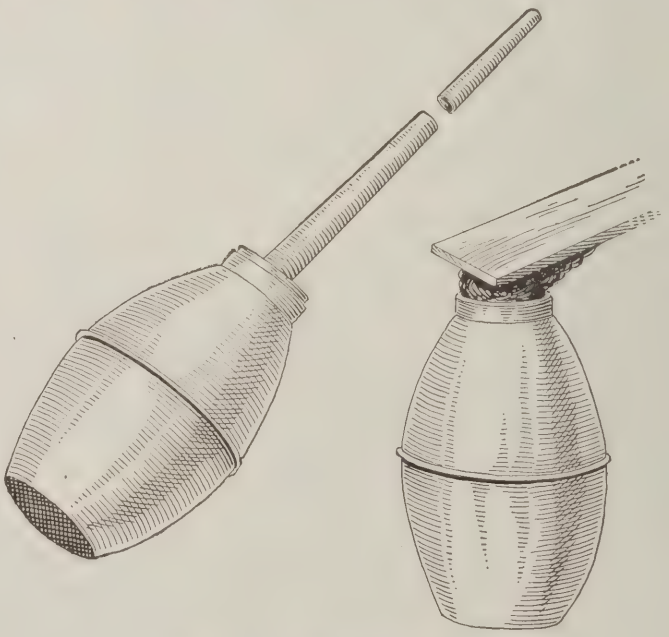
Material Needed in Mine Rescue Work

After many a mine disaster no progress can be made in recovery work without reëstablishing the ventilation. For this purpose much material may be needed. Some authority at the mine should at once arrange for the quick delivery of a supply of brattice cloth or canvas and 1-in. planks. Near-by mines and sawmills should be notified to send as quickly as possible such material as may be available. Mine supply stores should be reached by telephone and asked to forward at once by the quickest available method a supply of canvas or brattice cloth. The necessary timber for the support of stopings is usually on hand at all mines; it may consist of props, ties and wooden rails. Saws, nails, hatchets and hammers should be provided in abundance. —*Rescue and Recovery Operations in Mines.*

Grease Cup Filler

BY ERNEST SCHWARTZ
New York, N. Y.

Filling grease cups in places difficult of access and those on certain machine parts is often a tedious operation, which always necessitates waste of the lubricating material. To overcome this, the device shown in the accompanying illustration will be found practicable. It



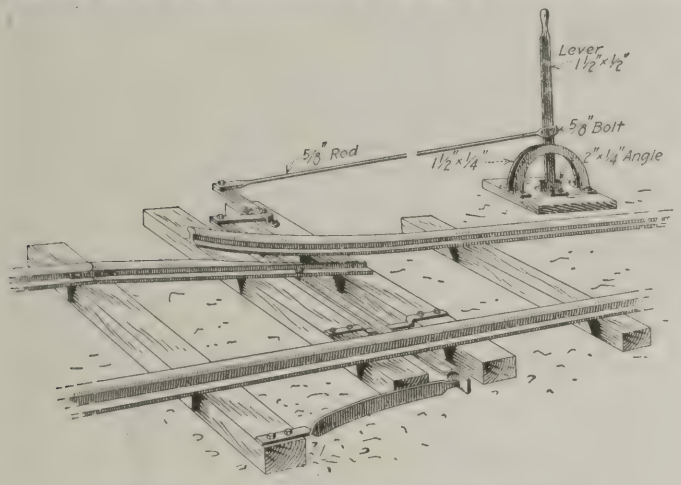
EASILY MADE GREASE GUN

can be made at a small cost. A rubber bulb is fitted with a brass or copper tube of any length desired. The bulb can be purchased in any drug store. The operation of filling the bulb with grease is shown in the right-hand sketch. Graphite compositions and oils can be quickly and successfully handled in large quantity by this method.

Simple Derailing Device

By J. W. Powell
Nanaimo, B. C.

The derailing device shown in the accompanying illustration has been installed at the head of the slopes at Cassidy, B. C. It has proved to be simple and positive in operation and absolutely reliable at all times. In addition to a head block, which is placed on top of the knuckle and which in itself satisfies the requirements of the Coal Mines Act, the device shown was placed in operation as an additional precaution in the interest of safety. The device is placed just below the knuckle at a point sufficiently far away to allow for the



SIMPLE AUTOMATIC DERAILING DEVICE

taking up of the slack in the rope, all couplings and the rope being taut before they reach the derailing switch.

The switch operates automatically when the trip ascends, working back and forth with the aid of the spring as the cars pass over it. This actuating spring is a leaf from an ordinary wagon spring. When the trip descends, the rope rider holds the lever, which is located on top of the slope that closes the switch, until the trip passes over it. He then releases the lever, when it returns to the safety position, as shown in the drawing. This contrivance is cheap and simple and can be installed in a few hours when the parts are completed. In fact the trip was held up only 30 minutes when the changes were made. In general it should be installed between shifts, after hoisting is through for the day.

Liberty Coal

Everyone realizes that the coal mines are short of miners and other help, and that the country needs all the coal that can be mined. An idea is being tried at a mine in Johnstown, Penn., that has every indication of being a success. Many day men are necessary in the operation of a large mine, and all of them are anxious to make as much money as possible. The company in question has therefore set apart a few rooms that are being cut by a chain machine and the track laid by day men. The props are also set and the coal shot by day men. Every night two men who are willing to work this extra shift as coal loaders are detailed to each place. They receive the same wages as other loaders at a set rate of so much per ton or are paid by the average car.

This plan gives extra shifts to any day men who want to load coal and help the situation as it exists at present. I think that there are quite a few day men who would gladly take this means of helping out the country and increasing their earnings. This idea can be used at all mines where the setting aside of certain rooms will not decrease the output and where there are sufficient men to work at night or a few hours evenings to load the coal. It might also be adopted at mines where there are no machines. The men can in such a case both dig and load coal and get the pick price.

Alternating-Current Motor Trouble

An alternating-current motor connected to a pump developed a hot spot on one of the coils. This hot spot was confined to a section of the coil about 2 in. long at the point of the connection. The motor ran all right. The hot spot seemed to attain a certain temperature, which it did not exceed, the rest of the coil remaining at a normal temperature.

The coils in this motor consisted of two No. 13 D. C. C. wires in multiple. The connections were examined and proved to be perfect. On removing the insulation from the coil at the point of heating, it was found that one wire of the start of the coil was partly shorted with one wire of the second turn of the same coil. The result was that the current was partly shunted around this one turn of the coil, causing the heating referred to. After raising the wires and reinsulating them at this point, the motor ran without heating the coil.

This is rather an odd case of trouble, as a shorted coil in an alternating-current winding generally results in that particular coil becoming red hot in a short time, burning off the insulation and causing damage to the other coils if the machine is permitted to run any length of time. The only remedy is to cut the coil out of the circuit, remove it from the machine, then reconnect the leads so as to bridge the gap caused by the removal of the coil.

Useful Combination Tool

An ingenious combination of a hacksaw and a cross peen hammer is shown in the accompanying illustration. This combination is not only advisable for the sake of convenience, but also to relieve the tool bag of unnecessary weight. It will also conserve space. In



COMBINATION HACKSAW AND HAMMER

construction the device is simple, and the illustration is self-explanatory. The hacksaw blade is adjusted by means of the setscrew, which will move the arm around the fulcrum and in this manner either tighten or loosen the blade.

Surface Plant of the Orient Mine in Franklin County, Illinois

Designed To Operate Under Varying Conditions of Transportation, the Orient Mine Holds the World's Hoisting Record of 6008 Tons in Eight Hours—The Operation Embodies Some of the Latest Mechanical Ideas

ALL manufacturers aim to turn out their product with the least expense consistent with the best results. The production of domestic and steam fuel should be no exception. An old coal operator once said, "The more valuable a ton of coal becomes to our customers the more in the end will be the producer's profit." Progressive operators today continue to work along such lines, as witness the fine million-dollar plants of the successful coal men of Franklin County, Illinois. The infinite pains taken to place a superior article on cars for shipment is told in the following description of one of the largest coal-preparation plants of southern Illinois; it was designed, constructed and equipped by some of the leading engineers, structural men and manufacturers. The Orient mine of the Chicago, Wilmington and Franklin Coal Co. is one of the largest and most successful in the Franklin County field. This mine holds the world's hoisting record of 6008 tons of coal per day of eight hours. Furthermore the week's output (from Oct. 7 to 12 inclusive) of coal hoisted, prepared and loaded for shipment was 32,514 tons. The run by days was—Monday 4928 tons, Tuesday 5237, Wednesday 5482, Thursday 6008, Friday 5355 and Saturday 5504, or an average of 5419 tons per day.

The average output was higher than any single day's output of any other mine in the southern Illinois field and the biggest day—6008 tons—is the largest single day's output heretofore reported for any coal mine in



FIG. 1. GENERAL VIEW OF ORIENT TIPPLE AND RESCREENING PLANT—THE HEADFRAME AND ENGINE HOUSE IN THE CENTER

The small views at the bottom show recent additions to the tipple and the rescreener. Left, reprocessing plant in connection with the storage recovery system; right, rescreener overflow for stocking surplus screenings



FIG. 2. VIEW OF ORIENT TIPPLE, HEADFRAME, AND ENGINE AND BOILER HOUSE

any field—a splendid achievement. To raise the 6008 tons on Thursday, it was necessary to make 1452 hoists or an average of 181½ hoists per hour; this is a little better than three per minute all day. The mine cars average somewhat better than four tons of coal each.

As evidenced by the comparatively large output on Wednesday and Friday, there was no unusual preparation for a big daily record drive by having extra coal on the bottom, and so on, nor was there any unusual let down on the day following. The record was stated to be "simply the result of a day's run in which there were practically no delays in any department of the operation—738 men reported for work on this day." The comment in quotation marks is the modest reference, on the part of the Orient mine's management, to a record which coal men will recognize as the result of intelligent planning from the inception of the mine to such a time as the mine and tipple development reached proportions permitting this most unusual movement of coal from face to railroad car. A number of other factors also enter into this problem such as the driving force of those responsible for results at the mine and the character of the men cutting and loading the coal. The slacker board at the Orient mine might also furnish some interesting information.

During the month of October, 1918, 132,411 tons of coal were hoisted at Orient. If this monthly record is the average for the year, the annual tonnage of this mine would amount to 1,588,932 tons—an achievement which should be closely approached judging from recent performance. In this connection reference is made to production information given in an article descriptive of the underground workings of the Orient plant in the Aug. 22, 1918, issue of *Coal Age*.

The surface plant at this mine is distributed about the main shaft. Views of the main structures in this group are shown in the accompanying illustrations. The tipple, which is built for large tonnage production, is presented in Figs. 1 and 2 from different points of view. As the coal is dumped from the Olsen cages at the top of the headframe it is discharged into the tipple. Here it is either loaded as run-of-mine or it is screened and made into the sizes commonly prepared in Illinois. The separation into the seven different sizes takes place in the tipple proper (the building at the left of Fig. 1) or in the rescreening house (shown at the right in Fig. 1). At times of uncertain car supply, run-of-mine or any of the prepared sizes may be stored and treated later, and loaded from the storage pile into railroad cars either for shipment or for reprocessing in the tipple.

Considering the preparation of the coal in detail, treatment starts when the run-of-mine is discharged into the bottom dump weigh pan at the top of the tipple. From this pan the coal goes to a reciprocating feeder which sends the coal uniformly to the screens. These shaking screens are 10 ft. wide and produce the regular sizes, according to Franklin County practice, over 6, 3 and 2-in. round perforations. Coal dropping through 2-in. round openings goes to the rescreening house. The three sizes made in the tipple proper are: lump (all coal passing over 6-in. round perforations), egg (drops through 6-in. and passes over 3-in.) and nut (goes over 2-in. round perforations). These three sizes are cleaned of impurities on the picking tables which are shown in Fig. 3; in this illustration men are at work picking out impurities which are taken up by means of a pan conveyor to a refuse storage bin. The refuse conveyor is the middle one of the three shown in Fig. 3; on either side are the conveyor picking tables for coal. The refuse storage bin is shown at the extreme left in Fig. 1; refuse is loaded into railroad cars from this bin and is thus carried for disposal to some point where it will not interfere with operations.

The lump, egg and nut coal is loaded into cars by booms to reduce breakage to a minimum. When run-of-mine is to be loaded, a gate is opened in the bottom of the feeder hopper, which diverts the coal from the screens (at a point just above the feeder) and into a chute; the lower end of this chute is the large pipe shown in Fig. 2 emerging from the side of the tipple and passing across and down to a loading point over a railroad track. This chute is used both for loading run-of-mine coal for shipment and for running coal into storage, as will be described later. On all loading tracks there is a car retarder made by the Fairmont Mining and Machinery Co., of Fairmont, W. Va. This arrangement permits each car trimmer to operate his own car as it is being loaded. All degradation from lump, egg and nut is carried by drag conveyor to an elevator which delivers to the rescreener belt or slack car; this belt conveys all coal dropping through the 2-in. perforations on the tipple screens to the rescreening house.

The rescreening house is shown at the extreme right of Fig. 1; it is of the latest type. In this building the screenings through the 2-in. perforations are treated and separated into four sizes. The rescreener is fed from the tipple by means of a 36-in. Stanley belt, made by the Stanley Belting Corporation, of Chicago, Ill. This belt runs on Stephens-Adamson ball-bearing rollers carried on an inclined covered bridge, which is shown in the center of Fig. 1, and which runs from the lower part of the tipple to the top of the rescreening house. The four sizes made here are nut No. 2, or stove (through 2-in. round perforations and over 1¼-in.), nut No. 3 (through 1¼-in. and over ¾-in.) nut No. 4, or pea (through ¾-in. and over ⅜-in.) and No. 5, or carbon (through ⅜-in. perforations).

The screening equipment consists of a four-deck, balanced steel shaking screen, suspended by board hangers and operated by double cranks with side arm connecting-rods. The screens are operated by a 15-hp. variable-speed motor; normally they run at 130 r.p.m., but they can be speeded up if wet coal is encountered or if an excessive quantity of small sizes comes up on the belt. The only size cleaned in this building is the No. 2 nut. Provision is made for this by having the lower end of the upper screen extended to form a picking pan where the impurities can be picked out. This refuse is taken to a bin at the end of the rescreener house shown in the small lower right-hand illustration in Fig. 1. This bin has a capacity of one carload. Under the rescreener house are the coal-storage pockets or bins; each bin holds 150 tons of coal, which is loaded out over a lip screen. The degradation is carried by a conveyor into the boiler house.

Motor Drives Sometimes Prove Advantageous

A pertinent thought comes up in connection with the motor drives which operate the shakers, scraper and elevator lines about this plant. Individual drives have been advocated for years, and in many cases this is the only practical solution. However, where machines naturally arrange themselves in groups about a plant, a motor drive for each group is thought to be an advantage by some. A number of machines tend to have a flywheel effect on a motor drive. The effect of an overload on one machine or of another discontinuing operation is neutralized by the balancing tendency of the remaining machines in the group.

About two years ago it was decided to install a ground overflow storage and recovery plant of large capacity at the Orient mine. Such action was brought about by the uncertain supply of cars and the great losses in operation consequent upon failure of car supply at a time when the men were in the mine. It was thought that a storage and recovery plant would equalize car supply and prevent losses through shutting down the mine in the course of a day's run. Furthermore, it should equalize coal production on account of variation in the market demand. Such a plan was carried out



FIG. 3. INTERIOR OF PICKING SHED AT TIPPLE OVER LOADING TRACKS

and involves three distinct operations: First, ground storage, by which mine-run coal or lump, or for that matter any size of coal is run out into the storage pile. Second, a recovery system by which the coal can be picked up and loaded either into railroad cars as mine-run or be taken back and reprocessed in the main tipple. Third, rescreener overflow by means of which the raw screenings can be wasted in a stock pile on the ground and afterward be recovered and reprocessed over the main screen or in the rescreener house.

In carrying out the first operation, or ground-storage part of the plan, a low trestle was built on a piece of flat land about half a mile down the track from the shaft. This trestle is about 1000 ft. long and 10 ft. high. The company then purchased twenty side-dump cars made by the Western Wheeled Scraper Co., of Aurora, Ill.; also two Link-Belt locomotive cranes, equipped with 2-yd. clamshell buckets. The dump cars have a capacity of 25 tons each. These cars are run under the chute at the tipple and filled with mine-run coal, then a train load is taken by the yard engine to the trestle and dumped, after which it is returned to the tipple. The cars are run in two trains so that one train can be under the tipple all the time. When the capacity of the trestle is reached, the locomotive cranes rehandle the coal and pile it within reach of their booms.

In this way it is possible to store coal as rapidly as it is being produced at the mine, so that the plant can be operated without slowing down the operation. The storage yard is shown in Fig. 4; the trestle is on the left

and the crane is shown at work rehandling the coal, taking it from the trestle and piling it to the right.

The second feature, or the recovery system, is planned for a smaller hourly capacity than the storing of coal in the storage yard. It is limited first by the capacity of the crane which loads the coal directly into railroad cars, and second by the capacity of the reprocessing plant, by means of which the coal is conveyed to the shaking screens again. The reprocessing plant is shown in the small bottom illustration to the left in Fig. 1. In case the coal at the storage yard is to be reprocessed, it is loaded back into the side-dump cars; these cars are moved to a point just above the tipple and then dropped by gravity on a special track to the reprocessing plant. The cars in this train of loads are now dumped, one by one, into a hopper at the side of the track. This hopper has an apron feeder in the bottom which delivers the coal to a short inclined conveyor; this in turn delivers to another and longer inclined conveyor running at right angles to the first conveyor line. These inclined conveyors are shown in the small bottom left-hand illustration in Fig. 1. The upper end of the short conveyor ends at a platform; the other and longer conveyor starting at this platform and running to a point above the feeder, discharging through a chute onto the same and thence onto the shaking screens again. This reprocessing installation is so arranged that the conveyors and feeder can be run at speeds to deliver between 50 and 500 tons of coal per hour. It is the practice of the company to keep these conveyors running at slow speed while the coal is being hoisted from the mine, so as to permit the conveyor coal to mix with the product from the mine on the shaking screens. Then in case of any temporary stoppage of hoisting, the conveyors are speeded up and the whole



FIG. 4. COAL-STORAGE PLANT AT ORIENT—TRESTLE AT LEFT AND RELOADING CRANE AT THE TOP

capacity of the screens can be delivered for a short time, thus equalizing the operation of the tipple.

The third feature is the overflow from the rescreener house. The rescreener house is shown at the right in Fig. 1; the overflow feature is depicted in the small illustration at the bottom and at the right of Fig. 1. The overflow is arranged as follows: A chute receives the screenings from the tipple as this coal is discharged from the long inclined belt conveyor at the top of the rescreener house. The chute delivers the screenings to an inclined conveyor (the lower part of this conveyor is shown in the small illustration in Fig. 1) which stocks the coal in a conical pile on the ground across the tracks from the rescreener house. This overflow chute can be placed in operation by simply opening a flap gate in the discharge from the conveyor at the top of the rescreener house, thus diverting the coal to the overflow apparatus. The coal can be recovered from the stock pile at any time, the locomotive crane loading it into side-dump cars; these cars may then dump the coal into the hopper of the reprocessing plant, which delivers it to the tipple shaking screens again.

Rescreener Overflow Proves Valuable in Operation

The special value of the rescreener overflow arises from the fact that the rescreener house pockets, or bins, occasionally get full and it is impossible to unload them without blocking the loading tracks. This overflow also enables the company to bypass the rescreener in case of car shortage; thus enough cars might be provided to take care of the main tipple whereby the lump, egg and nut would not be sent to the storage yard.

During these days it is customary to publish the names of "honor men" and firms connected with a worthy piece of work. In the case of the Orient plant, the original tipple structure was designed and built by the Wisconsin Bridge and Iron Co., of Milwaukee, Wis. The machinery in the original installation was furnished by the Scottdale Foundry and Machine Co., now the Marion Machine, Foundry and Supply Co., of Marion, Ind. The new installation in connection with the tipple was planned and the work was done in the field by the Allen & Garcia Co., of Chicago, Ill. The machinery was furnished by the Jeffrey Manufacturing Co., of Columbus, Ohio, the Stephens-Adamson Manufacturing Co., of Aurora, Ill., and the Skillin & Richards Manufacturing Co., of Chicago, Ill. The new rescreening plant was designed by the Allen & Garcia Co. and the steel work furnished and erected by the Wisconsin Bridge and Iron Co. The field work was done, aside from the steel erection, by the Allen & Garcia Company.

Among the other features of the plant is the Nordberg hoisting engine (made by the Nordberg Manufacturing Co., of Milwaukee, Wis.), which is the finest in the field. It is a 28 x 54-in. engine and was equipped last year with a cylindro-conical drum; the small diameter of the drum is 7 ft. and the large diameter 11 ft. This change in the drum has been the means of increasing the output of the shaft by at least 700 tons per day. Furthermore, the balancing of the hoist is so greatly improved by means of the conical drum that the engine is controlled and operated at a higher rate of speed than formerly, with much greater ease and safety and with a considerably greater steam economy. The latter feature is especially noticeable as the mine was often short of steam when hoisting with the old 10-ft. cylindrical drum. The hoisting cycle is such that more than three cars per minute can be handled constantly with a total hoist of about 600 ft. and a rope speed of about 4500 ft. per minute. The cylindro-conical drum installation was planned and executed by the Allen & Garcia Co. working in connection with the Nordberg Manufacturing Company.

In the same room with the hoisting engine is the electrical power plant, which includes a 350-kw. Nordberg-Corliss direct-current unit and a 500-kw. Fulton engine unit. The Fulton engine is made by the Fulton

Engine Works, Los Angeles, Cal. Power generated by these sets is used to operate the underground haulage, the mining machines and to run the surface machinery exclusive of the hoist. There is also a 65-kw. set furnishing current for lights. In the same building with the hoist and the generators is the steam power plant; it is of ample dimensions and capacity, and contains six 400-hp. Wickes vertical tube boilers, made by the Wickes Boiler Co., of Saginaw, Mich. The boilers are fired mechanically, being equipped with Green chain grate stokers, made by the Green Engineering Co., of East Chicago, Ind. The smallest sizes of coal are burned on these grates and it is conveyed to the boiler house hoppers, from which it is fed by gravity to the stokers.

The big brick stacks which are such a feature of the Franklin County field mark the location of plants as



FIG. 5. SAND-STORAGE AND DRYING PLANT AT ORIENT MINE

far as the eye can reach on all sides of Orient. The 175-ft. stack at this plant has an inside diameter of 8 ft. It is of Wiederholdt type (built by the Wiederholdt Construction Co., of St. Louis, Mo.) and is built of vitrified tile with honeycombed sections vertically. After the tile blocks are set, the sections are filled with concrete reinforced with rods which ties the whole construction solidly together.

There is a washhouse close to the main shaft with the usual equipment of lockers, hangers and sprays for 780 men. The washhouse was designed and built by the Allen & Garcia Company.

Water for the various needs of the town and plant comes from the Middle Fork of Big Muddy River. It is pumped by two centrifugals to a Booth water softener (made by the L. M. Booth Co., of Jersey City, N. J.) from which a boiler supply is sent to a 50,000-gal. tank as reserve storage.

This great preparation and coal-handling plant at Orient is noteworthy not alone for the excellence of the mechanical equipment but also for the comprehensive scheme for balancing the operation of the plant in the many emergencies which can be counted upon to arise during a year's or even a month's run. It also reflects the optimism as well as the foresight of the management. It has taken years to plan this operation, construct the plant and bring the underground development to the point where there is enough "coal in sight" (to borrow an expressive term from our metal-mining friends) to guarantee a steady and reliable flow of big tonnage from the mine face to the screens at the tipple. There was great depression in the coal trade in 1911 and again in 1914-1915—nevertheless this development was vigorously prosecuted and today, when coal is needed, the plant is able to turn out quantity shipments. Emergencies have been quickly met and new requirements speedily provided for as reflected in the improvements recently added.

The facts in this description of the Orient plant came from the authoritative sources of the management of the Chicago, Wilmington and Franklin Coal Co. and the Allen & Garcia Co., the engineering and constructing firm. *Coal Age* is appreciative of such courtesies.

Coal Prices in Ireland

Shortage of shipping, high freights, and the increased cost of labor have resulted in the price of coal being raised in Belfast, Ireland, until it is about double what it was before the war. Despite the shortage of tonnage, local dealers managed to maintain the imports to Belfast at the necessary standard, and they were able to supply all the demands made upon them. The total imports of coal into Belfast for 1917 amounted to 1,321,434 tons, which exceeds the figures for the last prewar year by about 8000 tons. The Government took over the control of coal prices and empowered the local authorities to appoint committees to fix the maximum charge per ton for each district. Subsequently it was resolved that the maximum price of household coal should be fixed at $10.95 per ton cash. Scheduled prices are being observed by making the charge of $11.19 per ton for the best English coal, subject to a discount of $0.243 for cash.

In exploration and recovery work at a mine following a disaster, the code of hoisting engines in general use should be followed. Copies of this code should be posted at the top of the shaft and be furnished the men who descend the shaft. If the regular signal devices have been destroyed, other methods of signaling must be improved. It is not safe to rely on any pipe running down the shaft, as it may be broken or entirely absent a short distance down. Hammers may be used for striking the bucket, or a triangle or short piece of T-rail may be suspended over the bucket or on the cage or float and be struck with a hammer. Two or more hammers should be taken, as one may be accidentally dropped into the shaft. Automobile horns may be heard in shallow shafts 200 ft. deep. A No. 8 wire may be used to advantage for signaling. The wire should be cut 10 ft. longer than the depth of the shaft, and the upper end should be attached to a counter-weighted bar of iron that will strike a suspended plate or circular saw when pulled.—*Rescue and Recovery Operations in Mines.*

Fans and Boilers

By W. D. OWENS
West Pittston, Penn.

SYNOPSIS — *The results of tests conducted upon mine fans were taken as a standard by which the capacities of similar fans used to furnish forced draft to boilers was determined. The amount of air thus calculated is then compared with the quantity required for complete combustion of the fuel used. The results showed some surprising air velocities and in one case resulted in the modification of the baffling.*

A SPECIAL test was made some time ago on two ventilation fans, and their efficiencies used as a guide to the probable efficiency of blast fans used in connection with boiler plants. This was done because of the difficulty in measuring correctly the quantity of air entering a blast fan, owing to the short air passage into this machine, and the whirling motion of the air entering the fan. While on this subject, I think it might be of considerable interest, since we know the tonnage of coal consumed at a boiler plant, to know also what quantity of air is necessary to be furnished each minute, so as to obtain the best results from the fuel consumed. We thus learn that there is a practical limit to the velocity of the gases traveling from the firebox into the stack.

The first ventilation fan tested was 20 ft. in diameter and 6 ft. 8 in. wide, with the blades bent forward in the direction of rotation of the fan. This machine running at 72 r.p.m. produced 113,850 cu.ft. of air per minute and developed a 1.2-in. water gage. The cubical contents in which this fan revolves at the above-stated speed $= 20^2 \times 0.7854 \times 6.66 \times 72 = 150{,}070$ cu.ft. (Small fractions in all the calculations in this article will be omitted, when possible, for the sake of simplicity). And the theoretical water gage for this speed will be $20 \times 3.1416 \times 72 = 4524$ ft., peripheral speed per minute, or

$$\frac{4524}{60} = 75.4 \textit{ ft. per sec.}$$

Therefore, assuming the average temperature to be about 60 deg. F. (which was approximately true when the test was made in the return airway), we have

$$\frac{75.4^2 \times 0.0765 \textit{ (the weight of air)}}{32.16 \times 5.2} = 2.60 \textit{ in. of water gage}$$

The percentage of mine water gage to the theoretical water gage equals $\frac{1.2}{2.60} = 46.15$ per cent. This shows that this fan cannot produce a large volume of air except when the air resistance is low.

Now, deducting the mine water gage from the theoretical water gage, we have 2.60 in. — 1.2 in. = 1.40 in. water gage. This pressure is consumed in the fan itself in forcing through it the 113,850 cu.ft. of air handled. Any fan should produce its own cubical contents when revolving in the open atmosphere and not connected in any shape or form with the mines or any other air duct; under such conditions the volume of air enters direct from the open atmosphere into the fan, and is thrown out by the blades in motion again into the atmosphere and the theoretical water gage is entirely consumed within the fan itself to force out this volume of air.

Assuming that all fans of this type or model are able to produce their own cubical contents per revolution, determine how much air a fan will produce under any given conditions above or below such standard. The cubical contents of this fan, as stated heretofore, is 150,070 cu.ft., and the theoretical water gage is 2.60 in. Therefore, when 1.2 in. of water gage of this 2.60 in. was taken to force the air through the mines, and up to the fan, we have a balance of 1.4 in. of water gage, which forced 113,850 cu.ft. of air through the fan itself. Since 2.60 in. of water gage should produce 150,070 cu.ft., what quantity of air should 1.40 in. of water gage produce? We now have the following proportion:

As $\sqrt{2.60}$: 150,070 : : $\sqrt{1.40}$: 110,153 cu.ft. But this fan actually produced 113,850 cu.ft. Therefore,

$$\frac{113{,}850 - 110{,}135}{150{,}070} = 2.47 \textit{ per cent.}$$

Hence, this fan is able to produce 2.47 per cent. above its own cubical contents per revolution when working against no head. The fan was built by the Vulcan Iron Works, Wilkes-Barre, Pennsylvania.

Second Fan Test

The second fan was a new one, built about two years ago by the Vulcan Iron Works, and, upon request, was furnished with straight or radial blades, bending neither forward nor backward. The fan was 24 ft. in diameter and 8 ft. wide, and ran at 72½ r.p.m. It produced 171,500 cu.ft. of air per minute, developing 2.40 in. mine water gage. The cubical contents of this fan at the above velocity equals $24^2 \times 0.7854 \times 8 \times 72.5 = 262{,}377$ cu.ft. and at this speed the wing tips traveled $24 \times 3.1416 \times 72.5 = 5466$ ft. per minute, or

$$\frac{5466}{60} = 91.1 \textit{ ft. per sec.}$$

Hence the water gage would be

$$\frac{91.1^2 \times 0.0765}{32.16 \times 5.2} = 3.79 \textit{ in.}$$

Now, 3.79 in. — 2.40 in. of mine water gage = 1.39 in. of fan water gage. This represents the pressure necessary to force 171,500 cu.ft. of air through the fan itself. Hence, the percentage of mine water gage to the theoretical water gage is as follows:

$$\frac{2.4}{3.79} = 63.32 \textit{ per cent.}$$

Therefore this is a better fan to develop pressure and volume than the preceding one. Now, what quantity of air should this fan produce, based on its cubical contents? We have as follows:

As $\sqrt{3.79}$: 262,377 : : $\sqrt{1.39}$: 158,840 cu.ft. Since the fan actually produced 171,500 cu.ft., we have 171,500

— 158,840 = 12,660 cu.ft., above its own cubical contents, or

$$\frac{12,660}{262,377} = 4.82 \textit{ per cent.}$$

It can be seen that this fan is a good one, and proves clearly the fallacy of having the blades of any fan bent either forward or backward as compared with the motion of rotation. It also proves that a fan can be depended upon to displace its own cubical contents, when the theoretical depression produced is entirely consumed within the fan itself. Therefore, the efficiency of a fan can be clearly calculated on the foregoing principles, if the purchaser will state the capacity of the machine when there is no resistance to be overcome. Of course, the temperature must be taken into consideration; but, under identical conditions the volume of air produced will be the same.

The gases resulting from the complete combustion of coal in air should not contain less than 16 per cent. of carbon dioxide gas. For, whenever the flue gas contains less than this amount, it is evident that too much air is allowed to pass through the furnace. Even on the basis of admitting one-third more air into the firebox than is theoretically necessary for complete combustion, the escaping gases should contain from 20 to 22 per cent. of carbon dioxide.

The molecule of carbon dioxide, or CO_2, is composed of one atom of carbon with an atomic weight of 12, and two atoms of oxygen with an atomic weight of 16. Hence, $\frac{2 \times 16}{12} = 2\frac{2}{3}$. Therefore, to convert 1 lb. of carbon into carbon dioxide requires $2\frac{2}{3}$ lb. of oxygen when complete combustion takes place. The composition of the atmosphere being made up of 23 per cent. of oxygen, by weight, and 77 per cent. of nitrogen, by weight, it is clear, since we need $2\frac{2}{3}$ lb. of oxygen from the atmosphere, that we must accept 8.94 lb. of nitrogen with it; for, as $23 : 2\frac{2}{3} :: 77 : 8.94$ Hence, to complete the combustion of 1 lb. of carbon we must consume 11.61 lb. of air ($2\frac{2}{3} + 8.94 = 11.61$). Now, since 1 cu.ft. of air weighs 0.0765 lb. at a temperature of 60 deg. F. (which is a fair average), we have to furnish $11.61 \div 0.0765 = 152$ cu.ft. of air for every pound of carbon consumed.

Best Practice Calls for More Air

This, of course, is the theoretical quantity necessary, but the best boiler-room practice calls for from one-third to one-half more air in addition. We will assume that an addition of one-half is admitted. Thus $152 + 76 = 228$. Therefore, for every pound of coal burned (assuming that every pound of coal contains 100 per cent. carbon) it requires about 228 cu.ft. of air to pass through the firebox.

In all probability the coal consumed under the boiler does not contain more than about 80 per cent. of carbon, but when we take into consideration the quantity of oxygen and hydrogen it also contains, which averages about 7½ per cent. according to the geologists, Rodger and Johnson, every pound of coal consumed under ordinary boilers will be fully equivalent in heating capacity to a fuel containing about 90 per cent. carbon. Hence, $228 \times 0.90 = 205$ cu.ft., and this for convenience can be reduced to 200 cu.ft. of air that must be furnished for every pound of coal consumed in order to secure sufficient oxygen for complete combustion to CO_2. This combustion should develop $14,550 \times 0.90 = 13,095$, or say 13,000 B.t.u. of heat for every pound of coal thus consumed. But, if any of this combustible escapes in the form of CO, it must be remembered that not to exceed 4200 B.t.u. will be developed.

We will now consider the two separate boiler plants at Heidelberg No. 1 and Exeter collieries, and ascertain what quantity of air is necessary to be furnished to the boilers at each.

Coal Consumption at Heidelberg Colliery

The Heidelberg No. 1 colliery power plant comprises four return-tubular boilers of 150 nominal horsepower each, and one battery of Stirling boilers of 300 hp., or a total of 900 hp. The coal consumed at this particular colliery averages about 1200 tons per month of 30 days, full time, or about 2,688,000 lb. This is equivalent to about 62½ lb. per minute; and since no steam is necessary for 12 hours of each day, and 24 hours on Sundays, except for pumping and ventilation, it is evident that about one quarter more coal than the average amount must be furnished during the 12 hours on the operating days. Hence, we have $62\frac{1}{2} + 15.56 = 77.81$ lb. consumed every minute during the operating period. For convenience' sake, we shall call it here 75 lb. per minute. Hence, this plant must be furnished with $75 \times 200 = 15,000$ cu.ft. of air per minute.

As stated heretofore, this plant is composed of four return-tubular boilers each 6 x 18 ft. These each contain 76 four-inch diameter flues, through which the gases return to the stack. Now, since 15,000 cu.ft. of air is necessary per minute, each boiler-horsepower will require $15,000 \div 900 = 16.66$ cu.ft. of air per minute. Consequently, one return-tubular boiler requires $16.66 \times 150 = 2500$ cu.ft. of air per minute. This boiler contains 76 flues each with an internal diameter of 3.73 in. and, therefore, the cross-sectional flue area is equal to 5.76 sq.ft. Hence the velocity of the gases going through these flues, when the boiler is thus forced, equals $2500 \div 5.76 = 434$ lin.ft., nearly, per minute (omitting the amount of carbon combined, which in this case is about 1/18 more). But since the average temperature of the return gases passing through the tubes cannot be less than about 1000 deg. F., this volume increases proportionately. Thus, as $0.0284 : 2500 :: 0.0765 : 6734$ cu.ft., and this latter figure divided by the area of the flues gives

$$\frac{6734}{5.76} = 1170 \textit{ lin.ft. (nearly)}$$

velocity per minute, or about 19.5 lin.ft. velocity per second.

When the boilers are thus forced the resistance becomes so great, owing to the small area compared with the rubbing surface of the tubes, combined with the above-stated high velocity, that the vacuum created at the foot of the stack, arising from the difference in temperature between the escaping gases going through the stack and that of the outside atmosphere, is not sufficient to force out the necessary quantity. The result is that part of the air forced through the fire by the blast fan must blow out directly through the firedoors into the boiler-room proper, and into the face

of the fireman. This also prevents any fresh air from entering the firebox from the boiler room, which is highly desirable when fresh coal is fired because generally some of the gases leaving the fire escape in the form of CO, or carbon monoxide. A small quantity of fresh air entering the combustion chamber at such times reconverts the CO into CO_2. It is important to secure this result since complete combustion into CO_2 produces 14,500 B.t.u. of heat, while the combustion to CO develops only 4200 B.t.u. per pound of carbon consumed.

In order to furnish the aforementioned quantity of air and force it through the grates and other gas passages, the blast fan has to run at from 130 to 150 r.p.m. The diameter of the fan is 8 ft. and its width 3 ft. 2½ in. In one of the tests made the fan was running 130 r.p.m., producing a water gage of 0.6 in. The cubical contents of the space occupied by this fan is 160.8 cu.ft., and this times 130 = 20,900 cu.ft. The theoretical water gage for this speed is 1.338 in. Deducting from this the 0.6 in. actually produced leaves 0.738 in., as the water gage consumed in the fan itself. Therefore, to find the quantity of air this fan produces under the conditions of the mine fan test, we have the proportion $\sqrt{1.338} : 20900 :: \sqrt{0.738} : 15{,}500$ cu.ft. It was calculated, heretofore, that 15,000 cu.ft. of air was necessary to proper combustion at this plant, and taking into consideration the waste, this fan must be producing a little more than its cubical contents.

The Exeter colliery steam plant has two batteries of Babcock boilers of 300 hp. each, and three batteries of Stirling boilers of 463 hp. each, making a total of 1989 hp. The consumption of coal at this colliery averages about 4000 tons per month of 30 days, full time, or about 210 lb. of coal per minute. During the days when the mines are in operation this colliery again has to burn about one-eighth more coal than the average consumption. Therefore, we must add 26 lb. per minute, making a total of 236 lb., or say 230 lb., so as to be on the safe side of the ledger. Now, since we must use 200 cu.ft. of air per pound of coal, we have 230 × 200 = 46,000 cu.ft. of air that must be furnished through the fireboxes every minute. The horsepower of this plant, as previously stated, is equal to 1989. Hence $\frac{46{,}000}{1989} = 23.12$ cu.ft. of air (nearly) per horsepower per minute.

One battery of Stirling boilers is equal to 463 hp., and 463 × 23.12 = 10,700 cu.ft., necessary for one battery. The passage into the stack, as originally constructed, was 1 ft. 5 in. by 15 ft., equals 21.25 sq.ft. Across this extends 30 water tubes, each 3.25 in. in outside diameter, thus cutting the effective area down to 9.75 sq.ft., through which the gases must pass in order to escape. The temperature of the gases at this point cannot be less than about 600 deg. F., or their weight will be about 0.0376 lb. per cu.ft. Since 10,700 cu.ft. is necessary at a temperature of 60 deg. F., or a weight of 0.0765 lb. per cu.ft., we have the proportion 0.0376 : 10,700 :: 0.0765 : 21,770 cu.ft. Consequently, $\frac{21{,}770}{9.75} = 2230$ lin.ft. velocity per minute.

It was shown, when discussing the Heidelberg return-tubular boilers, that the lineal velocity leaving the boilers was about 1170 ft. per minute; therefore, the velocity of the gases leaving the Stirling boilers at this colliery was unreasonable before the escape opening was enlarged. There is no wonder that the flames from the fireboxes were blowing out into the fireroom and into the face of the fireman.

The stacks are 5 ft. in diameter, or 19.635 sq.ft. in cross-sectional area. The area of the stack is the same in proportion as are the stacks used on the return-tubular boilers. These are 34 in. in diameter, or 6.30 sq.ft. in cross-section for a boiler of 150 nominal horsepower. Therefore, 150 : 6.30 sq.ft. :: 463 : 19.44 sq.ft., practically the same as the area of the 5-ft. diameter stack. There are dampers attached to these stacks, but they cannot be operated because the volume of the gases passing through the flue and stack is equal to the power of the vacuum developed between the temperature of the two atmospheres inside and outside. The stacks, even now, after the change in area, should be about 10 ft. higher.

The fan at this plant, when the test was made, was running 90 r.p.m. This machine is 14 ft. in diameter, 5 ft. 6 in. wide at the center and 4 ft. 9 in. at the tips of the blades. This gives a cubical content in which the fan is revolving of 800 cu.ft.; hence 90 × 800 = 72,000 cu.ft. of air. The machine developed 1.1 in. of water gage when the test was made. The theoretical depression at this velocity is 2 in. (nearly); therefore, the quantity of air this fan should produce is shown by the following proportion:

$$\sqrt{2} : 72{,}000 :: \sqrt{0.9} : 47{,}000 \ cu.ft.$$

It was heretofore shown that this plant required 46,000 cu.ft. per minute, and considering the amount of waste that takes place in the ashpits the quantities agree closely.

It has been shown that the average velocity of the gases going through the flues of the return-tubular boiler was about 1170 ft. per minute, and that at such a rate the flames in the firebox blew out through the doors. This proves that the velocity should not be higher than about 800 ft. per minute whenever the ratio of the rubbing surface to the area of the passage is as 1 to 230. That is, the area of one flue in the 150-hp. return-tubular boiler is $3.73^2 \times 0.7854 = 10.927$ sq.in., and this multiplied by 76 = 830.45 sq.in., or 5.76 sq.ft. But the rubbing surface of these flues each being 3.73 in. in internal diameter and 18 ft. long, or 216 in., equals

$$\frac{3.1416 \times 3.73 \times 216 \times 76}{144} = 1335 \ sq.ft.$$

And this divided by the area, equals

$$\frac{1335}{5.76} = 231$$

Therefore, the ratio is about 1 to 230.

The ratio of the rubbing surface to the area of passage in the Stirling or Maxim boilers is materially less than in the return-tubular type. Nevertheless, it is plain that the velocity of the gases leaving the boiler proper and entering the stack should not be higher than 1500 lin.ft. per minute.

Looking down into the flue passage of a Stirling 463-hp. battery, the flue area equals about 15 ft. by 3 ft. 2 in., or 47.5 sq.ft.; but this passage contains

120 water tubes each 3¼ in. in diameter, which occupy a space of about 6.91 sq.ft. Hence there remains about 47.5 — 6.91 = 40.59 sq.ft., or say 40 sq.ft., as the true average free area. The rubbing surface is of about 36-ft. perimeter and an average length of 10 ft., or 360 sq.ft. This times three, since there are three batteries, makes 1080 sq.ft. The surface of each water tube equals

$$\frac{3.1416 \times 325 \times 120}{144} = 8.5 \; sq.\,ft.$$

This times 120 tubes equals 1050 sq.ft., and this multiplied by three makes 3150 sq.ft. of rubbing surface in the water tubes. Hence, we have 3150 + 1080 = 4230 sq.ft. of total rubbing surface.

It was shown heretofore that when 2500 cu.ft. of air was forced through the grates of a return-tubular boiler, that the flames would blow out through the firedoors quite forcibly; and that if the whole amount of this air was to go through the flues the velocity would reach about 1170 ft. per minute. This would indicate that the velocity should not exceed about 800 ft. per minute; or say 2200 cu.ft. per minute as the greatest quantity that should be furnished to a return-tubular boiler of this size. Hence, the quantity that should go through the passages of a 463-hp. Stirling boiler will be directly as the ratios of the areas and inversely as the square roots of the rubbing surfaces. These proportions are as follows:

Direct .....5.76 : 2200 :: 40 : 15270 cu.ft.

Inverse.....$\sqrt{4230}$: 15270 :: $\sqrt{1335}$: 8600 cu.ft.

Since writing the foregoing, I find that the average length of the water tubes in the Stirling boilers is about 12 ft., and the quantity of air would thus be proportionately less, owing to the greater resistance, so that instead of 8600 cu.ft., it could not be more than about 7000 cu.ft., while it was stated previously that 10,700 cu.ft. was necessary. It is evident, therefore, that either the area of the passage had to be made much larger, or the boiler stacks would have to be made much higher, which of course would accomplish the same result.

Now, however, since the dimensions of the first and second baffle openings have been enlarged, and 7 in. added at the outlet into the stack, no flames are blowing out through the firedoors when the boilers are forced and the steam pressure can be kept higher and more constant.

Minecdotes

Getting a Bit of Their Own Back

In the earlier days of the war, before the seriousness of the outcome was recognized as it is at the present time, the shortage of coal and the scarcity of labor with which to mine it was hailed with outspoken pleasure by the employees of a certain small mine who had hitherto shown no great discontent with their lot.

"They," meaning the capitalists, of course, "have been putting it all over us every which way for years, and right here is where we get a bit of our own back," was the sentiment generally expressed; while a few of the more knowing ones insisted that "some of those fellows must be getting kind of hard up for easy money, else there'd have been no war; and it's up to us to get our share while we've the chance."

This simply meant that instead of loading only clean coal, for which they were paid good wages, rock, bone, slate and anything black enough which came along were all loaded in together. Naturally, the reputation of the mine began to suffer, and the management were at their wits' end to know how to cope with the situation, since dismissal as a means of discipline was useless in the face of the difficulty they had to replace the men who left.

Finally, a bright idea occurred to the pit boss, who began to keep a sharp lookout on the cars, ordering the dirtiest to be dumped in a place conveniently handy for loading when required. A hard cold snap coming on about that time, it wasn't long before quite a rush of orders came in from the company's own men, and these were filled from this dump.

The grouching and grumbling and general all-round fussing that went on when the trick was discovered was met with bland astonishment by the management, who innocently inquired: "What did they want, anyhow? They were getting the same coal they had mined themselves, weren't they? If the stuff wasn't good enough to suit them, how did they expect other people to put up with it?"

A few weeks of domestic discomfort, short tempers, poorly cooked food and belated meals helped a little more to convince the men that "easy money" could be too dearly bought, and it wasn't long before most of them came round to a saner view of the matter when this side of the "getting-a-bit of-their-own-back" question had been demonstrated.

Pride and Percy Verance

In one mine in West Virginia the miners are Welsh, Italian and Australian. Considerable rivalry exists between the several nationalities, but the Welsh hold the lead, beyond question. They are great coal miners; it seems to be born in the blood.

At the mine in question most of the work is contract, very little "company" work being done. One day the pit boss in making his rounds came upon two Welsh miners working at the face. It seems they were having a hard time, but were determined not to lay down. The pit boss asked how things were going.

"How goes it today, boys?"

"Pretty hard, boss; she sure is tough."

"Well, boys, perk up; all you need is pride and perseverance to keep you, and it will come all right." As he was walking back down the entry he heard the two miners stop working. He stopped and listened to the conversation.

"Say, Di, who is them fellows the boss was a-talking about?"

"I don't know. Who was he a-talking about?"

"That Pride and Percy Verance."

"Oh them! They must be the two wops on the night shift."

Research and Progress in Byproduct Coking in Great Britain—III

By J. B. C. KERSHAW
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SYNOPSIS — *The refinement of benzol and the extraction of benzene, toluene and xylene, the three most valuable constituents, is an interesting process. Much care and careful control of temperatures must be exercised in this process in order to secure the best results.*

BENZOL is a term which, in byproduct coking practice, is used to cover a mixture of compounds of which benzene, toluene and xylene are the more valuable and important members, while certain sulphur compounds—paraffins, phenols, pyridine and naphthalene—are present as impurities. The recovery and rectification of benzol, therefore, is directed to recovering and obtaining in the pure state as large a quantity as possible of the three first-named carbon "ring" compounds from the coke-oven tar and gases.

It may not be out of place to note here that the benzol produced by the modern coke oven is derived from two sources—the tar and the gas. Prior to 1914, the larger portion of the benzol recovered came from the light-oil fraction of the tar distillate, but now the gas furnishes the greater amount.

As evidence of the rapid extension of the benzol recovery plants in the United States, the following figures from a report by C. E. Lescher, of the United States Geological Survey, may be quoted: In 1915 the output of benzol and other light oils by all the byproduct coking plants in the country was estimated to be 13,942,763 gal., and only about one-half of this total was refined in the works where it was produced. From eight to nine million tons of coal were carbonized in the coke ovens that produced this light oil, and the 6,620,096 gal. refined at the byproduct coke works produced 4,833,939 gal. benzol, 1,315,727 gal. toluol and 470,425 gal. solvent naphtha.

Twelve months later the capacity of the benzol-recovery plants in operation in the United States was estimated to be 20,000,000 gal. per annum; while at the present time it is considerably over this amount—probably approaching 30,000,000 gallons.

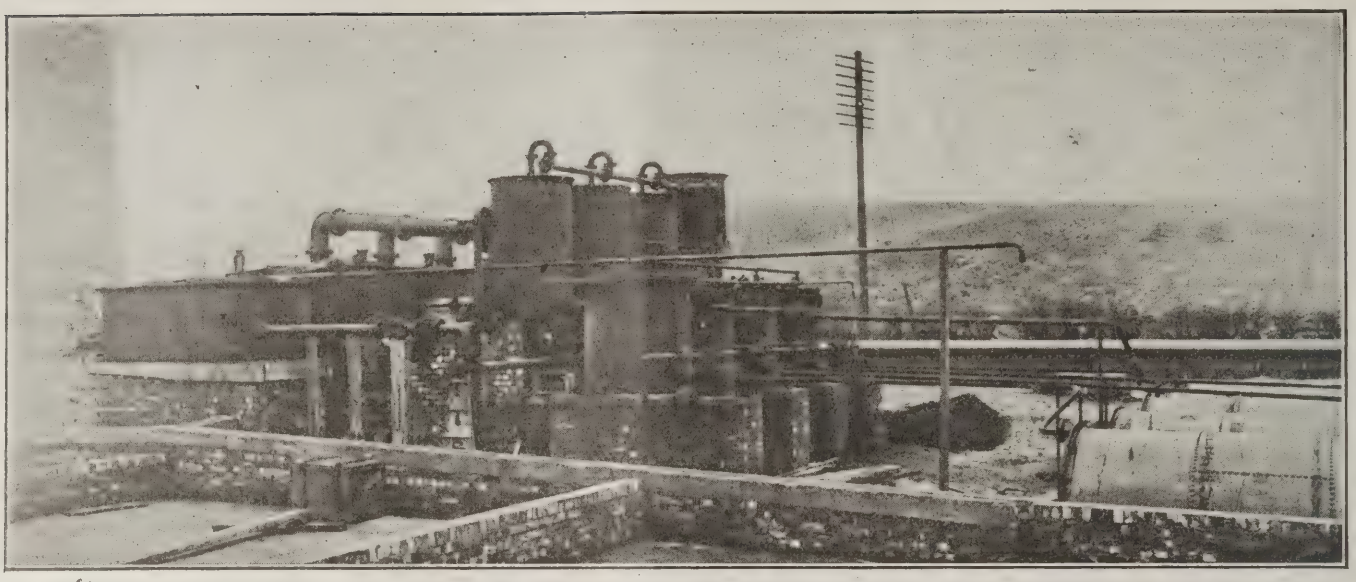
The corresponding figures for the United Kingdom are not available for publication; but according to Walmsley, at the beginning of the war practically the whole of the benzol produced in this country was obtained from byproduct coke ovens. The supply from this source amounted to 32,000,000 gal. per annum. The coal carbonized in English gas works would, however, yield another 60,000,000 gal. of benzol, and since all the leading gas works in the United Kingdom are now washing their gas with creosote oils and extracting the benzol, it follows that the English production of this carbon compound is now largely in excess of the 38,000,000 gal. estimated as the output in 1914.

In the following pages a résumé will be given of recent papers and articles which have appeared in English technical publications on benzol recovery and rectification.

The extraction of benzol from the waste gases of coke ovens is carried out in all plants on the same prin-



GENERAL VIEW OF HIRD CONTINUOUS TAR DISTILLATION PLANT



ANOTHER VIEW OF A HIRD CONTINUOUS DISTILLATION PLANT

ciple and by similar means. The tar and ammonia are first removed from the hot gases by cooling, spraying and treatment with sulphuric acid. Then, after further cooling, preferably down to atmospheric temperature, the gases are washed with creosote oil, in order to absorb the benzene, toluene and xylene which have escaped absorption by the tar. If the cooling of the gases be carried too far before the tar is separated, or if the gases are left too long in contact with the tar, the latter will contain a larger proportion of benzols and of the light oils when distilled; but in no case can complete separation be effected in this way, and therefore the use of creosote oil for washing the gases is always required. The oil, after the absorption of the benzol from the gases, is subjected to distillation by means of direct heat, or by steam, and the product obtained by condensing the distillate is the crude 65 per cent. benzol of commerce.

Recent progress and research in the United Kingdom have been devoted toward improvements in carrying out the foregoing process, and no very fundamental changes in principle or method have been made, or are to be expected. The best results no doubt can be obtained when the wash oil is atomized or sprayed into the gases, since this method produces a more intimate contact of the absorbing medium with the products to be recovered. The cooling of the wash oil is easily carried out in this case, by placing the suction and pressure pipes connected to the circulating pump in a cold water or brine solution.

As regards the chemical and physical characteristics of the creosote oil used for absorption, it is important that this should be as free as possible from naphthalene, and quite free from water. Walmsley and Morley in a paper read before the Manchester District Institute of Gas Engineers in November, 1916, give the following specification for a suitable oil:

RETORT TEST WITH BULB OF THERMOMETER IMMERSED IN LIQUID

Specific gravity	1.035
Dropping point	210 to 220 deg. C.
50 per cent. distils over at	250 deg. C.
80 per cent. distils over at	300 deg. C.
Water content	Traces

On cooling the distillate (obtained up to 300 deg. C.) to 7.2 deg. C., and maintaining this temperature for 30 minutes, the solid naphthalene settling out, on being filtered and pressed, should not amount to more than 7 per cent.

With regard to the presence of water, the authors of this paper point out that care is required at four points if the washing oil is to be kept free from this objectionable constituent.

The presence of water in the oil may be due to: (1) Water carried over in mechanical suspension in the gas from the scrubbing apparatus immediately preceding the oil-washing apparatus. (2) Water deposited in the oil, due to the temperature of the gas being reduced in the oil scrubber. From this it follows that the incoming oil should be at a slightly higher temperature than the gas. (3) In steam-heated stills water may be condensed in the oil by defective working of the still due to (a) the supply of steam being in an insufficiently dry state, (b) condensation of steam in the still due to low temperature of entering oil. (4) Lastly, there is the water which may be present in the oil when purchased.

The efficiency of a benzol washing or "scrubbing" plant, however, depends upon many other factors besides the quality and amount of the wash oil, and J. A. Wilson, in a paper read before the Coke-Oven Managers' Association at Sheffield, in November, 1916, stated that one of the chief of these was that of laboratory control, which should include daily tests of the gas, before and after it had passed the scrubbers, and regular sampling and testing of the oil at various points in the circulating system. The temperature of the gas and the area of the scrubbers or absorbing chambers, in relation to the volume of gas to be dealt with, are also factors of importance, and Mr. Wilson in his paper stated that at the Devonshire coke works at Staveley they used "the ordinary scrubbers filled with boards, the final scrubbing, however, taking place in rotary scrubbers. The distribution of the oil in the tower scrubbers is effected by means of ¾-in. pipes, radiating from a 3-in. circular cast-iron main. . . . The area of the scrubbers should be such that ample time contact is allowed between the gas and oil, more particularly as the process of benzol absorption by creosote oil is a purely mechanical one. A good allowance for the space to be occupied by the scrubbing boards is 16 cu.ft. per ton of coal carbonized per day. The amount of oil circulated should be such that a saturation of not more than 3 to 4.5 per cent. is shown, the water content of the oil being approximately 1 per cent."

With reference to the effects of the temperature of the gases and of the presence of water upon the absorptive power of creosote oil, W. Diamond, manager of the Marley Hill Coke Works, County Durham, has contributed some figures bearing on the subject to the *Gas World* of Mar. 2, 1918. These are reproduced, together with his remarks, below:

To recover the maximum quantity of benzol from coal gas the washing oil should have a specific gravity between 1.04 and 1.06. Coal-tar creosote absorbs five times as much benzol as filtered anthracene oil. The amount of water in the washing oil should not exceed 1 per cent.; the presence of 2.5 per cent. in creosote oil reduces its efficiency by over 35 per cent.; 7.5 per cent. by 45 per cent. and 10 per cent. by 73 per cent. By reducing the temperature of the gas below 15 deg. C. and that of the washing to 0 deg. C., absorption is increased by 20 per cent., but the cost is prohibitive. The extraction of 2.1 gal. of benzol from gas per ton of coal results in a decrease of 4.5 per cent. in the calorific value of the gas, removal of 2.5 gal. produces a decrease of 7 per cent., and of 3 gal. a decrease of 8 per cent.

ABSORPTION OF BENZOL

	Gal.
Coal-tar creosote free from water	0.22
Coal-tar creosote 2.5 per cent. water	0.14
Coal-tar creosote 5.0 per cent. water	0.14
Coal-tar creosote 7.5 per cent. water	0.12
Coal-tar creosote 10 per cent. water	0.06

When the quantity of water becomes 10 per cent. and over, the results are irregular; but below this the results seem regular. It is of course necessary that the lowest possible temperature to which one is able to reduce the gas should be used, as the lower the temperature of the wash oil and gas the greater the affinity.

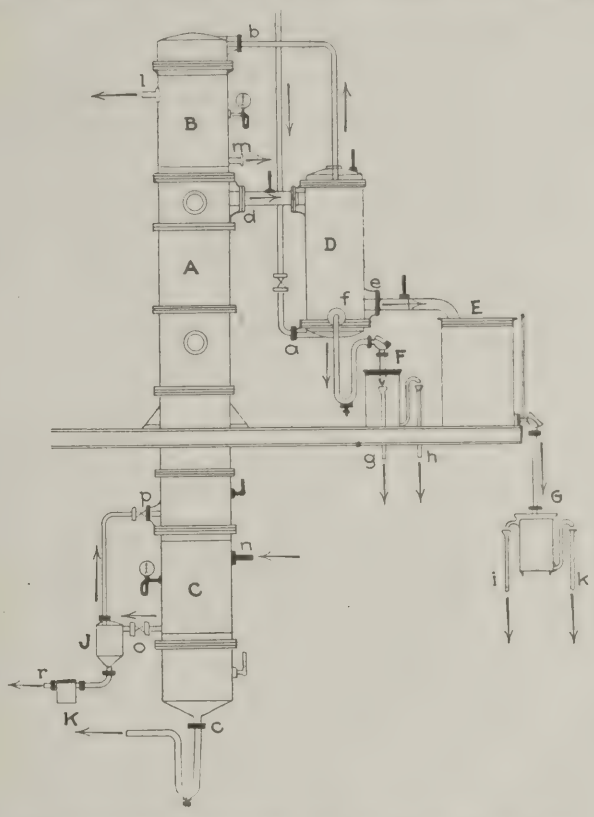
There are two methods of recovering the benzol from the creosote oil used for absorbing purposes—by heating in direct-fired stills, using either solid or liquid fuel, and by heating in steam-heated stills or columns. For small plants the former method is the simpler and the apparatus therefore is the less costly to erect. But when the works is dealing with the gas produced by coking 50 tons of coal per day or over, the steam-heated still is usually employed, since it is much the more easily controlled and in fact is almost automatic in its action. In a recent paper on this subject, read at Sheffield before the Midland Section of the Coke-Oven Managers' Association by J. B. Hamer, manager of the coking plant of the Middleton Estate and Colliery Co., of Leeds, the author stated as follows:

The modern type of plant for treating saturated oils after they have absorbed the benzol products from coal gas is the continuous steam-heated still. This plant has gradually reached a high standard of perfection by the addition of improvements which have aimed at economy in the fuel consumption, high stripping efficiency and good quality of the crude benzol. The arrangements consist of stills, preheaters, heat exchangers, superheaters, dephlegmating devices, condensers and oil coolers. The aims of the designers of the various plants have been to heat the wash oil to as high a temperature as the available steam heat will permit, and to do so as economically as possible. Thus there are the superheaters giving the final temperature to the oil entering the still, and preheaters and heat exchangers as aids to economy. The consumption of steam in the recovery of one ton of 65 per cent. benzol amounts to from 3 to 4½ tons, the production thus costing from $1.25 to $1.87 per ton in fuel alone.

The main advantages of the continuous steam stills as against the direct-fired pot stills of earlier days are less danger from fire, smaller plant (hence smaller capital charges) and the smaller oil storage necessary. The disadvantages are that efficiency is dependent on an absolutely uniform steam temperature, and that there are more complications—more moving parts—and higher fuel consumption.

No doubt in many of the continuous steam plants much waste of steam ensues owing to faulty design of the still proper. Simon-Carves & Brown have lately introduced an improvement in this direction. This consists of an internally arranged preheater in the still, so that the wash oil as it gravitates through the apparatus gains heat during debenzolization, thus doing away with the anomaly of the older type of plant, where the wash oil loses heat in the still. With regard to stills in which the wash oil loses heat in its passage, this type is not only wasteful and irrational but some of us are aware from costly experience of the difficulties which occur when part of the elaborate preheating or heat-exchanging plant fails. The anomaly referred to then becomes an accessory to conditions which lead to chronic emulsification of condensed water and oil.

Discussing the practical details of the working of a crude benzol plant, the author makes some sensible



KUBIERSCHKY SYSTEM OF TAR DISTILLATION

remarks upon the differences of opinion which exist among managers upon such questions as: (a) The best temperature for the wash oil to enter the still. (b) The temperature of the stripped oil leaving the still. (c) What should the "light-oil" content of the debenzolized absorbent be? (d) How does the percentage of water remaining in the oil affect its absorbent efficiency in the gas washers? (e) What is the best strength to make crude benzol? The author explains that the variety of opinions expressed in respect to these questions is due to the fact that there are no two plants exactly similar in every detail, and that each manager naturally is in favor of the conditions which have been found to give the best results in his own plant.

Concerning the important questions of still design and steam consumption, Mr. Hamer gave the following useful notes and hints:

With the still which makes no provision for the addition of heat during debenzolization the wash oil should leave the indirect steam-heating system within 10 deg. C. of the steam temperature; otherwise the preheating and superheating system is inefficient, and excessive consumption of direct steam may be expected in the still.

The outlet temperature of the oil, when it is less than the inlet temperature, is seldom very much of a guide to the working of the plant. Provided that the wash oil is sufficiently hot when it enters the still, the quality of the crude benzol is regulated by the direct steam admitted and by the dephlegmating devices. These latter should have sufficient latitude to be independent of the heat-exchanging system, and ample provision should be made for preventing the dephlegmating light oil, naphthalene and water of condensation passing back again through the still. The higher the temperature of the oil leaving the still the less chance is there of water passing away with the oil, and thus of a reduction in the efficiency of the oil-cooling plant. Owing to the use of about one ton of direct steam on the production of one ton of crude benzol, the outlet temperature of the oil will generally be found between the limits of 102 and 108 deg. C. The factors affecting this particular temperature are the saturation of the wash oil, the height of the still, the speed of the oil passing through the system and the temperature and quantity of the direct steam necessary for the quality of crude benzol produced, so that in reality there can be little control of this temperature.

The quantity of direct steam admitted to the still should, in conjunction with efficient preheating, be sufficient to insure the removal of all the products absorbed by the oil at the scrubbers, so that the efficiency to be aimed at is to have the debenzolized oil of the same quality as the fresh unused absorbing oil—that is, giving not more than

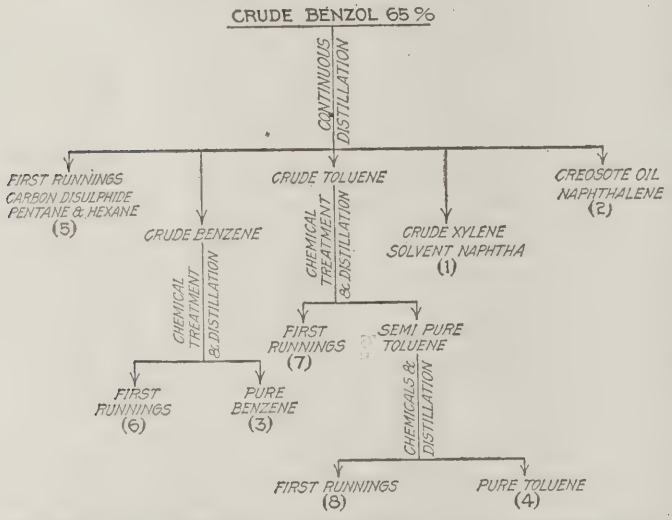


DIAGRAM ILLUSTRATING PURIFICATION OF BENZOL BY CHEMICAL TREATMENT AND DISTILLATION

The distillates numbered 1, 2, 3 and 4 are final products; 5, 6, 7 and 8 are distillates returned to the process for further treatment. Product 4 (pure toluene) is the most difficult to prepare, and sometimes four distillations are required, with chemical treatment between each, to obtain it in the pure state.

5 per cent. distillate at 200 deg. C. It then requires very efficient fractionation of the distillate leaving the still to insure that the crude benzol does not leave more than 10 per cent. of residue when distilled in a retort to 190 deg. C. The dephlegmates from the vapors distilling require careful separation of the condensed water, and cooling, in order to remove as much naphthalene as possible. The clear oil is then usually returned to the absorbing oil, but where a tar-distillation plant is available more profitable uses may be found for it.

Other problems of benzol rectification discussed in this paper were the effects of water on the absorbing oil, the importance of systematic tests, washing the "once-run" products and the final rectification.

The most efficient of the modern types of continuous steam-heated debenzolizing stills is probably that of Gasser, the design of which recognizes the fact that a washing oil saturated with benzol requires less heat to liberate the benzol than one which is not so highly charged. The temperature in the Gasser still, therefore, increases as the oil loses its benzol contents. The principle of countercurrent heating is adopted to obtain this result, the oil entering the still with a temperature of 110 to 115 deg. C. and leaving it with a temperature of 130 to 145 deg. C. The total steam consumption in the Gasser still is stated by Hamer to be about 2¼ tons per ton of 65 per cent. benzol produced.

As this type of still may be new to some of the readers of *Coal Age*, the following description of it, abstracted from an article in the *Révue Générale Chimie* by L. Fabre (through the *Chemical Trade Journal*, of Nov. 3, 1917) is here given.

The saturated oil enters first into a tubular heat exchanger and is heated by the benzol vapors and steam coming from the stills. The oil then passes into a second heater, which acts at the same time as a hydraulic seal or closure for the still, and in which the heat exchange is effected by the hot benzol-free oil coming from the stills. The oil then passes into a third reheater, consisting of cylindrical elements provided with superheated steam coils, and passes thence into the distilling apparatus. This consists of a number of cylindrical elements furnished with steam coils and jets. The coils maintain the necessary temperature and the jets remove the benzol. After leaving the stills, the oil passes through the reheater above described, and after cooling it is conveyed to the column. On the other hand, the mixture of steam and about 50 per cent. benzol are conveyed from the still into a dephlegmator, the surface of which consists of cylindrical cells, thence into a second dephlegmator consisting of three tubes filled with coke, to absorb the last traces of oil. The mixture goes thence into the oil reheater and finally into a cooler, where it is cooled down to 20 deg. to 25 deg. C. The water and benzol are then separated in the usual way.

An improved debenzolizing process and apparatus which requires no steam at all is, however, the latest advance in benzol recovery. Such a process was described in a paper read by W. Greaves before the Midland Section of the Coke Oven Managers' Association, at Leeds, in February, 1918.

An apparatus based on the same principle was tried 15 years ago for separating the first fractions of the distillate in tar distillation. It has been applied lately with success to the recovery of benzol from the wash oil.

The benzol is extracted from the gas by the usual method of scrubbing, but instead of the benzolized oil being then brought into contact with live high-pressure steam in the ordinary form of benzol still, it is pumped under pressure through a cast-iron coil heated to a temperature of 145 deg. C. by hot furnace gases. The hot benzolized oil is sprayed into a small still, or dephlegmator, the inside of which is at atmospheric pressure. The benzols and water vapor pass away to a condenser and separator to divide the condensed water from the benzol, while the dehydrated and debenzolized oil flows to the oil coolers, to be again used for absorbing the benzol from the gas. In this simple manner it is easy to produce the ordinary 65 per cent. crude benzol. The advantages of the method are as follows:

1. Small capital cost. The plant requires no house; ground space covered is small; the parts of the apparatus are less expensive than that required for the ordinary method of producing crude benzol.

2. Any inferior fuel can be used for heating the coil. It enables the heat in the fuel to be employed direct.

3. Simplicity of working. All that the attendant has to pay attention to are the fire, pump and thermometer.

4. Durability. The installation to which reference is made was started some 20 months ago and was stopped only a few days ago, as it was thought desirable to test the duplicate set of coils. The latter are working with equally satisfactory results.

5. Quickness of erection. The plant was set to work within four months.

This system of treating the oil and separating the benzol is of course much cheaper and simpler to operate than any of the steam-heated continuous stills, and Greaves estimates the fuel cost per ton of recovered benzol to be under 50c. per ton.

Crude Benzol and Its Rectification

The crude benzol obtained by debenzolizing the wash oil is a mixture of benzene (C_6H_6), toluene (C_6H_5—CH_3) and xylene (C_6H_4—$2CH_3$), with certain impurities. It is classed and known as 30, 50 or 90 per cent. benzol, according to the amount which distils over before the thermometer in the distillation test flask touches 100 deg. C. The boiling point of pure benzene is 30.5 deg. C., of pure toluene 111 deg. C., and of pure xylene 139 deg. C., so that the separation by repeated fractional distillation of these three constituents of commercial benzol from the impurities and from each other is quite possible. The hydrocarbons which distil after the xylene are known as solvent naphtha. This contains "cumene" in addition to other more complex compounds.

The relative proportion of the various constituents contained in crude benzol of course varies with its source and the conditions of its recovery, but the following may be taken as an average yield for English practice:

	Per Cent.
Benzene (90 per cent.)	60 to 65
Toluene (90 per cent.)	5 to 8
Solvent naphtha	6 to 8
Heavy naphtha	4 to 6
Total	75 to 87
Losses in washing and in absorbing oil	10 to 20

Modern rectification practice in the byproduct coke works in England is based on redistillation, chemical treatment and fractionation. The redistillation has for its purpose the separation of the naphthalene and those fractions of the absorbing oil which have been carried over with the steam in the debenzolizing process. It is carried out in large stills and is called "blowing-over." Either two or three fractions are collected, according to the scheme of after treatment in view.

In works where it is not intended to carry the refining process further, the usual plan is to obtain two fractions—the light oils which come over up to the appearance of steam and the heavy oils, which follow until naphthalene makes its appearance at the condenser exit.

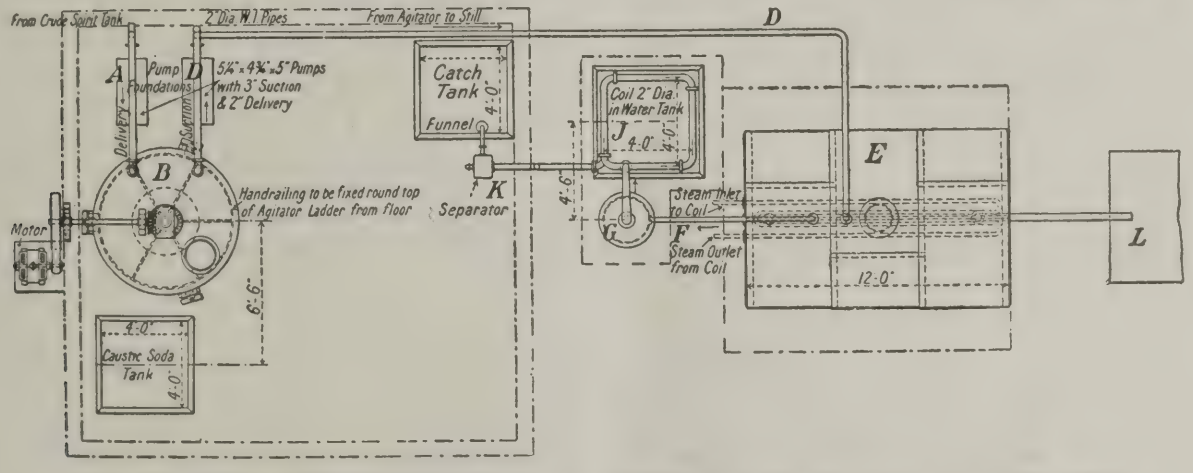
In those works, however, where the production of pure benzene, toluene and xylene is aimed at, the crude benzol is separated into three fractions, each of which is submitted to the washing treatment separately in order to economize in the use of acid. As regards the type of still and condenser employed for this "fractionating" of the crude benzol, a column provided with "bell-lutes" is preferable to the perforated-plate type, since the holes in the plates are liable to get stopped up with rust or other matter. Hamer, in the paper already quoted, however, recommends for this stage of the rectification process the Gasser type of still, and states:

> The working of the primary still should be as slow as possible for the first or forerunning fraction. The water overflow of the analyzer should show a temperature of at least 10 deg. C. lower than the normal reading for the benzol fraction. (This temperature varies for the different types of apparatus.) The rate of flow of the condensed products should be fixed about half the normal rate. By these means a large proportion of the unsaturated hydrocarbons and carbon bisulphide are removed as the forerunning fraction.

On the subject of washing the "once-run" products, Hamer's paper is also worth quoting:

> The first washing is usually a preliminary wash of from 5 to 10 gal. of D.O.V., according to whether the size of the charge is 1000 or 2000 gal. The object of this preliminary wash is to dry the benzol thoroughly; it also serves to remove pyridine bases, and to some extent attacks the more easily decomposed unsaturated hydrocarbons. Half-an-hour's brisk agitation of this first wash of sulphuric acid is ample, after which a period of one hour is allowed for settling, and the acid is then run off as completely as possible. A further quantity of acid is then run into the washer, equivalent to 2½ to 3 per cent. by weight of the charge; agitation is maintained for at least an hour, and during the period allowed for settling a sample is taken and tested.
>
> The quantity of acid required for the first or main acid wash largely depends on the care taken in, and the efficiency of, the once-distilling operation. Where washing in bulk of the once-run benzol is the practice, it will generally be found that a further additional wash of about 2 per cent. of acid is required to produce a clean rectified benzol.

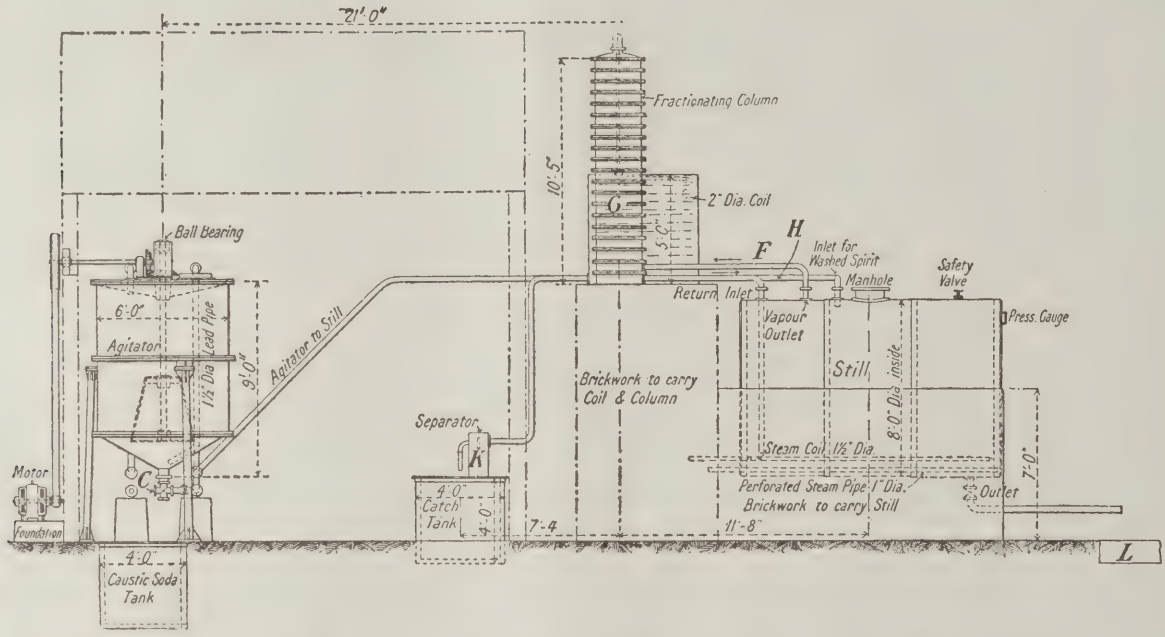
After the treatment with and removal of the acid, the charge is washed four or five times with water by spraying onto the benzol and allowing it to fall in the form of a fine rain. Finally, treatment with a 10 per cent. caustic soda solution is given, followed by two further washes with water.



PLAN OF BENZOL RECTIFICATION PLANT AT MITCHELL MAIN COLLIERY CO. COKE OVENS

This chemical treatment takes place in large cast-iron tanks of 1200 to 2500 gal. capacity, provided with mixing appliances of the inverted cone or archimedean screw type. In cases where old boilers are used for the purpose, it is necessary to have them lead-lined. Cast-iron gland cocks are best for the run-off pipes, since other metals will not stand the action of both sulphuric acid and caustic soda.

The final rectification of the washed crude benzol, or of the fractions into which it has been separated, is carried out on similar lines and with similar distilling and condensing apparatus, to that used to obtain the once-run products. When pure benzene, toluene and xylene are required, the first rectified products are re-



ELEVATION OF BENZOL RECTIFICATION PLANT AT MITCHELL MAIN COLLIERY CO. COKE OVENS

washed with chemicals and water. Special precautions must be taken to remove the thiophene and other sulphur compounds which are the chief cause of trouble at this stage.

One of the latest methods for this purpose is to treat the benzene with cold chlorine gas. Chlorine has a greater affinity for thiophene compounds than for benzene and toluene, and as the chlorine derivatives have a much higher boiling point than pure benzene and toluene, selective treatment with chlorine offers a simple method of separation. According to Hamer:

> In tests made last year of this process, after the use of 1½ to 2½ per cent. of chlorine, the benzene gave no reaction with isatin, although it previously contained 0.1 per cent. thiophene. By means of two rectifications, preceded in each case by efficient sulphuric acid treatment, there is seldom much difficulty in obtaining a "pure" benzene of the standard required by dyemakers and explosives manufacturers. In the case of toluene it is rather more difficult to produce the pure article. For one reason, both paraffins and unsaturated hydrocarbons are present, which have boiling points too close to that of toluene to permit of much purification by fractionation.
>
> The washed rectified toluol should be collected over a range of 105 to 120 deg. C. It is then washed with Nordhausen sulphuric, or with D.O.V. of 1.84 sp.gr., having an addition of 1 per cent. nitric acid. After drawing off the acid, the toluol is washed with caustic soda solution, followed by clean water. Washed toluol has a tendency to emulsify with water, so that care must be taken in adding the final water washings that violent agitation does not take place. The washed toluol is then fractionated and the portion collected boiling over the limits of 108 to 114 deg. C. This material will still contain benzene, xylene and paraffins which are not nitrifiable. Without additional washing a further careful fractionation will yield on a good column 80 per cent. pure toluene from this twice-washed and rectified toluol.

In conclusion, a description of the benzol rectification plant at the coke ovens of the Mitchell Main Colliery Co. may be given. The details are taken from the paper by Walmsley and Morley previously quoted. The crude benzol is pumped from a storage tank, into an agitator, which is of wrought or cast iron and of 1200 gal. capacity. In this tank the washing with sulphuric acid, water and caustic soda is carried out with the aid of mechanical agitators. After settling, the various wash liquids are run off by means of a suitable cock.

The washed benzol is then pumped out and passes to a still, which is fitted with a closed coil for dry steam heating, and a perforated pipe for blowing live steam into the liquid when required. The charge of benzol is first heated by the closed steam coil, and the vapors which are produced pass to a fractionating column. The vapors which escape from the head of this column then pass to a condensing coil, where they are cooled to the liquid form and atmospheric temperature. They then pass to a separator, where any water present is removed.

As the distillation proceeds, live steam is gradually admitted to the still to carry over the vapors of higher boiling points. The liquid which is finally left in the still is run off into a settling tank, where any naphthalene it contains settles out in solid form. The various fractions of the distillate as they run from the separator are collected in 50-gal. drums. The contents of these drums are tested in the laboratory before mixing to produce the following standard products: Benzol, 95 per cent. over at 90 deg. C.; toluol, 90 per cent. over at 117 deg. C.; solvent naphtha, 90 per cent. over at 160 deg. C.; heavy naphtha, 90 per cent. over at 190 deg. C.

Chamber of Commerce to Consider Reconstruction Problems

MANY phases of reconstruction will be taken up at the Reconstruction Conference of Industrial War Service Committees called by the Chamber of Commerce of the United States for Dec. 3, 4, 5 and 6 at Atlantic City, N. J. The sudden termination of the war has brought reconstruction to the front as the one important problem today facing business men. In the congress of business interests at Atlantic City an opportunity is offered for industry to advise the public as to those questions which primarily affect business.

The program for the conference has not been completed, but enough of the details have been worked out to indicate the comprehensive way in which this conference will approach the problem of reconstruction. On Dec. 3, the first day of the conference, the 350 war service committees meeting separately will take up questions of special interest to their own industries. At these meetings there will be formulated the policies of the industries represented by the committees and resolutions which individual crafts desire to present during the conference.

For the purpose of facilitating discussion and coördinating the ideas of the various industries represented, the war service committees after meeting separately will gather together in 35 related groups. Afterward these related groups will assemble as ten major groups representing the ten primary industries within the United States.

The ten groups as defined for the purpose of the conference are as follows: Food products, textiles, heat, light and power, metals and minerals other than iron and steel, iron and steel, wood and wood products, chemicals, leather, earthen products and industrial professions. One of the 35 related groups is "coal and coke." A list of 25 questions has been sent out by the War Service Executive Committee to the members of all war service committees for use as a basis for the deliberations of the individual war service committees at their first meeting. These suggestions are not considered exhaustive, and members of the committees have been requested to present other subjects which they think should be discussed. The subjects are set forth in the following communication to the committees:

1. What legal methods or means, affecting the appended items, could be introduced in the craft to better stabilize prices, during the reconstruction period.

a. Inventories on hand.

b. Orders placed at war prices but not delivered.

c. Labor costs and conditions.

d. Increased taxes.

e. Increased rates of interest.

f. An estimated increased demand for non-war materials restricted during the war period.

g. Will an increased production of your commodity increase the price of material or labor, or will a controlled redistribution of material and labor from war industries prevent such an increase?

h. Discuss the practice of the sale of commodities at a price less than the cost of production; its injury and disturbance on the industries and the ultimate consumer. What methods would you suggest to remedy this evil?

i. If the Government sees fit to dispose of used materials and products in the open market, what effect will it have on your production and the sale of new goods? At home? Abroad?

j. If it is not advisable for the Government to sell these goods on hand, either home or abroad, what shall it do with them?

k. In this connection, what point of contact should business interests have with the Governmental departments in the sale or disposition of these various commodities?

2. What is the estimated amount of labor, skilled and unskilled, male and female, required for the estimated 1919 production? What is to be the source of labor? How much must be moved? How much have you lost to war industries?

3. What is your financing problem during the reconstruction period? Do you recommend Governmental aid? Is financial legislation needed? Should the Capital Issues Committee be continued during this period?

In this connection discuss and recommend what financial obligations, if any, the industries in your craft are under to the Government for moneys advanced for buildings, machinery or as loans or security for Government contracts. How are these to be liquidated or adjusted?

4. What method would you suggest for the cancellation of Government war orders with your craft, that would create the least amount of hardship on the industries and permit a readjustment to normal commercial conditions?

5. On undelivered Government orders, what percentage of materials on hand, supplied either by the Government or purchased by you for these Government orders, can be utilized by your craft for commercial purposes during 1919? What disposition shall be made of those not usable?

6. Have you any suggestions to make as to the continuation of the War Industries Board or any of its divisions, or any other Governmental departments during the period of reconstruction, such board or departments to have the authority to control materials and regulate prices? If so, for what period?

7. What intelligent control of materials during the reconstruction period could the War Service Committee suggest which would prevent an over or under supply and avoid a demoralization of the market? Should this be controlled by the crafts or by a Governmental agency?

8. What effect had the war program on your output? Was it increased or decreased? Will there be an increased demand during the reconstruction period? If materials are uncontrolled will prices go up or down?

9. What is the estimated tonnage or unit of production of your raw materials for 1918? For 1919? Estimated demand for foreign commerce for 1919?

10. What is the estimated demand for your finished product for 1919? How does this compare with the average demand per annum in weight or unit of production for a five-year period immediately prior to 1914?

11. Sources of your raw materials? Domestic or imported? If domestic, can railroad cross-hauling be eliminated by purchasing nearer your plants? Causes of cross-hauling? If imported, at what ports? Would other ports of entry be more advantageous? What ports and why?

12. The value of a uniform method of cost accounting for the individual manufacturer and the craft as a whole.

13. What suggestions of the Conservation Division made to your craft might, with financial profit to your craft, be continued during the readjustment period? Is it possible to maintain a conservation schedule after the war, without legislative authority?

14. What methods and practices, other than those your craft has already introduced, would simplify production, save materials, eliminate wasteful practices, reduce the number of styles, without destroying individual creativeness?

15. What propaganda are necessary to educate the retailer and consumer to accept these eliminations and simplifications, and what plans might be arranged for better functioning with committees of jobbers and retailers handling your commodities?

16. What percentage of the commodities represented by your war service committee was produced in the United States before the war and what percentage imported? What suggestion have you to make for increased production for domestic and foreign commerce?

17. What effect will foreign competition have on your business? Will it increase or decrease your production?

18. What is the underlying reason for the importation of foreign-made goods—Prices? Styles? Label? Design? Or excess demand over domestic supply?

19. What disposition should be made by the Government of her merchant marine?

20. What steps have you taken, or do you propose to take, for the entire craft to take advantage of the Webb-Pomerene Bill, which allows combination for foreign trade, or have you other plans? What do you suggest as the best means of financing foreign credits? What percentage of the foreign commerce heretofore controlled by Germany can your craft obtain and supply?

21. What study is necessary, and what suggestions have you to make, in order to determine what are the needs of our allied countries for rehabilitation, and how far can you supply both raw and finished materials until they have been rehabilitated?

22. Has your craft been solicited by, or are you soliciting, foreign countries to supply these materials for rehabilitation purposes? If solicited, does this come from the Allies, or from neutral or enemy countries?

23. Would you recommend the appointment of a committee of United States manufacturers to confer with similar committees from our Allies, to learn of their plans for protecting industry during the reconstruction period? Also to obtain information regarding commodities and supplies needed by them and ourselves during this period.

24. When the demobilization of military forces takes place, how can these men best be returned to their former industrial pursuits, and how will it affect your labor situation?

In this connection, how closely should the conference work with the Governmental bodies in the study of demobilization plans?

25. What suggestions have you to make to encourage and stimulate public work, such as the building of roads, pavements, water and sewer extension, the construction of public buildings, schoolhouses, etc.? What effect will it have on the labor market?

In this connection consider the building program in the United States and especially the utilization or destruction of new plants built for war purposes. Location of convalescent and reconstruction hospitals near industrial centers, so that these men can be trained in the factories nearest to the hospitals without creating new vocational schools.

The committees are anxious to receive from industry such information and advice as will enable them to properly mirror the attitude of the industrial world to business problems. Such communications from the coal and coke industry may be sent direct to the Coal and Coke Committee of the Reconstruction Conference, Atlantic City, N. J., or can be sent to *Coal Age* for submission to the proper committee on Dec. 3.

Experience has shown that in the United States the normal balance in transportation which brings about a maximum of production with maximum economy occurs when out of every 100 tons of originating freight approximately 56 tons are unmanufactured mineral products and 44 are manufactured products, foodstuffs and other commodities, and when of the 56 tons of mineral products 35 tons are coal. Of these 35 tons of coal the railroads themselves consume about 12 tons.

Coal Mining Institute of America

The Coal Mining Institute of America will meet Dec. 4 and 5 at the Fort Pitt Hotel, Pittsburgh, Penn., opening with a question box presided over by Vice President Fohl. The questions are as follows:

1. Are roller bearings too delicate for coal-mine cars?
2. What are you doing to increase the efficiency and steady working of your employees? With what success are you meeting?
3. In what ways can the conservation of materials and supplies be best effected both inside and outside the mines?
4. Is the underground use of alternating current more hazardous than the use of direct current?
5. Has the law permitting the employment of non-certified officials in coal mines been detrimental to their efficient and safe operation?
6. Is there any practical way of dealing with a drunken miner who is above the draft age or one who has been given deferred classification through some other cause than an industrial claim?
7. To what extent can the water-gage chart be used as an index of the volume of air passing through a mine?
8. Should the drawing of mine timbers be penalized under the safety standards in computing compensation insurance rates? If so, under what conditions?

At the dinner, which will take place on Wednesday evening, Dec. 4, S. E. Button, chief of the Pennsylvania Department of Mines; J. B. Neale, Federal Production Manager, and W. R. Rasmussen, of the National Safety Council, and several representatives of the Government will be present, including, if it can possibly be arranged, Franklin K. Lane, Secretary of the Department of the Interior.

On Thursday E. N. Zern will give an address on "Loading Machinery in Coal Mines"; K. W. Mackall, on "Use and Abuse of Headlights on Mine Locomotives"; K. C. Barth, on "Preservative Treatment of Mine Timbers as a Conservation Measure"; J. C. Davies, on "Reopening a Mine Following a Mine Fire," and John Andrews, Jr., on "Power Losses Inside the Mine and How to Correct Them."

Legal Department

MINER'S WORKING PLACE — A track in a mine used for removing coal in the pulling of pillars, but not as a usual means of going to and from work, was a part of the working place of a miner engaged at work there and not such "traveling way" as obligated the operator to keep the place safe from falling rock. (Colorado Supreme Court, Rossi vs. Calumet Fuel Co., 173 Pacific Reporter, 943.)

USE OF DANGEROUS TOOLS IN TAMPING CHARGES.—A coal operator is not liable for injury to a miner, caused by premature explosion of a charge of powder which the latter and his helper were shoving into a drilled hole by means of a steel tamping bar, where the injured man was a certified miner, had had several years' experience in mining, furnished his own tools, and had just as good means of appreciating the danger to which he was exposed as did his employer. Under such circumstances, the employer cannot be regarded as having been negligent in permitting plaintiff to use the particular bar. There is a general rule of law to the effect that where one obtains employment by holding himself out as being skilled in his trade, he cannot afterwards assert negligence on the part of the employer because of failure to instruct him in matters which men so skilled are presumed to know. (United States Circuit Court of Appeals, Second Circuit; Sawickas vs. Lehigh and Wilkes-Barre Coal Co.; 247 Federal Reporter, 432.)



Work Started by Fuel Administration May Be Kept Alive After Peace Is Declared

Definite recommendations have gone to the President from the four great war agencies—the Fuel Administration, the War Trade Board, the War Industries Board and the Food Administration—as to those of their functions which should be continued. These recommendations have not been made public. So far as the Fuel Administration is concerned, however, it is fairly well understood that the continuation of the zone system, of the conservation work and of the statistical compilations has been recommended.

So far as can be learned there is no intention of trying to keep the Fuel Administration alive after the expiration of its legal existence. The continuation of the zone system probably will be in the hands of the Railroad Administration. Conservation and statistics also can be handled by existing governmental agencies. In both these divisions the Fuel Administration has made a remarkable showing. No less than 11,000,000 tons of coal are being saved annually, it is stated, as a result of the conservation efforts of the Fuel Administration.

Coal statistics, prior to the war, were handled largely by the Geological Survey. Some work along that line was done by the Bureau of Mines. In neither case, however, were the appropriations for the work at all adequate for comprehensive compilations. By close cooperation with the statistical bureaus of private enterprises, especially the railroads, a considerable number of very valuable statistics was made available. Since the war, however, the railroad statistical bureaus have been discontinued. Some of the bureaus maintained by coal operators have been discontinued. As a result, the Government could not do justice to the industry in allowing no larger expenditure for statistical work than was the case before the war.

Zoning System Saving Millions

Estimates made earlier in the fuel year, that approximately 160,000,000 car-miles would be saved in the coal year through the operation of the zone system for the distribution of bituminous coal, are being fully realized, it was announced on Nov. 16 by the United States Fuel Administration.

This system, made possible through the close coöperation of the United States Railroad Administration with the Fuel Administration, has had a large share in bringing the nation's supply of bituminous coal to its present proportions, which, with patriotic economy, will be sufficient for the winter's requirements.

This method of distribution was established so that the coal supply of all sections of the country should normally be derived from mines relatively near, thus preventing abnormal and wasteful transportation movements, and insuring more equal distribution of cars to the mines and the more steady employment of mine labor.

Early estimates were that the movement of bituminous coal affected by the zone system would involve about 300,000,000 tons, or 60 per cent. of the total production. The latest figures show that 368,858,000 net tons of this kind of coal have been produced and delivered since Apr. 1, 60 per cent. of which is affected by the zone system.

These later figures show that even more than the originally estimated 160,000,000 car-miles will be saved in round trips to and from the mines and that considerably more than the 300,000 additional trips, which the saving in car-miles would effect, will be made. Exact figures have not been compiled, but the early estimate allowed for the 300,000 additional trips being the equivalent of 5 per cent. increase in the production.

Fuel Administration Issues Warning

A tendency in some quarters to take it for granted that the war is over, and that therefore all bars are down, has made it necessary for the Fuel Administrator to issue the following warning:

"In order that there may be no confusion or misunderstanding, the United States Fuel Administrator wishes it understood that the signing of an armistice in no way alters the rules and regulations or the supervision now in force. By Act of Congress the Fuel Administration continues until the promulgation of the treaty of peace and its powers extend to the production, distribution and conservation of fuel, including fuel oil and natural gas. Due notice will be given of any cancellations or changes in orders and regulations by the duly authorized officials of the Fuel Administration in Washington."

Applications for mine sidetracks are to be made "as in pre-war days," the Fuel Administration announces. This is believed to be the forerunner of the relinquishment of certain other powers which have been exercised by the Fuel Administration. More than 800 applications for sidings and auxiliary tracks have been handled by the Fuel Administration. Most have not been granted.

Transportation Conditions Generally Satisfactory

Reporting to the Railroad Administration on transportation matters the Fuel Administration has made the following observations:

Eastern, Allegheny and Pocahontas Regions—Transportation ample and surplus car supply, except on Baltimore & Ohio R.R. Some little difficulty on the Chesapeake & Ohio R.R. and Monongahela R.R.

Tidewater—Vessel and car supply ample.

Lake—Bituminous program completed and shipments discontinued Nov. 16.

Southern and Western Regions—Transportation and car supply ample. Movement slower account influenza.

Coke—Beehive production stationary. Byproduct production somewhat reduced.

General—Coal production further reduced account illness and elections; but bituminous supply ample throughout the country.

The Railroad Administration also has made public that "Utah coal mines are running on short time on account of the lack of orders," and that "shortage of labor has delayed the loading of cars at mines in the Pocahontas region and has delayed dumpage at tidewater."

Formal Order Closing Lake Trade

The text of the order with regard to the closing of navigation on the Great Lakes is as follows:

"Except in individual cases where shippers have unfilled obligations for coal needed for special uses, and such shippers can assemble cargoes rapidly enough to avoid delay to railroad equipment and vessels assigned for this particular coal, all loading of bituminous coals for Lake Erie ports will be suspended with the close of business, Saturday, Nov. 16, 1918.

"Except for the individual cases named above, all loading of cargoes of bituminous coal at Lake Erie ports will cease at midnight, Saturday, Nov. 23, 1918.

"Definite arrangements must be made in advance with H. M. Griggs, Manager Ore and Coal Exchange, Cleveland, Ohio, by shippers desiring to forward cargoes after that date for use of car dumping machines at Lake Erie ports, as the existing pooling and loading arrangements of the exchange will be discontinued at midnight Nov. 23.

"Shipments of anthracite coal to the Upper Lakes will be permitted to the extent of the regular allotment as previously determined by the United States Fuel Administration under individual arrangements between shippers and carriers for the floating of this coal up to the date of the closing of the lake navigation."

Await Return of Fuel Commission

Return of the Fuel Administration's Commission, which now is in Europe, is being awaited with much interest. As yet, the Commission has cabled none of its observations and it is regarded as probable that no report will be made until its return, which is expected about Dec. 20.

Prior to the return of the Commission, it is not probable that the matter of extending aid in the rehabilitation of the French coal mines at Lens will be gone into deeply. It is understood that the French Government already has in storage here a considerable quantity of coal-mining machinery. This machinery was purchased two years ago, when it was thought the Lens regions would be liberated. Further purchases of machinery for this purpose are being negotiated, it is said.

The introduction of American mining machinery into French and English mines is expected to open new markets to American machinery manufacturers. Conditions which have interfered in the past in the use of machines in English coal mines are changing, it is believed. No objection on the part of French labor to the use of machines is anticipated.

Fuel Restriction Modified in Cement and Clay Products Industries

Percentages of curtailment of fuel to be used in the manufacture of clay products and cement have been cut in two. This action has been taken by the Fuel Administrator in view of the increased supply of bituminous coal now available. Under present conditions, fuel curtailment in the industries mentioned must be the following per cent. less than normal requirements: Cement, 12½ per cent.; face brick, common brick, paving brick, terra cotta, roofing tile, floor and wall tile and sanitary ware, 25 per cent.; hollow tile, drain tile and sewer pipe, 12½ per cent.; stoneware, 7½ per cent.

Price Fixed on Steam Sizes of Anthracite

Prices of steam sizes of anthracite coal are to be held below the pea size price. The order to this end reads as follows:

"On and after the effective date of this order (Nov. 17) the maximum prices for the different sizes of anthracite coal below and smaller than the size commonly known as 'pea' size, f.o.b. mines, shall not be in excess of the maximum prices established and in force, on the effective date of this order, by Executive Orders of the President and orders of the United States Fuel Administrator for that size of anthracite coal commonly known as 'pea' size, less 50c. per gross ton of 2240 pounds."

Coal Loaded During Week Ended Nov. 2

Loading of coal during the week ended Nov. 2, with the figures for the corresponding week of 1917, is shown by the following:

	1918	1917
Total cars bituminous	187,638	187,184
Total cars anthracite	29,223	31,115
Total cars lignite	3,530	4,134
Grand total cars, all coal	220,391	222,433

The decrease in coal loading has been due to influenza among the miners and railroad workers. Total increase of 1918 up to and including week ending Nov. 2, over the same period in 1917, is 723,047 cars.

A reduction of its allotment of bituminous coal has been asked for New England by the Fuel Administrators of that section. The original budget assigned 30,000,000 tons of bituminous coal to New England. It is now asked that shipments not exceed 27,300,000 Deliveries up to Nov. 1 approximated 17,000,000 tons.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The week has been quite generally without any outstanding events, and indeed it is well that it is so. More important than any other matter is the necessity for stability at these times. We need a pivot about which to turn when retreating from war to peace. We do not want to change any of the conditions which do not need change, until we have completed all those changes which cannot be delayed.

The soldier and munition worker must go back to civil work, and business must be kept steadily going so that he can find his place still open to him in the files of industry. We must be all in line and at attention waiting for him when he comes. After he is back, and things moving steadily, then we can attack other problems. There is such a thing as trying to achieve too much. It is fortunate that there is a larger element trying to secure stability in industry than trying to upset the present regimen.

LET OUR SLOGAN BE "STAND BY THE PRESENT"

We must try just now not to rock the boat. The soldiers and munition workers crowding into the front, rear and oar seats of the industrial craft will rock it badly enough; the turning of the rudder so as to direct the boat from war to peace will also tend to upset it. If those who are waiting for the soldiers and munition workers add to the confusion by seeking new adjustments in the industrial craft, then the dangers of an upset will be multiplied. For the moment let us cry as loudly "Stand by the present" as we have cried in the past "Stand by the President."

The mine workers and operators somewhat generally are realizing their duty at this time. They are not going to engage in a conflict at a juncture so critical as the present. Some time ago the operators quite generally thought that the wages being paid were war-time wages to be adjusted later, but now they realize that war-time wages and largely also war-time prices have come to stay. The peace industries, or rather those which are principally in evidence in peace, are quite largely nonunion, and, as resumption takes place, they will have to bid for labor as war industries have, and they will have to pay the price. They will accordingly come up to a standard in accord with the cost of living.

Great Britain, France, Belgium and Germany—pardon our mentioning them together—will, we may expect, increase wages till they reach our level. In that event we shall not find their competition heavy unless we endeavor to enter places where, by reason of unfavorable transportational difficulties, we are placed at a disadvantage. When the world is levelled let us level it up rather than down.

HAYES STILL DEMANDS A NEW WAGE SCALE

Frank J. Hayes, the international president of the United Mine Workers, on Nov. 15 delivered a statement condemning lowering of wages—which was right—but urging increases—which was wrong. Those who have not had increases during the war or whose increases have been small may be justified in looking for the mine workers to pay them more money, but they strongly resent the action of those men who claimed and got big wages because their work was essential to the war and who now want still bigger wages when peace comes along. Let them go back into the corner of the field and let the others take their place at the trough. It may be added that all authorities do not agree with Mr. Hayes that there is no likelihood of prices declining for a year. They may decline enough to send profits aglimmering. They will not lower markedly, however, for they are based on high wage scales which will not, we hope, be lowered. His statement is as follows:

"Wages have gone up during the war, but they have not advanced proportionately to the increased cost of living. All authorities agree that there is no likelihood of prices declining for at least a year. But despite this prophecy, councils of employers are now devising programs to batter wages down. It is this scheming that organized labor must combat. We cannot parley, linger, wait. Our forces must be up and doing, not only to thwart attempted reduction, but to win additional gains to meet living costs which present-day wages are so inadequate to cope with."

GOODWILL NEEDS NO CITIZENSHIP TICKET

The war being over let us not give up our Americanization plans. Nothing will make more for unity than to have us all think and speak together. For this, education is necessary. Let us avoid trying merely to make citizens. The last matters in Americanization are the possession of a court certificate and the singing of the "Star Spangled Banner." The first matter is the creation of a kindly feeling of appreciation. This appreciation can only be attained by friendliness and understanding and the understanding can only come to one who knows the tongue of this country. Given the friendly understanding, the national anthem and the certificate of citizenship will follow as a natural development. Every mining plant should have its English school, and every man who cannot speak English should be compelled to attend it. It would be well if in addition common branches of education should go with the other instruction. It would pass belief if hearing the record of the national life and achievements accompanied by the glad hand of the instructor failed to give the same intensity of passionate affection for America that is deep-seated in the heart of the native born.

In central Pennsylvania a somewhat bitter dispute has arisen as regards the Fuel Administration's request that the mine workers should work on Sunday, Oct. 27. It will not be made any less bitter by the sudden change in the coal situation from a small threatened shortage to a large surplus. The Fuel Administration did what it believed was for the best. It denies that it asked the men to violate the contract regulations in order to increase tonnage, as the contract did not make any reference to the observance of Sunday as a holiday. This is, of course, more or less of a subterfuge. The union officials declare they were not consulted and that something should have been said to them.

RIGHT TO SUNDAY REST IS NOT JEOPARDIZED

No harm has been done; rather a great good. The mine workers have been afforded a chance to show their local devotion to the national interests, and the contract stands just as rock-ribbed as ever. No one will ask for Sunday work from the miners now that an armistice is declared. Sunday work is so at variance with the movement of the national conscience that nothing but the war and the scarcity it causes will be held to justify any such activity.

Labor news is extremely scant, but as has been heretofore suggested all that comes to hand is good. From Conifer, a mine of the Allegheny River Mining Co., in Armstrong County, central Pennsylvania, we hear of a miner, Rudolph Cheney, who loaded 438 tons of coal during the month of September, or an average of 18 tons per day for every working day in the month.

West Virginia reports that the influenza epidemic is rapidly receding throughout the state except in a few spots where it made its attack somewhat late. The productive ability of the mine workers is still, however, restricted

owing to the weakness which an attack of influenza leaves as its wake. In the Fairmont region, now happily bidding farewell to the disease, the epidemic made a surprise visit to the Annabelle plant of the Four States Coal Co., and several went down before the infection.

The influenza epidemic was quite late in reaching Wheeling and the Pan Handle of West Virginia, arriving there within the last few days. A report from Moundsville, Marshall County, a few days ago stated that the epidemic was worse at that place. The epidemic invaded the settlement of the Youghiogheny & Ohio R.R. mines near Martins Ferry on Saturday, Oct. 9, in most malignant form, three deaths resulting in a few days.

The epidemic of influenza which took a heavy toll in Logan County during the last month is now believed to have been entirely checked. Dr. Hess, the Government physician, is still at work in the mining camps, but regards the situation as safely past the critical stage; and he is therefore devoting most of his efforts to securing better sanitary conditions in some of the camps.

The epidemic in West Virginia seems to have been, at all times and places, mild compared with that in certain parts of Pennsylvania. If reports are true Wishaw, a town in Jefferson County with 400 inhabitants, has had 78 deaths since Sept. 28. There were probably only four English-speaking families in the little village. The rest spoke Italian and were of that nationality. Of the 400 all but ten were victims of the epidemic.

Much Ado About Nothing Costs $12 a Head

As a result of the efforts of Special Umpire Allison O. Smith, representing the Fuel Administration, the dispute has been settled between the McKell Coal Co. and its mine workers at Kilsyth, on the line between Raleigh and Fayette Counties, West Virginia. The difference was as to the hour at which the man trip should leave the outside of the mine. The hour is fixed at 7 a.m. The company and mine workers were at loggerheads about this trifling matter for 30 long days. Every miner was fined $12 for going on strike in violation of the express terms of the contract.

The influenza has made heavy inroads into the funds of the United Mine Workers in the State of Illinois. In one day recently 19 claims were presented at the offices of the organization in Springfield. The beneficiaries of each member of the organization who dies are paid $250.

The Illinois organization can stand the drain, however, as it still has $2,434,841 in the bank. The Illinois district has 95,000 members and is the largest and wealthiest miners' union district in the world. An audit of its accounts which brings the record down to October has just been completed by the district auditors, J. H. Pitman, James Box and Homer Whiteside. It shows that the income of the organization in the district for the preceding six months was $723,612 and the expenditures $252,782. The balance on hand at the beginning of the half year was $1,963,958, to which $470,884 is added as the excess of income over expenditure for the half year. The largest item in the income tables is that of assessments, which brought in $612,243.

Biggest District Pays Out Big Money

In the expenditure tables the largest item is death claims, for which $127,728 was paid out during the half year. For relief and aid $2154 was paid out. Officers' salaries amounted to $38,082 and their traveling and other expenses to $22,325. Field workers' salaries amounted to $10,317 and their expenses were $2408.

Of the funded assets of the district $500,000 is represented by Liberty Bonds. The district has real estate in East St. Louis and Chicago valued at $139,000. Two thousand dollars are invested in the bonds of township schools.

Numerous loans, some of large dimensions, have been made to related organizations, locals of the district and cooperative organizations. The largest loans are $100,000 to the Western Federation of Miners and $100,000 to District No. 6, United Mine Workers. The greater part of the funds are invested in 67 banks, all but four of which are in Illinois. The four outside banks are in Colorado and hold $50,000 among them, and this money is guaranteed by the international organization. Six of the Springfield banks have deposits ranging from $25,000 to $150,000. The district organization owns only $830 of war stamps.

Little coal was mined in Illinois on Nov. 11, when the news of the ending of the war came. The mine whistles helped spread the tidings, and the miners, instead of going to the pits, formed in parades and marched through the streets of the town. The suspension was much more general than on the previous Thursday, when a premature announcement was received, because that announcement did not come until about noon and most of the miners were below. When the real news came it was so early in the morning that all the miners knew it before going to work, and so they were able to observe the event. Influenza, coupled with the peace holiday, has greatly cut down the production. At some mines the man power has been reduced 50 per cent. by sickness, death and fright. Many miners are laying off until the epidemic subsides.

Illinois Miners Want Wage Readjustment

With the signing of the armistice some people expect that the Illinois miners will become more insistent in their demands for increased wages. This expectation has given rise to speculation as to whether they will consider that they are bound to still observe the contract which was to run for the period of the war. It is supposed that there will be a disposition to claim that the war has ended, for the purposes of the contract, although peace has not been signed.

From Roundup in Montana word comes of a great shortage of coal miners and other coal mine workers. As a result of the scarcity a much lower production has been mined this year. The consumer will doubtless suffer where he is dependent on the Roundup output. The state director of the United States Employment Service, Scott Leavitt, has been asked to provide the men needed.

A vote of approximately 4300 coal miners in the State of Washington has resulted in Martin J. Flyzik, president of District No. 10; Ernest Nesham, secretary-treasurer, and Sam Caddy, of the international executive board, of the same district, being reëlected. President Flyzik is now in the East seeking an increase in wage for the Washington coal miners and the matter will be taken up with President Wilson direct.

Like Dynamite To Be Handled with Care

On Nov. 7, Burton L. French, a representative from the state of Idaho, introduced into the House of Representatives a joint resolution, No. 342, which was referred to the Committee on Appropriations. It provided for a commission of seven members to be known as the United States Employment Commission, and authorized them to spend a sum of $50,000 in the making of plans for road building, canalization and improvement of rivers, drainage, reclamation of lands by irrigation or otherwise, reforesting of acres chiefly suitable for forest and other improvements of large community or national interest.

The commission is to report to the President as early as practicable as to the importance of the work planned, the number of men that can be advantageously employed and, as nearly as may be practicable, the kinds and character of labor required and any other pertinent facts.

This is a splendid scheme to cushion the possible blows of reconstruction should any such occur. The plans should be, however, marked "Dangerous! Handle with Care!" for if they go off prematurely or in the neighborhood of pressing business they may do a lot of harm. We must always remember that the work of this committee should be looked upon as merely a safety inlet valve and as such it should not be opened unless the vacuum in the labor market becomes too high. Moreover, there is always the danger that it may develop into the largest pork barrel ever unstaved and disembowelled in our, or any other, history.

On Nov. 19 Frank P. Walsh, joint chairman with W. H. Taft of the National War Labor Board, tendered his resignation to President Wilson.

EDITORIALS

Fighting Publicity with Publicity

VIGOROUS indeed are the attacks made on the coal industry both in war and in peace. Some of its contemners find fault with the financial side of the industry; others attack it from a labor viewpoint. The men and the women who denounce the industry boldly sign their names to their diatribes, usually appending even their given names, and as a result the public gets to know them, to acquire a certain familiarity with them, and is then ready to listen to all they have to say. The people delight in the pungency of their remarks and believe much of what they put into print. How can the readers of their writings do otherwise, for knowing nothing about the industry they have no information wherewith to meet the misstatement. With no one to contradict the traducers of our industry, even anonymously, everybody believes that their arguments are unanswerable.

How much better it would be if there were men in the industry who were as well known to the public as these hireling publicists and who yet acted in the rôle of honorable and conservative protagonists of the coal operators. Should some of the men in the industry thus enter the public eye they could unquestionably remove with success much of the criticism under which the industry rests and prevent the development of the growing discontent.

The public is not to blame if it adjudges that the sullen silence, which the coal industry deems the wiser plan, is the outcome of guilt rather than of reserve.

Some time ago the anthracite operators in council assembled prepared advertisements which were published far and wide. It is not to such publicity that we are referring but rather to written statements of individuals such as are in general known as "interviews." Those who make such statements before long learn just what papers will publish them without unfair modification.

Yet it seems premature to talk about interviews in the daily papers, for operators have scarcely arrived at the point where they will, under their own names, discuss, in the technical press, the problems of industry, ethical or even mechanical. They are afraid to take a stand for fear it will be criticized. The temperately minded, with a few admirable exceptions, will not write even anonymously. Still fewer are the broad minded men who will sign their names to the thoughts they commit to paper.

Thus while the rabid element in the industry is suffered to misrepresent the purposes and ideals of the mining world, the radical element outside the industry makes false and unfair attacks on it. All the while there are none to defend it either from Bourbonism within or Bolshevism without.

If the thoughtful men of the industry would only do their thinking out loud. If they would publish their conclusions without fear or restraint, we might in a short while arrive at a better understanding. A few false steps might be taken, but no false step is as bad as no step at all. The silence of the industry appears to all the world as ominous. It seems that there must be something to hide when men are so little willing to put their thoughts on print paper.

Coal Industry's Production Manager

THE war being apparently ended it is time to take stock of the big men it has given us. Happy indeed was the chance that lighted on J. B. Neale for production manager. To him we owe a great deal, for it was largely his enthusiasm which brought up the production despite the loss of men to the united services and to the munition works. He truly became a leader in the industry—a vital force in promoting adequate coal production.

Leaders of men are men who can sway moral forces, those qualities in men we too often scoff at and decry; those qualities which, deny them as we may, are the very breath of the nations. Neale believed so firmly in the moral call that he could always appeal to it effectively.

His was no easy task; so hard indeed was it that we still find ourselves greatly wondering how he contrived so readily and happily to perform it. He had to direct two forces who, when they were asked to act in unison, usually ended by scrapping among themselves. The word "production" always held endless possibilities for a purposeless squabble. Somehow, however, Neale managed to harness capital and labor to the national gun carriage as a splendid working team, with the steeds eyeing one another occasionally perhaps, but pulling for all they were worth.

To most men there were two ways in which the work could be done. Neale could have "jollied" both of the contending parties, or he could have been indiscriminately neutral and with foolish words condemned both parties for the follies exhibited by either—a balanced form of denunciation which of late has been all too common. Neither of these courses did Neale take. He would have looked upon mere "jollying" as the shallow and dishonest concept of a politician, and he would have regarded neutrality as an unworthy trick of a man without convictions.

Instead of taking either stand he used his close-hand knowledge of the coal business in such a manner that every word of blame—and words of that kind were many—were as soon as uttered recognized as just and truly spoken. Instead of blaming both operators and mine workers for the same faults, he singled out their peculiar failings for correction. He made each of them make careful inventory of their failings and record them in black and white. It was no secret confessional either; he would have the outcome of it all posted in

plain sight where all could see how much time and tonnage were lost by the faults of each.

To the credit of both parties, be it said, they took his advice well, and they prepared themselves for the public approval by a diligent and ready self-examination. Mr. Neale visualized for them, as it had never been made visual before, the importance of the work they were doing. He saw clearly just why the tonnage did not reach in full the possibilities which labor supply, opened mines and railroad-car service justified the nation in expecting.

From this man the coal miner and the coal operator got justice, judgment and sympathy. In a rough and ready world neither of the parties get enough of these things. Blame and recrimination are bandied around all too freely. For a while we were allowed each to view himself sanely and honestly, neither extenuating faults nor painting them blacker than they really were nor yet creating them when they did not exist.

With one bound, production and good-will advanced, especially in those places where Neale made his principal appeal. The nation owes him its thanks. He certainly served truly and well, and happy indeed is he who is honored by the opportunity to perform for the nation such a signal service as has been his.

Peace and Waste Are Not Synonymous

THE Hun has been defeated. The war, so far as active hostilities are concerned, is over. The chief purpose for which this country unsheathed the sword a year and a half ago has been accomplished. We rejoice in the belief that the world has been made safe for democracy. It must now be kept secure.

Aside from the main issue at stake—which has been settled by force in France—one of the greatest benefits derived from the war has been the lessons learned in conservation. Americans have learned that certain economies could be made without serious inconvenience. The tremendous sales of liberty bonds and of thrift stamps furnish striking illustrations of what the country as a whole has been able to do in a financial way. But many savings have been made in the shape of fuel and materials that have been quite as important to the country as the huge sums received by the Government.

The world is now entering upon a period of reconstruction in many respects quite as hazardous and crucial as the era of blood through which we have just passed. The present is no time to relax the reins of frugality and thrift, or to abondon the practices that have made victory swift and sure.

Perhaps in no resource have the savings effected in the past few months been more important than in coal. Consistent conservation has long been urged and encouraged by the United States Fuel Administration and other agencies. Some of the results obtained have been highly gratifying. Unfortunately, however, the benefits derived have not received the publicity that their importance warrants.

At the suggestion of the Fuel Administration, therefore, *Coal Age* extends an invitation to its readers to contribute articles or letters setting forth specific cases of where conservation measures adopted have borne fruit. Such articles should be illustrated if possible and should cover among other things the following three important points: What was done; how was it done; what results were obtained.

No man should "hide his light under a bushel." The needs of the country are now, and will be, as great during the next few months as at any time in the recent past. If you have been successful in your attempts at fuel conservation let your experiences be known that others may be encouraged to follow your example and save coal against the needs of humanity.

What Coal Are You Burning?

THE president says to the manager: "Of course we will burn our bugdust under our boilers." The manager assents, and the order goes forth: "Dump the bugdust cars over the boiler chute." The order is obeyed. Presently a cutter in 20th left complains he has no power for cutting. The motorman in the 6th face reports that he cannot make the hill beyond the swag at 15th right because he hasn't the "juice."

The foreman comes out in hot haste and interviews the engineer in the power house. He blames the boiler-room men, but says they haven't a chance to keep up a brisk fire and a boiler full of high-pressure steam on the bugdust supplied them. Then the foreman changes the orders and says the bugdust must be sweetened with a few cars of lumpy coal, and soon the boiler house gets the cream of the coal and the bugdust goes to market.

Of course, no one reports that the bugdust is no longer being used. It is likely that the president of the company never finds out that fact. The manager makes a few feeble protests, but he finally gives the assent of silence and looks at the coal pile with a blind eye, except on the day when the president is expected. Then he passes a tip to the foreman, and bugdust goes to the furnace, and the mine slacks hopelessly in consequence all along the line.

The only way to prevent this is to put in mechanical stokers that will burn nothing but small coal and will burn it efficiently, while keeping up a full head of steam. Your orders must then be obeyed, for the mechanical stoker doesn't know how to burn anything but the small sizes. Your furnace man doesn't make any objection against his work, for the bugdust is fed by machinery. You save money and get your own way—which is worth something. Nobody will ever get his own way who, with the modern fireman and without mechanical stokers, tries to utilize his bugdust in the generation of steam.

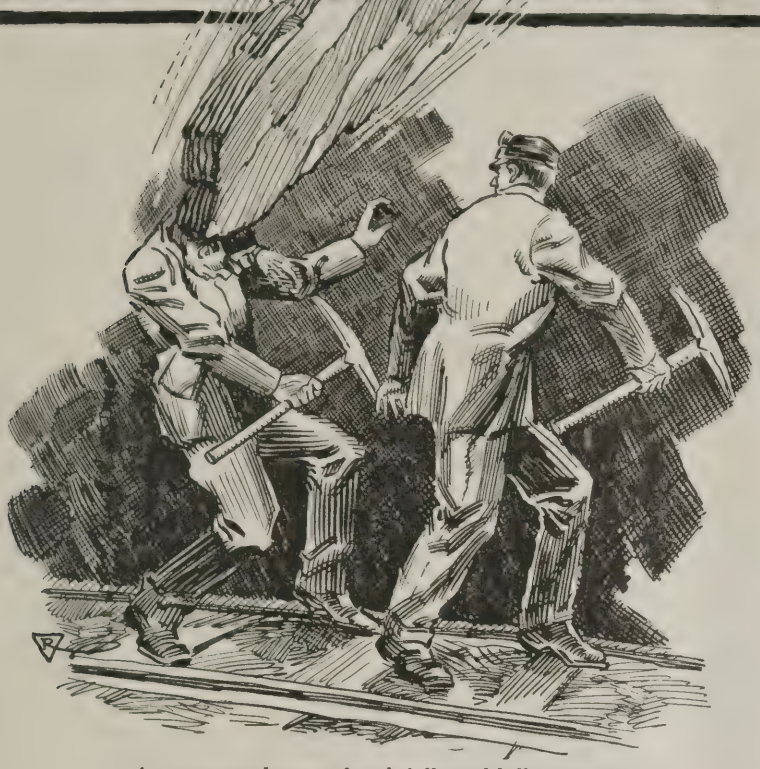
Reëstablishment or Reconstruction?

MUCH water has passed over the dam since the war was declared back in 1914. It is gone. We can no longer impound it. Wages have risen, costs also have gone up. These matters cannot well be corrected. The change has done little good to the workingman, but he would not stand to have his wages reduced even nominally. So let the wages alone, and values also.

We have, however, to put back our war workers and our armies into peace industries. But in so far as changes are made, let them be in the nature of reëstablishment rather than reconstruction. Now is no time to recast the social fabric. The problems involved in maintaining it are severe enough. Let us have, if you will, a new spirit; but let us not attempt by law to create a new order.

FALLS ON ROADWAYS & TRAVELLING WAYS

Safety letter of a large Coal Company to its men



An unreported piece of rock falls and kills its man

THIS summer two miners were walking out of the mine to the place where they get on the man trip. One stopped, the other passed on, and at almost that instant a large piece of slate fell, killing one instantly.

Probably a number of men had passed that piece of slate that day. It is hardly possible that no one noted that it was becoming dangerous, but the big thing is that no one felt that it was his particular duty to give it special attention or even to send the word of warning that might have saved a man's life.



Never mind the fire, no one will pay me for reporting it

THE maintenance of traveling ways in a safe condition is primarily the duty of the mine foreman. We all know that he will spare no expense in securing safety when he knows of an immediate danger, but he cannot be at all parts of the mine at all times. A dangerous condition may arise in but a few minutes and each man should feel that it is his duty to give warning as soon as danger is perceived.

Safety work is like many other things in life which are above payment—done for humanity's sake and because we expect as payment that the other man will do likewise. Would you think of waiting till someone gave you a $10 bill before waking up your neighbor at night if you saw his house on fire? Yet how often will you scoot by a dangerous place and expect the next man to be equally alert and see it.



They scoot by and let the rock fall on the other fellow

THIS is where we who work in the mines fail in reciprocative safety, the most important of all safety work. Don't be a safety slacker. We must train and educate ourselves to feel that the other man deserves the benefit of our knowledge whenever we see an immediate danger and that we must not fail to take the few extra steps to warn our fellow employees or at least to get the proper information to those who will either warn them for us or remove the danger.

We all use the manways, we all take a like chance from any danger that exists in them, consequently we should make their safety a coöperative affair. Let us all get together and take a part in keeping them safe so that another accident as above described will be impossible.

DISCUSSION BY READERS

Accounting of Materials

Letter No. 2—Referring to the excellent letter of J. Kenvin, on the accounting of mine supplies and materials, *Coal Age*, Oct. 17, p. 754, which possesses much merit and cannot fail to be of interest to all, allow me to present a simple form of cost-sheet that I have found useful, in my eight years of service in the offices of coal companies. They appeal to me as being the simplest and best of the various forms I have seen in use.

It is my experience that many coal companies do not attempt to keep an accurate cost-sheet, because they are unwilling to go to the expense of employing a man capable of that work, while other companies fail to realize its importance and are confused by the seeming complications and endless chain of forms that they believe are necessary for the purpose.

The cost-sheet submitted here is a simple affair, causing no extra expenditure for numberless forms and instructions, which fact has been much appreciated by all operators who have used it. The cost-sheet is so constructed that anyone around the office can figure it out in an hour's time. The form submitted here gives the departments generally used around a drift-mouth mine, but blank spaces are left so that any one can add what extra accounts they may desire.

All that is necessary to obtain at a glance the cost of labor is to arrange the foremen's time book so as to show a separate division for each department of the work, giving to each division as many lines as required for the number of men employed in the department represented.

October, 1918

	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Days Worked	Rate	Amt.
Electric Haulage:																				
John Smith	8	8	8	..	..	..	..	8	7	9	6	2	..	16	8	..	..	10	4.68	46.80
George Thomas	10	10	10	10	10	..	8	5	..	..	..	..	..	9	..	..	..	9	4.68	42.12
Ben Jones	10	10	10	10	10	..	8	5	..	..	..	..	..	9	..	..	..	9	4.20	37.80
Total electric haulage																				126.72
Trackwork:																				
William Beck	4	4	6	..	..	..	4	8	6	..	..	..	..	..	..	..	..	4	4.50	18.00
Thomas Long	4	4	6	..	..	..	4	8	6	..	2	6	..	..	..	..	..	5	4.20	21.00
John Smith	..	..	..	..	..	..	..	..	..	..	2	6	..	..	..	..	..	1	4.68	4.68
Total trackwork																				43.68

PORTION OF MINE FOREMAN'S TIMEBOOK, OCTOBER 15-31, SHOWING METHOD OF DISTRIBUTING TIME

Shown above is a sample page torn from a mine foreman's timebook for the last half of the month of October, 1918. It shows the number of hours worked by each man, in the several departments that appear on this page, and the total for each man, in each department, with his rate and amount due him.

In order to keep an accurate account of the cost of labor in each department, the number of hours a man works in each must be charged in its proper place. For example, on the page here shown, John Smith worked only 6 hr. on the motor, Oct. 25, when the mine shut down for lack of railroad cars. He then worked 2 hr. repairing track. Similar distribution must always be made when men are shifted about in the mine. The total cost of labor is summed up, as shown, for each department.

The reason for calling special attention to the need of proper distribution of time is that so many coal companies are charging the total time worked by employees to the class of work under which they are listed as their regular job. Many operations, for instance, charge the labor of oiling the mine cars, under the head of tipple labor. As a consequence, if they were asked to state the cost of operating their mine cars, the amount would not include the oiler's salary.

Importance of Accurate Time Distribution

But, during these strenuous times when every operator is striving to increase his production at the least possible cost, it is very important to know exactly what each department is doing. Many scientific methods are being offered, many of which will not only help to increase the output but enable an operator to show a satisfactory saving in the cost of production. How will an operator who merely guesses at his cost, by using estimates, know when an "honest to goodness" saving proposition is made to him?

Where an operator realizes the need of accurate accounting and adopts such a cost-sheet as I have suggested, every foreman should be made to keep his timebook so as to show the hours each man works in each department for which a separate account is kept, and sign the same, so that it can be accepted as correct by the payroll clerk.

No corrections will be made on payday; but if any time is due a man he should be given credit on the payroll then open, and the amount charged to the proper department. Pick and machine coal comes in on the coal-sheet every day so that one can easily prove the correct tonnage for each class of coal and the amount paid for the mining in each section of the mine.

Material to be used in and around the mines should be inventoried as received and placed in the supply house, which should be kept under lock and key, and a competent and reliable man placed in charge and held responsible for all material. Every foreman should understand that he must send a written order for such material as he may need. The order must show what material is wanted and to what department it is to be charged, as for example:

STOREHOUSE KEEPER:
Please deliver to bearer:
2 Trolley poles (6 ft.);
1 Trolley wheel, No. 120.
Charge to Electric Haulage.
100 Morgan & Gardner mining machine bits.
Charge to Mining Machines.
(Signed) Bill Jones, Mine Foreman.

Each order when filled should be taken and priced with the average cost of the material, as shown by the invoices. Freight and express should be added to all invoices, unless they are bought delivered. This order should then be filed until the close of that half-month, when a sheet of paper with all the departments shown should be taken and the amounts shown on the orders charged under each head.

I believe this is as simple a system as can be devised and will give an accurate cost of labor and material for each department. A simple perpetual inventory can be maintained as a check against material bought, on hand and used.

The overhead charges shown in the following lines must be left to the operators to distribute as they think best.

OVERHEAD CHARGES

Superintendent			
Office			
Insurance			
Taxes			
Workman's compensation			
Royalty			
Sinking fund			
Proportion of main office expense			
Total			

The yearly salary of the superintendent is generally divided up between the mines and commissary and a certain percentage charged to each department. Insurance and taxes paid each year will be charged off each month or semi-monthly in equal amounts. For instance, $2400 paid for insurance in a year, would mean $200 a month or $100 for a half month. Taxes are to be handled the same way. An average charge for main-office expense must be distributed in like manner.

Workman's compensation is generally carried by every mine these days. The amount actually paid the compensation commission should be entered, less the amount collected from the employees. Where royalty is paid, the amount per ton can be applied against the tonnage produced. Royalty is generally paid on a tonnage basis of 2240 lb. Hence, an output of, say, 10,000 tons of 2000 lb. would equal (10,000 × 2000) ÷ 2240 = 8928.5 gross tons, subject to royalty. A sinking fund is an amount, per ton, charged off to take care of improvements, etc., and is generally assumed as 5c. per ton. Thus, 10,000 tons @ 0.05 = $500 charge to sinking fund.

I have made up a card memorandum of accounts, which I think will take care of all the departments shown. I may have omitted some accounts that should be shown under some of the departments. If so, it will be easy to add whatever is wished to these accounts.

COST-SHEET

The Blank Coal Company, Montgomery, Ala.
For Period Ending Oct. 15 to 31, 1918

Labor	Amount	Cost per Ton	Comparative Cost Last Half
Pick coal			
Machine coal			
Contract coal			
Machine cutting			
Yardage			
Inside labor			
Track			
Mule haulage			
Electric haulage			
Storage-battery locomotive			
Ventilation			
Drainage and pumping			
Timbering			
Power house			
Electricians			
Tipple			
General outside labor			
Blacksmith			
Mine-car repairs			
Motor repairs			
Mining-machinery repairs			
Drum house and incline			
Monthly men			
Total cost for labor			
Materials			
Yardage			
Track			
Mule haulage			
Electric motors			
Storage-battery motors			
Ventilation			
Drainage and pumping			
Tipple			
Mine timber			
Powerhouse			
Mining-machinery repairs			
Mine-car repairs			
General outside			
Stable			
Drumhouse and incline			
Office supplies			
Total cost of materials			

The following is a copy of a card index or memorandum for reference, showing classification of items of labor and material in common use.

CARD ACCOUNTS

M-1 Pick Coal
(a) Labor paid for pick mining

M-2 Machine Coal
(a) Labor paid for machine mining

M-3 Contract Coal
(a) Labor paid men who are working for contractor
(b) Amount paid contractor after deducting his expenses as shown above

M-4 Machine Cutting (Labor)
(a) Amount paid machine runners for cutting coal

M-5 Yardage (Labor)
(a) Scale, rates for slate
(b) Cleaning up slate falls and moving gob

M-6 Inside Labor
(a) Firebosses
(b) Mine foremen and assistants

M-7 Track (Labor)
(a) Foreman of track
(b) Tracklayers
(c) Helpers

M-8 Mule Haulage (Labor)
(a) Boss driver
(b) Drivers
(c) Stable boss

M-9 Electric Haulage (Labor)
(a) Motormen
(b) Brakemen
(c) Wiremen and bonding

M-10 Storage Battery Loco. (Labor)
(a) Motor runner
(b) Brakeman
(c) Labor for charging

M-11 Water and Ventilation (Labor)
(a) Trappers
(b) Brattice
(c) Pumpers
(d) Water bailed in cars

M-12 Timbering (Labor)
(a) Labor for timbering

M-13 Power (Labor)
(a) Engineers
(b) Firemen
(c) Extra labor for repair
(d) Electricians' salary

M-14 Electricians (Labor)
(a) Labor provided it is not distributed to work actually done

M-15 Tipple (Labor)
(a) Tipple workman
(b) Weighmaster
(c) Car droppers
(d) Pickers
(e) Inspectors and car rounders

M-16 General Outside (Labor)
(a) Timbermen getting mine timber
(b) Saw mill operators who saw timber for the mines
(c) General repairs on the outside pertaining to the mines
(d) Teamsters

M-17 Blacksmith (Labor)
(a) Labor repairing miners' tools
(b) Labor shoeing teams

M-18 Mine Car Repairs or Replacements
(a) Carpenters
(b) Helpers
(c) Blacksmiths
(d) Labor of oilers or greasers

M-19 Motor Repairs (Labor)
(a) Electrician and other labor

M-20 Mining Machine Repairs (Labor)
(a) Labor electricians and other labor

M-21 Drumhouse and Incline
(a) Drum runners and helpers
(b) Couplers
(c) Labor repairing incline, cable, etc.

M-22 Monthly Men Salaries
(a) Any monthly man's salary who is not charged to any particular department can be charged to this account

MATERIALS

M-30 Yardage
(a) Any dynamite, powder fuse, etc., used in the mines for which no charge is made

M-31 Track
(a) Spikes, nails, ties, rails, switches, plates and bolts
M-32 Mule Haulage
(a) Mule shoes, nails, etc.
(b) Horses and mules replaced
(c) Harness
M-33 Electric Haulage
(a) Repairs used
(b) Waste, oil, etc.
(c) Trolley wire, bonds, hangers, etc.
M-34 Storage-Battery Locomotive
(a) Repairs used
(b) Power for changing batteries
(c) Waste, oil, etc.
M-35 Water and Ventilation
(a) Brattice cloth
(b) Pumps installed and repairs to same
(c) Timber, cement, brick, etc.
M-36 Tipple
(a) Repairs
(b) Installation of new machinery
M-37 Mine Timber
(a) Post and other timber used in timbering
M-38 Power
(a) Waste, oil and other supplies
(b) Installation of new machinery
(c) Coal used for boilers (this account should not be added until you have found your actual cost per ton, including supplies, labor and overhead)
M-39 Mining Machine Repairs
(a) Bits, jacks and other repairs
(b) New machinery
M-40 Mine Car Repairs
(a) Timber, wheels, axles, bearings, nails, bolts and other supplies
(b) Lubrications
M-41 General Outside
(a) Material used for general repairs pertaining to the mines (not house repairs)
M-42 Stable
(a) Feed used in feeding teams
M-43 Drumhouse and Incline
(a) Cables, switches, rail, ties, spikes, etc., used for repairing
M-44 Office Supplies

OVERHEAD CHARGES

M-48 Superintendents
(a) Proportion of superintendent's salary (part of which should be charged to commissary)
M-49 Office
(a) Salaries of office men (not including payroll clerk, which should be charged to commissary with other help in that department)
M-50 Insurance
(a) Proportion of yearly premium
M-51 Taxes
(a) Proportion of yearly tax
M-52 Workmen's Compensation
(a) Amount paid each month less the amount collected from men
M-54 Royalty
(a) Amount paid per ton as (10,000 tons @ $0.08 = $800 premium paid)
M-55 Sinking Fund
(a) So much a ton charged off each month to take care of improvements
M-56 Main Office Expense
(a) Get the main office to give you an amount which will represent a fair average of your department's expense each month

I sincerely hope this cost-sheet will be found suitable by a good number of practical operators, and particularly would I like to see it discussed in *Coal Age*.

———, W. Va. A. T. LAMENT.

Hauling Capacity of Locomotives

Letter No. 1—The inquiry of a West Virginia operator regarding the hauling capacity of a storage battery locomotive is an interesting one, and the reply given, *Coal Age*, Oct. 3, p. 660, is all that could be expected from the data given. However, what impresses me as being the most important, in this case, is the possible effect of the substitution of flexible roller-bearing wheels for the plain-bearing wheels with which the mine cars are said to have been equipped.

It is unfortunate, in my opinion, that this operator listened to the advice of his friend and gave up his original idea of replacing the old plain-bearing wheels with those of the flexible roller-bearing type, as he said he contemplated doing. It is my belief that this change of bearings would have solved the difficulty.

Plain-Bearing Cars Cause Excessive Drain on Batteries

It is stated in this inquiry that the batteries of the locomotive gave out after about six hours' work. Now, when one realizes the great saving of power made possible by the substitution of flexible roller bearings for plain bearings, it is reasonable to suppose that such a change would have gone far toward assisting the batteries to hold out during an entire shift.

Practical tests have shown that it requires about two and one-half times as much power to start a trip of plain-bearing mine cars as it does to start the same trip when the cars are equipped with flexible roller bearings. It is clear that excessive drains on the batteries are caused by the frequent heavy overloads that occur where plain-bearing cars are used; and this tax or drain shortens the working day of a storage-battery locomotive. Such being the case, it follows that the plain-bearing wheel is really a governing factor in determining the hauling capacity of a battery locomotive.

Flexible Roller Bearings Effect a Saving of Fifty Per Cent. of Power

Allow me to refer briefly to the results of the reliable tests that were made by the manufacturers of flexible roller bearings for mine car wheels. The tests were made in coöperation with a number of coal-mining officials. In one of the tests, it was shown that the drawbar pull of cars equipped with plain-bearing wheels was 24.3 lb. per ton of load hauled on a horizontal track, while that of cars equipped with flexible roller bearings was only 12.8 lb. per ton of load hauled. A similar test made at another time and in another place, before a large assemblage of mining men, gave the drawbar pull, for the plain-bearing cars tested, as 32 lb. per ton of load hauled on a horizontal track, while that for flexible roller bearings, under the same conditions, was 13 lb. per ton of load hauled.

In the first of the tests mentioned, the saving of power was 47.3 per cent., while in the second test it was 59.4 per cent. For all practical purposes, therefore, it can be assumed that the saving of power effected by the use of flexible roller-bearing, in place of plain-bearing wheels, on mine cars hauled on level track, will range somewhat above 50 per cent.

It has been my custom, in comparing these two types of bearings, for the purpose of showing the saving of power by the use of the improved type, to take 28 lb., per ton of load hauled, as the track resistance for plain bearings, and 12.9 lb., per ton of load hauled, as the average for flexible roller bearings, which makes the saving in power practically 54 per cent.

It goes without saying that the actual saving in power would much exceed this average, in a large majority of cases, in practice, as the tests made at the mines on the plain-bearing cars furnished by the companies using them cannot be assumed to have been made under the worst conditions. The cars selected were probably above the average of those in use.

Dynamometer Readings Carefully Checked

In each of the tests mentioned the readings of the dynamometer car and the calculations were checked by the mechanical engineer of the coal company, or other reliable and disinterested person, and can be accepted as being truly representative and reliable. The same dynamometer car is now in the service of the government and its accuracy is undisputed.

One fact that is worthy of consideration is the constancy of drawbar pull, per ton of load hauled, when the cars are equipped with flexible bearings. Owing to the care exercised in the manufacture of these bearings, little, if any, wear takes place for a long period of time. Only recently, I heard a man who is in charge of a mine where the cars are equipped with flexible bearings, say that scarcely any wear could be observed on the axles or bearings that had then been in operation for about ten years.

In the same connection, the statement of J. J. Bumpus, of Sovereign, W. Va., which recently appeared in *Coal Age* [Vol. 13, p. 844] describing the work performed by a 5½-ton storage-battery locomotive, is worthy of note. This machine, it was stated, operated one year on a 3500-ft. haul, with a 3 per cent. grade against the loads. and hauled 125 loaded cars weighing 4 tons each, in a 9-hr. shift, the cars being equipped with roller bearings.

The same locomotive was then used six months longer for gathering cars at the face, before the life of the 48 lead-battery cells expired. During this 18 months' service, the locomotive had taken the place of four mules and three drivers, and was operated continuously, with a total cost for repairs of $86.45, which does not include the replacing of exhausted battery cells with new ones.

In closing, let me draw attention to the fact that the last instance cited bears a close analogy to the case mentioned in the inquiry to which I have referred. In each case, a storage-battery locomotive is described as operating on a 3 per cent. grade, the statement in the inquiry being that the grade did not exceed 3 per cent. This confirms me in the opinion that the substitution of flexible bearings for the plain bearings in use would have proved equally successful in the instance mentioned in the inquiry, as in the case cited by Mr. Bumpus.

For the sake of argument, allowing the 28 lb. per ton, previously mentioned for track resistance, and 60 lb. for a 3 per cent. grade resistance, making a total of 88 lb. per ton of load hauled, with plain-bearing cars, as compared with 12.9 lb. track resistance and 60 lb. grade resistance, or 72.9 lb. per ton for flexible roller-bearing cars, the difference between the two types then being $88 - 72.9 = 15.1$ lb., per ton of load hauled, the saving in power is $(15.1 \div 88) \times 100 = 17.16$ per cent. It is important to remember that the ease with which flexible roller-bearing cars are hauled up a grade makes them seem to almost "float" over the high spots in the road, and I can recommend this type of equipment without hesitation. HOWARD K. PORTER.

New York City.

Mining Equipment

Letter No. 9—In reading the many interesting letters on mining equipment that have appeared in *Coal Age* and in answer to the suggestion so often made that coal operators should *pass on* their ideas and not hold back what they have found useful in their own practice, it occurred to me that one little device that has been in use in our mines for some time past might be of interest and help to others.

We are using a No. 3 electric mine locomotive to haul our cars. There are several steep grades on the haulage roads; and many, who have worked under similar conditions, will know what it is to set sprags in 15 or 20 cars and run the risk of having one's fingers caught in the wheels. Then, when the trip has landed in a swag, one must crawl over cars, climb couplings and squeeze between other cars and close ribs, in order to take out the sprags and enable the trip to be hauled up the next grade.

In order to overcome these difficulties, we set to work some time ago and devised what might be called a "drag slide," which was applied to the last car of the trip when descending a steep grade. This drag slide was a simple affair, costing little, and proving a great success. It takes but a few moments to put on or take off, and is a great improvement over the old method of spragging the cars.

The drag slide is made of two angle irons fitted to slide on the rails. They are long enough to turn up at the front end in the same manner as tipple horns on a dump, and reach back under both wheels. The affair is substantially made and when in use forms a sled on which the rear car of a trip rides. To apply the drag the rear car is uncoupled and pushed back, the drag slide placed on the rails and the car shoved over it and again coupled. A chain can be used to hold the slide in position if this is necessary.

We have found the use of this drag to be of great benefit. It serves to hold the trip straight and steady, which has the effect of reducing the jerks that always occur when a locomotive starts a trip of cars and the couplings take up the play. This reduces the strain both on the cars and on the locomotive. Another benefit is the great saving of car wheels, which are rapidly worn when sprags are used. I have submitted the description of this little device for what it is worth, hoping it may prove of as much value to some others as it has to us.

Crawford, Tenn. W. T. HALE.

Estimating Percentage of Grade

Letter No. 1—Having read carefully the inquiry of "Mining Engineer," *Coal Age*, Oct. 17, p. 756, in regard to the best method to use in calculating the percentage of grade, and having had considerable experience in this kind of work, in the employ of some of the largest coal companies in this district, let me say that I have always used and been instructed to use the method where the percentage of grade is based on the horizontal distance. I agree with the suggestion that this is a good subject for discussion, because without a thorough understanding of the method used there would be many errors in reading mine maps. My reason for thinking that the horizontal basis is the best method to use lies in the fact that, as most mine maps are made on the horizontal scale, it makes it much easier to determine the grade betwen any two points on the map. All that is then required to find the grade between two points is to divide the difference in elevation between those points by the distance taken from the map and the result is the required percentage of grade.

MAKES THE WORK MUCH EASIER

Compare, for instance, a case where the other method is used and the per cent. of grade is based on the pitch distance, with one where it is based on the horizontal distance. In studying the mine map, in my opinion, it would be easier for a mine foreman to make a mistake in calculating a grade based on pitch measurement.

In such a case, it would be necessary to first calculate the pitch distance by dividing the distance on the map by the cosine of the angle of inclination. It is right there that one has a possible chance for an error, either in his mathematics or by taking the wrong cosine from the table.

In the former method, in order to calculate the grade, one does not need to use any distances that he himself must determine, because the required distance is given on the mine map and all that he has to do is to make a simple division.

In closing, permit me to say that I think the better method of the two is that where the per cent. of grade is based on the horizonal distance. That is the only method that I have ever used and I believe it is the method where the least chance for error exists.

Plymouth, Penn. JOSEPH R. THOMAS.

Iron vs. Wood Mine Cars

Letter No. 3—Regarding the question of which is the better, iron or wood cars, for use under all conditions in mines, it is necessary to consider carefully the power employed for hauling. What would be suitable for motor haulage would not necessarily be best to employ in animal haulage, as the strength of the horse or mule must be taken into account. Likewise, in rope haulage, we must have regard to the strength of the rope before deciding in favor of adopting iron cars.

Where animal haulage is employed in a mine, the use of iron cars is almost out of the question, owing to the greater weight of an iron car for the same capacity. Assume, for instance, that a horse will haul four wood cars carrying 2 tons of coal apiece. If the cars weigh 1¼ tons, the total weight hauled will be $4(1\frac{1}{4} + 2) = 13$ tons. A good horse or mule working under favorable conditions will be able to handle such a trip and stand the strain for an 8-hr. day and, after a night's rest, be in shape to do the same work the following day.

IRON CARS A HINDRANCE IN ANIMAL HAULAGE

Now, suppose iron cars weighing, say 1½ tons each, and having the same capacity are substituted for the wood cars. A four-car trip, in this case, would weigh $4(1\frac{1}{2} + 2) = 14$ tons. A horse pulling this load would hardly hold out to the end of the shift and would be so fagged out and exhausted that the work would soon tell on him and shorten his period of usefulness.

Again, with the same running gear, these two types of cars cannot be hauled with the same ease. There is a give to a wood car that makes it easier to haul but an iron car is rigid and does not run as readily on the same track. This fact can only be thoroughly appreciated by those who have had experience in hauling both kinds of cars.

Owing to these hindrances, while a good horse can make, say 12 trips a day, hauling four wood cars in a trip, and stand up to the work, if iron cars of the same capacity are used instead of wood it will be necessary to cut the trips down to three cars each, and that would reduce the output of the mine one-fourth. Estimating on 12 four-car trips a day, with wood cars having a capacity of 2 tons each, gives an output of 96 tons. The use of iron cars, in that case, hauling 3 car trips, would necessitate a loss of 24 tons. This fact alone would seem to be sufficient to bar the use of iron cars where animal power is employed for hauling.

With motor haulage, the case is somewhat different. However, even here, the rigidity of iron cars throws a greater strain on the locomotive, and the necessary bumping and jerking, in starting trips, causes more injury to the cars than where lighter cars are in use. Broken axles are more frequent on iron cars than on wood ones, because of the rigidity of the former. It is, no doubt, true that wood cars are more easily injured and broken in a wreck than iron ones; but they are the simplest and cheapest to repair, at any ordinary mine shop. Suppose, in case of a wreck, 10 cars are so badly damaged that they cannot be used until they are repaired. If these are wood cars, they can probably be put in shape in one or two days and sent back into the mines. On the other hand, iron cars in a similar wreck would be battered in such a manner that it would require several days or weeks to put them in condition for use again. In some cases, it will cost more to straighten out an iron car than to build a new one and such cars must be thrown aside, unless the shop is properly equipped to handle the work.

Much that has been said with reference to the use of iron cars in animal haulage will apply, in somewhat less degree, to rope haulage, whatever system is employed, as the rope will be overtaxed in most cases and may break when least expected and cause a serious wreck. However, this can be largely avoided by the use of heavier and stronger rope when hauling trips of iron cars.

IRON CARS CAN BE BUILT MUCH LIGHTER AND MADE MORE SERVICEABLE

It may seem, from the foregoing, that I am an advocate of the sole use of wood cars in mine hauling; but this is not the case, provided a suitable kind of iron car is brought into service. My experience with iron mine cars is that they are built much heavier than there is any need. It is my belief that an iron car having a capacity of 2 tons should not exceed half this weight when empty. That is to say, the weight of the empty car should not be greater than one-third of its weight when loaded.

In the manufacture of iron cars, I am satisfied that the thickness of the steel shell or body can be less than is ordinarily employed, and that the frame can be constructed of ⅜ × 2-in. angle or channel iron, while the axles need not be more than 2½ in. Such a car would not require more than the ordinary size and weight of wheels. The bed of the wagon should be rounded to a half circle.

In my opinion, the repair of this style of iron car would not require much more in the way of shop equipment than is necessary for the repair of wood cars. The repair of iron cars, particularly in wet mines, it seems to me, calls for a well-defined system. The requirements must be closely studied with a view to securing the greatest economy in this work.

My plan would be to number each car and make it a rule that 10 cars should be sent out every Saturday and given a good coat of hot coal tar reduced to a thin liquid. This should be applied inside and out, alike. The nuts of all bolts should be on the inside of the car, so that none but mushroom heads would appear on the outside. The corners of the car should all be rounded so as to reduce the tendency of the iron to catch anything in its way. Where such a car can be furnished, I believe it would prove more serviceable than a wood car when power is employed for hauling.

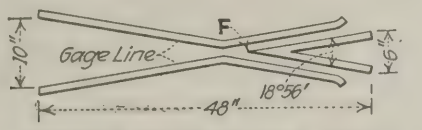
Perryopolis, Penn. R. W. LIGHTBURN.

INQUIRIES OF GENERAL INTEREST

Mine-Switch Calculations

I have been a constant reader of *Coal Age* for some time past and have noticed many articles and questions asked in its columns, regarding tracklaying, turnouts and switches in mines. These have always been of interest to me, and I have frequently made use of the information thus gained, in my work in the mines.

Recently, we have had some argument on the lengths of lead rails and latches required for a frog laid in a turn-out, near the shaft bottom. In order to make the case clear, I have drawn the inclosed sketch of this frog which, by my way of figuring, is a No. 3 frog. As shown in the sketch, the frog is 48 in. long, out to out,



COMMON FORM OF RAIL FROG

and has a spread of 10 in. at one end and 6 in. at the other end, the spread being measured between the gage lines of the rails. As I understand it, the "lead rail" is the curved rail running from the point of frog, marked *F* in the sketch, to the point of switch, which is the point of the latch in the main road.

The track gage, in our mine, is 42 in., and the length of the lead rail, as measured, is 21 ft. 9 in. I want to ask if this is the correct length for this rail. I have calculated the frog angle as 18° 54′. My method of calculating the number of a frog is to divide the length of the frog, out to out, by the sum of the spread of the rails at each end of the frog, which gives for the frog number, in this case, $48 \div (6 + 10) = 3$. We shall watch with interest for the reply, as we are anxious to know what is right. TRACKLAYER.

————, Ill.

The method of finding the number of a frog, as described by this correspondent, is correct. The frog is a No. 3, rail frog. The length of lead rail, or the curved rail extending from the point of frog *F*, to the point of switch or the point of the latches in the main road, is calculated, as has been frequently explained in *Coal Age*, by multiplying twice the track gage, in feet, by the number of the frog. Thus, for a track gage of 42 in. or $3\frac{1}{2}$ ft., the length of lead rail is

$$l = 2gn = 2 \times 3\tfrac{1}{2} \times 3 = 21 \text{ ft.}$$

The length of the latch required will depend on what clearance is desired between the hinge of the latch and the gage line of the main rail. Thus, expressing all dimensions in feet, the length of the latch is equal to the square root of the product of twice the radius of the curve and the desired clearance. The length of radius (R) of curvature of the lead rail is found by multiplying the length (l) of the rail by the frog number (n), which gives, in this case, $R = ln = 21 \times 3 = 63$ ft. Finally, calling the length of the latch x, the radius of the curve R, and the desired clearance between the latch and the main rail d, we have for a clearance of 3 in. or $\frac{1}{4}$ ft., in this case,

$$x = \sqrt{2Rd} = \sqrt{2 \times 63 \times \tfrac{1}{4}} = 5.61 \text{ ft.}$$

For a clearance of 4 in. or $\frac{1}{3}$ ft., the length of latch is

$$x = \sqrt{2 \times 63 \times \tfrac{1}{3}} \quad 6.48 \text{ ft.}$$

Portable Coal Loaders

I am writing to ask for any information that *Coal Age* can give me, in regard to a portable machine for loading coal at the working face. We are mining a 9-ft. seam of coal and I am desirous of installing a machine that will load this coal to the best advantage, with regard to economy and ease of handling. The different types of conveyor belts that I have been considering do not appeal to me as suitable for handling and loading the coal, in our case. In one instance, the belt was only 12 in. wide, which is much too small for our purpose. Any suggestions that *Coal Age* can offer that will assist in solving our problem will be greatly appreciated.

Rugby, Colo. OPERATOR.

From the statement in this inquiry there is some doubt as to the kind of loading equipment desired by the correspondent. There are a number of chain, belt and scraper conveyors now on the market. These are mostly designed for transporting the coal along the working face to the roadhead where it is dumped or loaded into the mine cars to be hauled out of the mine. The different types will be found advertised by their manufacturers, in the advertising columns of *Coal Age*, each type having its peculiar advantage and adaptation to varying conditions.

As a rule, all kinds of face conveyors are designed and adapted for use in the working of thin seams of coal where the mine cars cannot be taken along the face to be loaded. Such conveyors are particularly adapted to longwall work, where the roadheads are often 100 yd. apart, affording a good opportunity for the operation of the conveyor.

In a 9-ft. seam of coal, as in this instance, it would seem that a coal loader of the Myers-Whaley type, which was described in *Coal Age*, Oct. 10, p. 711, would be well adapted to the work. This machine is both a shoveler and a loader and has been found to work very successfully, shoveling the coal from the bottom, elevating, transporting and dumping it into the mine car at hand. The machine is portable.

Another light and portable coal loader is that manufactured by the Jeffrey Manufacturing Co., which differs from the one just mentioned by requiring the coal to be shoveled into the conveyor by which it is transported and dumped into the mine cars standing close at hand. Any of these types of loaders are recommended as giving good results under varying conditions.

EXAMINATION QUESTIONS

Miscellaneous Questions

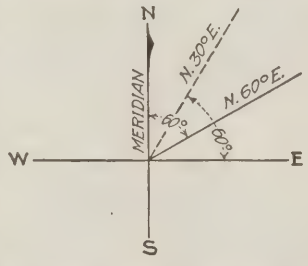
(*Answered by Request*)

Ques.—Under what conditions is it safe for men to enter return airways contaminated by gases emanating from a mine fire?

Ans.—No one should be permitted to enter a return airway that is filled with gases generated by a mine fire, unless he is protected by an approved form of breathing apparatus. There is always a large amount of carbon monoxide produced by the fire, and this gas is very poisonous and may produce instant death if present in sufficient proportion in the air current.

Ques.—What is the difference between north 60 deg. east and 60 deg. north of east?

Ans.—As shown in the accompanying figure, a line having a bearing of N 60° E makes an angle of 60 deg. to the right of the meridian, facing in a northerly direction. On the other hand, the direction or bearing described as 60 deg. north of east would indicate that the line makes an angle of 60 deg. with a due east line, the angle lying on the north side of the line. In the figure, the bearing first named is indicated by the full line, while the dotted line represents the second bearing named. The true bearing of this second line should be expressed as N 30° E, instead of 60 deg. north of east.



ILLUSTRATING BEARINGS

Ques.—What should be the daily procedure of a mine foreman?

Ans.—The foreman in charge of a mine should be on hand at the shaft or slope bottom when the men are about to enter the mine for work. His first duty is to inspect the report of the fireboss or firebosses who have examined the mine that morning, and see that it is reported safe. The foreman must note what dangers have been found as stated in these reports, and give instructions to his men in regard to removing such dangers and making the places safe for work. The foreman should withhold the checks of any miners whose places are reported unsafe for work.

After starting the miners and instructing the company men in regard to their work, the foreman must give his attention to the hoisting of coal and the work of the drivers. In making his daily rounds, the foreman must see that the working places are properly ventilated and timbered. He must examine carefully the roof in each place and give the miners any needed instructions regarding their safety. The foreman must see that all roadways and air-courses are properly timbered and safe. He must also examine all abandoned and void places in the mines and see that they are free from accumulations of gas and other dangers.

In addition to these duties, the mine foreman must attend to the needed supplies of material and order whatever is necessary for the operation of the mine. At the close of the day the foreman must ascertain that all of the men have left the mine. The foreman is responsible for the mine being operated in compliance with the mine law. He must see that the rules and regulations of the mine are obeyed and discipline men guilty of any violations.

Ques.—What conditions would guide you in determining the size of pillars in mine workings?

Ans.—The conditions affecting the size of mine pillars are the following: The nature, character and depth of the overlying strata; the quality, thickness and inclination of the coal; the nature of the floor or underlying strata; the size of openings and method of working employed; the time that must elapse before the pillars are to be drawn; and the presence of water or gas in the seam or contiguous strata.

Ques.—State what, in your opinion, would be considered as a main door.

Ans.—A main door, in mine ventilation, is a door separating the main intake from the main return airway. Any door leading from the main intake airway into another airway or section of the mine is also rightly called a main door.

Ques.—How would you distinguish between a rupture of an artery or a vein, where the victim is bleeding profusely? What steps would you take to protect the life of the victim?

Ans.—The blood coming from a ruptured artery will have a bright-red color and issue in spurts or jets, corresponding to the throb of the heart. On the other hand, blood flowing from a vein will have a darker color and issue quietly without spurting. In the former case, expose the wound so as to locate the point of rupture and apply a bandage so as to press tightly on the artery, between the point of rupture and the heart. This will check the flow of blood from the wound and give opportunity for the blood to form a clot at the opening. In applying such a bandage, a tourniquet should be used to insure a sufficient pressure on the artery and check the flow of blood from the wound.

In the case of a ruptured vein, remove any tight wrapping that would prevent the free flow of blood back to the heart and apply a bandage directly over the wound, which will assist the formation of the clot of blood and stop the flow at that point. In any case of serious bleeding, send for a doctor at once.

Candidates are constantly asking *Coal Age* to answer the questions asked in their state examinations. Examining boards are requested, therefore, to forward to *Coal Age* copies of the examinations, as soon after the examinations are held as possible. This will prevent mistakes, which are often made by candidates sending incorrect questions with requests for answers.

COAL AND COKE NEWS

What Happened in October

[The bracketed figures in the text refer to pages in the present volume, and should the reader desire further information he can obtain it by reference to the pages indicated.]

Oct. 3—Meeting of Anthracite Conciliation Board with union men and representatives of the Fuel Administration is held at Washington, D. C., the purpose being to consider whether the need for labor in the anthracite region furnished sufficient reason for a readjustment of wage which would bring the rate paid more nearly in accord with that in effect in bituminous mines and munition factories. [703]—C. E. Persons appointed Director of Education of the Fuel Administration [699]—Special maximum price set for coal of Loony Creek Coal Co., in Harlan County, Kentucky [744].

Oct. 4—Special maximum price set for coal mined by Montevallo Mining Co., in Alabama [744].

Oct. 7—Gladstone and Michel mine workers in Calgary field, British Columbia, vote to return to work under provision, of Sept. 27, of Dominion Director of Coal Operations [748]—Plant of Pike Coal Co. near Petersburg, Ind., is destroyed by fire [760]—Special maximum price set for coal of Southern Ohio Coal Co., Starr Township, Hocking County, Ohio, and for coal of Alliance Coal Co., Colorado.

Oct. 8—Conference of mine workers and mine operators of the anthracite region with Fuel Administrator Garfield consider data telegraphed from mining field relative to wage rates.

Oct. 9—Conlon mines fall in and cause much damage at Plains in anthracite region of Pennsylvania.

Oct. 11—Attempt is made to burn the tipple of the Panama Coal Co., near Moundsville, W. Va. [800].

Oct. 12—Fourth Liberty Loan drive commences [654, 704, 750]—Announcement is made of the Anthracite Wage Agreement as proposed and accepted by the wage board but not yet made operative [701, 703, 705, 789]—Main office of Thomas Colliery Co.'s mine, operated by Madeira Hill Coal Co., burns down [800].

Oct. 13—Fourteen bodies are recovered from the north mine of the Franklin Coal and Coke Co., at Royalton, Ill., victims of the fatal explosion of Sept. 28 [714, 760].

Oct. 16—United States Fuel Administration authorizes an increase in the reserve stocks of coal held by all classes of consumers except Class 1 east of the Mississippi River.

Oct. 18—Announcement is made that the United States had offered to place at the disposal of the Dutch government 100,000 tons of coal monthly till the end of the war on condition that food be not sent to Germany [800, 827, 865].

Oct. 20—Miners worked in large numbers in an endeavor to maintain production in face of influenza epidemic.

Oct. 24—New agreement in Vancouver Island, B. C., with wages increased 75c. a day with a sliding scale to adjust wages to cost of living [868].

Oct. 25—W. D. Tyler appointed Acting Director of the Bureau of Prices, vice E. Q. Trowbridge, who resigns for army service.

Oct. 26—Dr. H. A. Garfield, United States Fuel Administrator, announces that "the Fuel Administration approaches the winter season well organized with stocks of coal on hand far in excess of the stocks of other years".—Trade paper editors leave United States for Great Britain as guests of the British Bureau of Information [921]—New maximum prices set for coal mined by certain corporations in Bell and Harlan counties, Kentucky, and Wise County, Virginia, are made by United States Fuel Administration.

Oct. 28—United States Fuel Administration closes 13 small mines producing dirty coal [865].

Oct. 31—New anthracite wage scale as forecast Oct. 12 is made operative by the United States Fuel Administration [789, 867].

Harrisburg, Penn.

Coal companies must pay for the care of injured miners sent to hospitals, according to a decision of Judge Woodward in the suit of the trustees of the State Hospital of the Middle Coal Fields against the Lehigh Valley Coal Co. The dispute was presented to the court in the form of a case stated, and Judge Woodward of Luzerne directs that judgment be entered in favor of the plaintiff for $1,166.68, for the board and treatment of certain injured patients, who were employed by the defendant company. The case decides a question raised under the Workmen's Compensation Act.

Before the compensation act there was no obligation on the part of the employer to furnish treatment to the injured employee. So that if the employee went to the State Hospital the contract for treatment was between the hospital and the employee, and the purpose of the act, the court states, was to relieve the injured employee from the burden of payment. Before the Workmen's Compensation Act, if the employer had sent his employee to the State Hospital there would have been nothing to prevent his becoming responsible for his treatment, if he so stipulated. The compensation act now stipulates for him that he will be responsible if he sends his employee for treatment.

The court further states, "If on the other hand the employer had absolutely refused to furnish treatment, or had not been consulted, and the employee being a mine worker had gone to the hospital on his own account, the plaintiffs could not collect, because there would have been no privity of contract between the plaintiff and the employer, but only between the plaintiff and the employee, whom they could not charge for service; and as the compensation act only requires the employer to reimburse the employee for what he has spent for service, there would be nothing for the employer to pay."

The court contends that the obligation to pay in this case does not arise from that part of the compensation act which specifically requires the defendant to pay something, because the payment referred to is made to the employee and not to the person and institution rendering the service; but it arises from the obligation to procure treatment which was not on the employer before, and when the treatment is furnished the law creates the obligation to pay. The act creates the privity of contract which did not exist before, and the common law creates the obligation to pay a quantum meruit up to the limitation fixed by the compensation act. The State Hospital act does not prohibit the receiving of compensation except from the injured mine worker.

Uniontown, Penn.

Signing of the armistice will have no immediate effect upon the regulation of the coal and coke industry in the Connellsville region other than increase the difficulties of fuel officials in preventing the rank and file of the workmen from relaxing their efforts. Operators generally are inclined to welcome government supervision until the industry had readjusted itself to a peace-time basis. With the passing of the war appeal, however, a problem is presenting in retaining maximum efficiency among the workers to maintain tonnage at the high peak required to meet present demands. Definite policy in that regard has not yet been formulated.

Another low level was touched in production for the week ended Nov. 9, figures issued by the fuel administration placing the output at 610,604 tons of coal, of which 416,767 tons was manufactured into 277,849 tons of coke and 193,837 tons was shipped to byproduct plants and other industries. The figures in the aggregate represent a drop from the previous week of 44,600 tons and a decrease of 138,784 tons from the high record of Oct. 12. Coke dropped 17,711 tons and coal 22,500 tons. General peace demonstrations and influenza, which has not disappeared by any means, is blamed for the continued drop.

Three days after the effectiveness of the Pennsylvania Railroad order discontinuing box-cars to team-track loaders, no orders have been placed at the division office here for open-top cars by that class of operators, leading to the assumption that the team-trackers, as a class, had carried out their threat to discontinue operations. There were 155 of those operators served by the Pennsylvania R. R. with a daily rating of 175 cars, making a daily average output of 4275 tons. With the reduced price of 75c. per ton for coal loaded in open-top cars, the team-trackers claim they can make no profit. In addition there has been a decided slump in that grade of coal and instances have been reported of sales below the Government price.

Dissolution of the J. V. Thompson creditors' committee, a body established two years ago to protect interests of unsecured creditors with claims of $13,000,000 against the former coal baron, is asked in a petition in equity filed in the Fayette County courts by a number of creditors. An accounting of their management of the estate is also asked.

Sweeping charges of inactivity by the committee are made to support the plea for its dissolution, the claim being made that Thompson has at all times dominated its policy. The fight for the control of the Thompson Connellsville Coke Co., which has been pending here for several months, is also referred to in the equity bill. The charge is made that the sale of securities pledged with the First-Second National Bank of Pittsburgh as collateral was made to J. H. Hillman, Jr., at an inequitable price. The transaction, which included 5750 shares of stock in the Thompson Connellsville company and other securities, the petition avers lost to the Thompson estate a sum "in excess of $300,000."

Birmingham, Ala.

Greatly increased coal production in Alabama and the Birmingham district is shown in the figures for the week ending Nov. 2, when the output amounted to 347,557 tons. Operators and miners are being urged to push their activities to the utmost, to obtain maximum production during the remainder of the year. The fact that the war seems to be about over will not slow up the developments now being pushed in the mining sections of the district. Notable among these are those of the Republic company at Palos, the Tennessee company at Getmore, in the Blue Creek region, and the Woodward Iron Co., near Dolomite. These mines are on a large scale and will produce upward of 20000 tons per day each when in full operation.

The transportation companies in the Birmingham district are moving equipment as quickly as possible and the tonnage being reported shows steady increase. The intra-district business is also picking up, as the passing of the influenza epidemic has brought about improvements in the outputs of coal mines, coke ovens, furnaces, steel plants, foundries, machine shops and other industrial plants.

The announcement during the past week that the Birmingham Southern R. R., a subsidiary of the Tennessee Coal, Iron and Railroad Co., was losing its identity as a common carrier means the elimination of switching charges, brings about the right to charge demurrage and does away with many complications that heretofore existed. When the transportation charges deal now with the Birmingham Southern R. R., they deal directly with the Tennessee Coal, Iron and Railroad Co.

Warrior River transportation plans are still being carried forward rapidly, and with a favorable report at Washington last week by Assistant Director General of Railroads Tomlinson, in charge of inland waterways, early operation of the full resources of the system is expected. Advices from Washington state that Director General McAdoo may journey to Alabama next month to inspect the Warrior and act on the recommendations of Mr. Tomlinson.

Charleston, W. Va.

Pronounced improvement in production was made possible in the Fairmont region during the week ending Nov. 9 through a well maintained car supply covering practically the entire week, the mines in the district being able to rely upon about 1400 cars a day. Delivery of empties to the mines was also more prompt, although on one day cars were late in being placed. With less sickness among the miners more men were available for work. In one or two places only were operations crippled by the prevalence of influenza.

Little progress was made at the beginning of November by the mines of the Tug River and Pocahontas regions in meeting the quota of 2,000,000 tons assigned to those mines by the Fuel Administration as their goal for November. As a matter of fact production had fallen off considerably, dropping from 464,000 two weeks ago to 412,000, a difference in weekly production of over 50,000 tons. Production loss for the week was 63,855 and of that total inability to secure sufficient man power cost 41,596 tons. Production officials express the opinion that influenza kept a good many miners away from the mines. Car shortage had little to do with the decreased output but mine disability cut down the amount produced to the extent of over 11,000 tons. There was also a reduction in the tonnage of coke production, the amount being slightly in excess of 48,000 tons.

Conditions following the influenza epidemic in the New River field have made it difficult to command the full strength of the miners in that field, sickness alone having cut down the output at least 15 per cent. A number of miners remained at home for election day and premature announcement of an armistice also caused many to leave the mines to celebrate. While the production figures for the week ending Nov. 9 show a decrease for that period of 1499 gross tons, the total output being 128,260 tons, it is said that there has really been an increase owing to the fact that certain New River mines were classified in the wrong district.

There was a further decrease in the output of Winding Gulf district for the week Nov. 9 of 2087 gross tons, the gross tonnage produced during the period named being 102,005. Influenza, lack of sufficient power and election day absences caused the curtailment of output, but conditions in the Gulf district are said to be improving.

Lack of power again operated to limit production in the Kanawha mine field during the week ending Nov. 9, sickness to a limited extent also affecting production. The increase amounted to only 727 tons, the tonnage produced being raised from 162,097 tons for the previous week to 162,824 tons. Of the total loss of time, power shortage and other mine disability was responsible for 585 hours. Car shortage was down to a 12-hour loss, while a shortage of man power entailed a loss of 1894 hours.

Victoria, B. C.

The British Columbia Court of Appeal has handed down judgment in favor of H. W. Treat and his associates as against the Esquimalt & Nanaimo Railway Co., in the suit brought by the latter to have the defendants, Messrs. Treat, et al, declared trespassers on certain coal-bearing lands on the foreshore of that block of land known as the Esquimalt & Nanaimo Land Belt, Vancouver Island. This confirms the opinion of the lower court and affirms Mr. Treat's title to the lands in question, which are situated near the mouth of the Chemainus River between Victoria and Nanaimo, B. C. It means that the courts hold the view that the Dominion Government had no power to convey foreshore rights to the Railway company when bonusing it, by a considerable land grant, for the construction of the road. It means, also, that the development of the coal in question will proceed without interference and that others, holding Provincial licenses to coal areas on the foreshore of the Island and within the belt, probably will take steps leading to the development of this part of the coal resources of the Island.

New York, N. Y.

Believing that trouble would be caused by the sudden discontinuance of the National Fuel Administration, the officers and executive committee of the National Retail Coal Merchants' Association have adopted a resolution, which has been transmitted to Dr. Garfield, asking that for the best interests of the retail trade the Fuel Administration, as at present constituted, should, in any event be continued at least until Mar. 31, next. Under the present law the Fuel Administration ceases to exist as soon as peace is declared.

A resolution was also passed and transmitted to Dr. Garfield asking that the present prices for bituminous coal and the steam sizes of anthracite be made the minimum prices up to Apr. 1, next, and that the zone system be continued. This action was taken because of the great stocks of bituminous coal stored throughout the west (1,000,000 tons being stored in Chicago alone, most of which is low-grade Illinois and Indiana coal), and that because of the decrease in the demand and increase in production, the dealers are threatened with tremendous losses, especially if the zone system be not continued and high grades kept out until this coal has been disposed of; and also unless price protection is given by the Fuel Administration. To some extent the same situation regarding the steam sizes of anthracite exists in the East.

Other matters discussed were the establishment of the uniform tons of 2000 lb. throughout the United States; the resizing of anthracite coal; the exact definition of what constitutes retail dealers, with a view to having distribution confined to such; the establishment of a Trade Relations Committee for bringing about closer cooperation between the dealers and the operators; and the creation of a committee for the betterment of conditions regarding shipping, weighing, reconsignments, etc.

PENNSYLVANIA

Anthracite

Beaver Meadow—The coal operators of this district have launched a movement to recruit their labor forces for next winter among the farmers of the region.

Pottsville—Two pieces of real estate in the neighborhood of Lawton's Hill and Mill Creek were conveyed to the Lehigh Coal and Navigation Co. They will be a part of the real estate in this city and East Norwegian Township, recently acquired by the company.

Pottsville—The Darkwater Coal Co., near St. Clair, will increase its output of coal by the opening up of new stripping operations. The company has called upon the Pennsylvania R.R. for an increased number of cars to transport the output and guarantees to fill 18 or 20 each day.

Wilkes-Barre—The mine foremen and the firebosses in the anthracite coal fields may soon become affiliated with the United Mine Workers of America. A booster meeting is being planned for this purpose. A few months ago more than 200 of these petty mine officials organized a union and appointed a committee to apply to the American Federation of Labor for a charter. Since that time the enthusiasm and profits that might be gained from such a union spread through the district and it is learned from reliable source that 90 per cent. of the foremen and firebosses are willing to come into the new organization.

Hazleton.—Coal operators of the Lehigh coal field are protesting against the new coal rates which allow $1.05 per ton advance on domestic sizes to cover the increase given the miners effective Nov. 1. It is claimed the wage boost has added 75c. a ton to the cost of producing anthracite, but that $1.05 per ton permitted on each ton will be only 65 to 70c. when spread over the total output. This is due to the fact that the fuel administration allows the higher price only on domestic sizes, covering 70.6 per cent. of the hard coal tonnage, while on the smaller grades, comprising 29.4 per cent. of the output, no raising of rates will be permitted.

Lykens.—The Lykens valley mining region of the anthracite field will show a loss of hundreds of thousands of tons of coal, according to a report of Charles J. Price, state mine inspector in this district, as a result of the influenza epidemic. In Williamstown it is reported that there were 42 deaths in a population of 5000, while in Tower City there were 115 deaths in 6000 population. In Lykens and Wiconisco there were 53 deaths with a population of about 5000. Several of the collieries were actually shut down for from three to four days a week by the epidemic and the production of anthracite of a high grade, ordinarily 7000 tons a day, went down 50 per cent. for the October working days.

Bituminous

Charleroi—The Dawson Coal Co. has been granted a permit by the United States Government to construct a coal tipple and drive piling on the right bank of the Monongahela River, opposite Millsboro in the Fifth pool.

Uniontown.—Development of 140 acres of the Sewickley vein of coal underlying the Fisher farm in Westmoreland County is to be commenced immediately following its purchase here by Miller Brothers, custom coal operators.

Yukon—The tipple and barn of the Yukon Coal Co. were destroyed by fire recently. It is believed that the blaze was of incendiary origin. The damage is about $15,000, partly covered by insurance. The mine employs about 50 men.

Brownsville—The steamer "Alicia," owned by the W. Harry Brown interests, has been returned to the Monongehala River trade after having been extensively repaired. The steamer was caught in the ice jam last winter and sent to the bottom near the Alicia works of the Brown interests.

Charleroi.—The Carnegie Steel Co. has commenced work on the construction of a new marine ways on the Monongahela River, near here. The ways are being built to care for the increasing fleet of steamers and steel craft the Carnegie Steel Co. is developing to deliver coal to the Clairton byproduct plant.

Greensburg—A. Mitchell Palmer, alien property custodian, has taken over 421 acres of land in St. Clair township, title to which was held by the Deutsche Bank, a financial institution in which the Hohenzollerns are said to be heavily interested. The lands involved are said to be a mountain timber tract, underlaid with two seams of Freeport coal.

WEST VIRGINIA

Logan—Among other improvements made by the Shamrock Coal Co. at its plant near here has been the installation of a new substation under the direction of J. B. Agee, general manager.

Dorothy—The Western Pocahontas Fuel Co. is making arrangements to install a tube for the purpose of conveying crushed coal from its mine to the yard bins at Dorothy. The executive in charge of operations is C. E. Sandberg.

Logan—After having been compelled almost to suspend operations because of the prevalence of influenza among its miners, the Gay Coal and Coke Co., of which H. S. Gay, Jr., is general manager, is now able to operate at about half its normal capacity.

Cora—Extensive improvements have been made by the Standard Island Creek Coal Co. at its Cora plant. The company in addition to opening another mine and buying much additional mining machinery, has also installed a new motor generator set. All company houses have also been given a coat of paint.

Holden—Just as soon as they can be delivered a battery of two 400-hp. boilers will be added to the power equipment of the Island Creek Coal Co. at its Holden plant. The company has also arranged for new equipment at its No. 3 mine. The general manager of the Island Creek Co. is A. R. Beisel.

Logan—The new tipple of the Wood Coal Co. at its Ethel plant, used in connection with both Mine No. 1 and Mine No. 2, represents an expenditure of $40,000. Not only has the company built a new tipple but it has added much new equipment and has just completed the construction of 65 miners' houses. All improvements have been made under the direction of L. R. Howell, superintendent.

Affinity—The program of betterments at the Affinity plant of the Pemberton Coal and Coke Co. includes a new brick power house, a machine shop, the installation of a 300-kw. alternating-current machine, and a 150-kw. direct-current machine, together with a new battery of boilers. The company will also install a water-purifying plant. The betterment program also includes the construction of a number of houses for miners, in addition to an amusement recreation hall.

OHIO

Zaleski—The Chieftain Coal Co. has opened a new mine on the Baltimore & Ohio near Zaleski. The property consists of 236 acres of No. 6 coal about 4 ft. thick. The Chieftain Coal Co. is backed by the same interests as the Wheeler & Mason Co., of Columbus.

Murray—The Owl Creek Coal Co., chartered with a capital of $36,000 by E. W. Davis, Vance Webb, Charles Schultz, Lewis Green and J. W. Green, has purchased the operating mine of the Carbon Hill Coal Co., near Murray, which was owned by E. A. Cole & Co., of Columbus. The mine has a daily capacity of 400 tons.

ILLINOIS

Du Quoin—The Jewel Coal and Mining Co. is sinking a shaft ½ mile southeast of this city. The operation will be completed within 60 days and will have a capacity of about 500 tons daily. The company intends to serve the local trade and ship all surplus by rail to various points. Locomotives and mining machines will be installed eventually.

Tower Hill—The Tower Hill coal mine has closed down permanently. About 1303 miners have been thrown out of work and most of them will remove to other mining centers. The mine has been operated this summer at a financial loss. Owing to the semi-plastic condition of the soil, the entries of the mine have been squeezed out and the two principal entries have been lost by this means. With the condition growing worse, the permanent closing of the mine was the only recourse. The Tower Hill Coal Co. has been conducting the mine since its purchase from the original Century Coal Co., except for a closed period of a year or so prior to its reopening more than a year ago.

MONTANA

Belt—Arrangements for the development of a new coal mine in this district are being made by a company in which Senator J. M. Burlingame and other Great Falls men are interested.

Foreign News

Nanaimo, B. C.—Coal miners on Vancouver Island are now receiving their first checks under the recent increase in wages of 75c. per day. The wage scale will henceforth be adjusted every three months in accordance with the cost of living.

Victoria, B. C.—Some of the coal deposits of Northern British Columbia are being developed, that which now is receiving attention being the Telkwa Coal Basin, situated abaout 35 miles from Telkwa on the line of the Grand Trunk Pacific Ry. Three drill holes have been sunk, and, according to the engineer's report, it has been established that there are 50,000,000 tons of good bituminous coal available in this particular section. Experiments seem to indicate that it will prove to be good coking material, but the coal has not yet been given a practical trial. The most serious difficulty confronting the promoters is the question of transportation, the construction of a branch line connecting with the Grand Trunk Pacific being necessary. This is a matter which is being dealt with now and, if the financial support necessary for the work is secured, this coal wil be exploited.

Personals

Samuel Mottishaw has been appointed manager of East Wellington No. 1 mine, operated by the British Columbia Coal Mining Co., vice **James Gray**.

George Crossland has resigned his position as superintendent of the Briar Hill Coal Co. and accepted the position of superintendent for the Anow Coal Mining Co., near Windber, Penn.

Edward H. Coxe, of Pittsburgh, Penn., has resigned his position as general superintendent of the United Coal Corporation, effective when his successor is appointed. His successor has not yet been named.

J. T. Morris has been appointed assistant general manager of the Pemberton Coal and Coke Co., with headquarters at Affinity, W. Va., and will have charge of a number of improvements to be made there. Mr. Morris has been the superintendent of the Stotesbury operation of the E. E. White Coal Co.

William Walker, formerly overman at No. 5 mine, Comox Colliery, operated by the Canadian Collieries (D) Ltd., has been appointed manager of the same mine, succeeding **J. W. Montgomery**, resigned. **Robert Brown**, formerly overman at No. 7 mine of the same colliery, has been transferred to No. 5, succeeding Mr. Walker.

George H. Barker, vice president of the Maynard Coal Co., of Columbus was made chairman of the foreign trade committee of the National Coal Association at a recent meeting in Washington, D. C. Recently the directors of that organization met to map out action on export business after the war is over and Mr. Barker was selected for the important post.

Obituary

Louis Lyman LaClair, aged 36, superintendent of the Martin plant of the McKeefrey Coal Co., died at his home in Martin, Penn., following an illness of pneumonia. He had been connected with the McKeefrey Coal Co. since 1905.

David Alexander, mine foremen of No. 10 colliery of the Pennsylvania Coal Co., died of pneumonia on Nov. 11 at his home in Pittston, Penn. He was 58 years of age and was one of the best known mining men in the Wyoming region. He leaves a widow and two sons.

P. F. Caten, one of the members of the National Board of the United Mine Workers of America, is dead of influenza, having succumbed at his home at Bancroft, Putnam County, West Virginia. Mr. Caten was one of the leading spirits in organizing the Clarksburg and Fairmont mining region for the United Mine Workers.

Archibald R. Henly, aged 32, of Scranton, Penn., a prominent consulting engineer of mines, died on Nov. 12 of typhoid fever at the home of his mother-in-law in Lansford. He is survived by his wife, his father, and several sisters and brothers. Mr. Henly was a graduate of Lehigh University and until six months ago was chief mechanical engineer of the Delaware & Hudson Coal Co., resigning to engage in business for himself. For several years Mr. Henly was connected with the Lehigh Coal and Navigation Co. and with the Lehigh Valley Coal Co. in the engineering divisions.

Industrial News

Spokane, Wash.—Local coal dealers report that the retail situation this winter is more promising than ever before as the greatest majority of the home owners have put in their winter's supply and the dealers have much coal in storage.

Mansfield, Ohio—The Ohio Brass Co. announces that on Nov. 15 it moved its New York City office from 30 Church St. to 1781 Hudson Terminal Building, 50 Church St. The telephone numbers of the New York office remain the same—2495-2496 Cortlandt.

Greenville, Ohio—Residents of Darke County have been notified by the county fuel administration that there will be no hard coal available for burning this winter. Those who were depending on hard coal are therefore making different arrangements for their winter fuel.

Des Moines, Iowa—Three million cords of wood will be cut in Iowa this fall for the winter supply, supplementing the coal supply of the state, according to figures announced by the state fuel administrator. This wood will take the place of at least a million tons of coal, it is said.

Huntington, W. Va.—October movements of Pocahontas coal amounted to 34,514 cars, averaging 53 tons per car, making a total of 1,829,242 tons shipped during the month. This constitutes the largest shipping record of the present year and has only been exceeded two or three times in the history of the field.

Cleveland, Ohio—The C. O. Bartlett & Snow Co., manufacturers of tipple equipment, have closed their eastern branch, which was located at 50 Church St., New York. H. H. Bighouse, second vice president and chief engineer, who has been in charge of the eastern district, will hereafter be located at the main office of the company at Cleveland.

Vancouver, B. C.—The Canadian Northwest Steel Co. is building a fuel pulverizer, on plans prepared by the Fuller Engineering Co., for the British Columbia Sugar Refinery, of Vancouver, B. C. It is expected to cost about $40,000. This is the first installation of the kind in the Canadian West, and, for that reason, is being viewed with special interest.

Pittsburgh, Penn.—Cost of insurance rating of miners was reduced 10 per cent. recently by the adoption of a new compensation insurance schedule, following a two-days' session at the Fort Pitt Hotel by representatives of the bituminous operators and the Pennsylvania State Bureau of Mines. The reduction in the rate is the result of the raise in wages.

Charleston, W. Va.—Installation of new 20,000-kw. generators at the plant of the Virginian Power Co., which furnishes power to mines in the Kanawha, New River and Winding Gulf fields, is now under way. Upon the completion of the installation of new machinery and changes in the transmission system, the company will be able to meet all the power requirements in this territory.

Knoxville, Tenn.—At present prices of coal many small mines in Tennessee, along the Cincinnati Southern line of the Southern R. R., are finding it profitable to reopen operations. Several of these mines which have no rail connections are using motor trucks of 1½ to 2 tons capacity for hauling coal to the nearest railway siding, where it may be dumped into a loading hopper or shoveled directly into a car.

Cordova, Alaska—The first shipment of Alaska coal to the states is expected soon to take place. It will consist of 1000 tons from the mines of the Alaska Petroleum and Coal Co. in the Bering coal fields. By early in 1919, it is believed, Cordova will be using Katalla coal exclusively. The coal is said to be a high grade anthracite and will be delivered on the Alaska coast much cheaper than coal can be imported from the states.

Linton, Ind.—The Indiana Public Service Commission has entered an order reducing the passenger rates on the miners' train operating between Linton and the Gould, Rose Hill, Ajax and Little Giant mines on the Monon R. R. The existing rate was $2.75 a month and the new rate will allow the miners to purchase 54-trip commuters' tickets, good for 30 days, for $1.50, or a 27-day ticket for 75 cents. The order is effective at once.

Urbana, Ill.—Prof. S. W. Parr, of the department of applied chemistry of the University of Illinois, has completed a series of experiments on coal carbonization which he has been carrying for some years. Prof. Parr says that the results show a possibility of changing Illinois coal into a smokeless fuel which would mean an opening for a new industry. The by-products of the carbonization of coal are also of interest and may have an important bearing upon the manufacture of gas for city and other uses.

Morgantown, W. Va.—Inability to obtain sufficient power has led operators of the Monongalia field to take preliminary steps toward having another power plant built in the field in order to relieve the situation. Discussion has led to having plans and specifications drawn up and to securing estimates as to the probable cost of a new plant. Mine owners operating in the Monongalia field point out that a new plant is a necessity because of the fact that production is being restricted by the difficulty in securing sufficient power to keep all mines going to their capacity.

Toledo, Ohio—Considerable activity prevails at the lower lake ports as is shown by the record of loading at the various docks at this place. It is believed that the lake season will be officially closed Nov. 23, although the announcement is still withheld. During the week ending Nov. 9 the Hocking Valley docks loaded 160,491 tons, as compared with 140,564 tons the previous week, making a total of 4,795,060 tons for the season. During the same week the Toledo & Ohio Central docks loaded 72,000, as compared with 65,000 tons the previous week, making a total of 2,089,936 tons for the season.

Philadelphia, Penn.—A large brewery in the suburbs has volunteered to turn over for domestic use a large pile of No. 1 buckwheat coal. It appears that this coal was shipped to the brewery by a large operating company during the six weeks after Apr. 30, on which latter date the anthracite distribution authorities had ruled that no more buckwheat should be sold to manufacturing plants. The coal is offered to the public through the retail dealers, who will take orders for it and deliver to such consumers as may want it. As yet little demand has developed, but it is thought as the colder weather comes on every ton of it will be taken, as last year the dealers were unable to meet the demand for this size.

Frankfort, Ky.—Judge Sheckleford Miller of the Kentucky Court of Appeals has reversed a decision of the Muhlenberg Circuit Court, Greenville, in which the lower court cancelled a fifty-year lease held by the Continental Fuel Co. on 421 acres of coal land, and at the same time gave the property owners, J. C. Haden and Mrs. A. M. Bohannon, possession to $100,000 worth of mining machinery on the company's premises. The owners of the property secured the cancellation on the ground of waste, but the higher court held that there was nothing to show that there had been any unnecessary waste in operation.. The company was paying $1500 annual rental. Besides spending $100,000 for equipment it had spent considerable sums in fighting floods and protecting the property.

MARKET DEPARTMENT

Weekly Review

Lowered Production of Soft Coal Will Serve To Tighten Market—Large Stocks in Hands of Consumers Leads to Embargoes and Closing Down of Mines—Would Keep Alive Fuel Administration—Anthracite Situation Growing Worse

SORRY, indeed, would have been the status of the coal market at the present time if production for the months of October and November had been maintained at the high rate that prevailed during the latter part of September. During the period following Sept. 28 the output of soft coal has declined steadily, until we find that for the week ended Nov. 9 (the latest statistics available) the tonnage produced amounted to 10,409,000 net tons, which is considerably lower than the output for the corresponding period of 1917.

Instead of arousing consternation, this state of affairs has barely awakened the interest of the soft-coal consumer, who continues to preserve an apathetic calm in the face of warnings that a sudden cold snap, with the tying up of transportation facilities and the congestion of terminals, would militate against the possibility of the market becoming demoralized and bring about a lowering of prices. The continued decline in the output will have a decided tendency to tighten the market.

True, stocks of soft coal now in the hands of both dealers and consumers are larger than ever before in the history of the trade, but any number of things are likely to happen to remove this advantage. Strikes in the bituminous regions are not at all a remote possibility. Already murmurings of discontent are heard here and there.

Coal moving east from the Kanawha and New River fields of West Virginia, including even the coal used by the railroads themselves, has been embargoed owing to the congestion at tidewater. This means that the mines in these districts will have to close down. Thousands of mine workers will thus be forced into idleness. And when it is remembered that these very men were only a short time ago working extra time to provide more and more coal at the behest of the authorities, it seems a harsh reward to lay them idle now.

This condition, unfortunately, appears to be one that it was impossible to avoid. In the New England States the signing of the armistice led to an aftermath of cancelled Government contracts, the suspension of orders for various materials, the elimination of night work and overtime, and in quite a few instances the closing down of entire plants. The industries thus affected, in order to prevent repetition of last winter's conditions (when they found it difficult to obtain an adequate fuel supply), this year overestimated their requirements and stocked up with coal accordingly. New England, therefore, now finds itself with a twenty weeks' reserve of soft coal, and is out of the market for the time being, if not virtually for the rest of the coal year. For this reason the embargo to tidewater ports was declared.

These extraordinary conditions prevail not only on the Atlantic seaboard, but in the Middle West as well. Many mines in Illinois were working only two or three days during the past week, and a number of operators report that they contemplate shutting down entirely as there is no market for their product. Naturally here too the mine workers are dissatisfied. Only the filling of orders for railroad coal keeps certain mines in the Middle West working anywhere near full time, and even the demand for this fuel is growing less vehement.

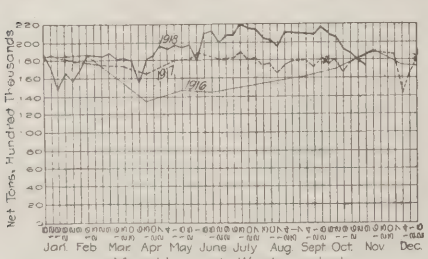
Operators are hopeful that the Government's program for the gradual transition of the country from a war to a peace basis will be carried out without any undue disturbance to industry, though the problems to be met are so complex in their nature that no one can truly say what unlooked for development the morrow will bring to light.

An earnest appeal has come from many factors in the coal industry that the Fuel Administration be kept alive at least until the end of the coal year if not for a longer period, instead of having its functions end with the signing of the peace pact, as provided by the terms of the Lever act. This would mean, of course, the maintenance of Government prices, the retention of the salient features of the zoning system, and the general control of the production and distribution of coal as in the months gone by. In its final analysis, this centralized control would undoubtedly work out for the best interests of all concerned. To restore the competitive features of the coal market at this time would work irreparable injury to dealers who have large stocks of unsold coal on hand, while the elimination of the zoning regulations would mean that coals from the east would again move to the interior and strangle local operations, as of yore.

During the week ended Nov. 9 the production of anthracite is estimated at 1,587,000 net tons, an increase of 87,000 net tons as compared with the week preceding. The total production of hard coal from Apr. 1 to Nov. 9 is estimated at 62,176,000 net tons, 704,000 net tons behind last year's output for the corresponding period. The steam sizes of anthracite continue to move slowly, while the efforts to supply the domestic sizes proves unavailing because the output of anthracite continues to grow steadily smaller. In the opinion of some operators it will be some time before sufficient hard coal will be mined to care for the normal demand.

WEEKLY COAL PRODUCTION

The downward trend of production of bituminous coal, which began after the record production during the week ended Sept. 28 when the output exceeded 13,000,000 net tons, not only continued through the week of Nov. 9 but brought the output during the current week, which is estimated at 10,409,000 net tons, below the production of the corresponding week of 1917, for the first time during the present coal year. It will thus be seen that the influenza epidemic together with the observance of election day, during the past week, and the celebration of the signing of the armistice, caused a decrease in the weekly production, during a period of six weeks, of over two and one-half million net tons.



The average daily production during the week of Nov. 9 is estimated at 1,735,000 net tons, as compared with 1,811,000 net tons during the week of Nov. 2, and 1,845,000 net tons during the corresponding week of last year. For the 1918 coal year to date, the daily average is estimated at 1,976,000 net tons, as compared with 1,758,000 net tons, and it is now necessary, under the budget as just revised by the Fuel Administration, to produce daily, during the balance of the coal year to make up for the past deficit, 2,034,000 net tons, 58,000 net tons, or approximately 3 per cent. in excess of the average daily production for the period Apr. 1 to Nov. 9.

The total production for the coal year to date is estimated at 379,364,000 net tons, as compared with 337,532,000 net tons during the same period of 1917, an increase of 41,832,000 net tons, or 12.3 per cent.

The holidays which further limited production of bituminous coal had no effect on the production of anthracite, the output during the week of Nov. 9 exceeding the preceding week by 87,000 net tons, or 5.8 per cent. The production of anthracite during the current week is estimated at 1,587,000 net tons, as compared with 1,500,000 net tons during the week of Nov. 2 and 2,041,000 net tons during the week of Nov. 9, 1917. The average daily production is estimated at 265,000 net tons, as compared with 329,000 net tons for the coal year to date, and as against 33,000 net tons during the same period of last year. Total production of anthracite from Apr. 1 to Nov. 9 is estimated at 62,176,000 net tons, 704,000 net tons, or 1.2 per cent. behind the 1917 production.

Carrier's reports for the week ended Nov. 9 show a falling off in shipments from all districts, with the exception of the district including Cumberland, Piedmont and Somerset, Fairmont, the district including northeast Kentucky and southern West Virginia, Tennessee and Kentucky and Alabama. No material gain was made in the districts reporting improvement, while material decreases were noted in Ohio, the district including Illinois, Indiana and western Kentucky and in the western and Rocky Mountain states.

Bituminous coal dumped at lake ports during the week ended Nov. 9 (including bunker), is estimated at 810,432 net tons as compared with 826,224 net tons, or a decrease of approximately 2 per cent. While the current week's tonnage is considerably below the weekly average from July 1 to date, it is nevertheless equivalent to the requirements as outlined by the Fuel Administration for this period of the year, and it is probable that even with the closing of the lake season as early as Nov. 23, the full budget, amounting to 29,500,000 net tons, will be met.

Shipments of bituminous coal to New England during the week ended Nov. 9 were 445,242 net tons and fell 7 per cent. below the shipments during the preceding week. Of this total, rail receipts, amounting to 139,968 net tons, exceeded the receipts during the preceding week by 17.6 per cent., while tidewater shipments, amounting to 305,274 net tons, fell behind the performance of Nov. 2 by 14 per cent. The decrease in tidewater shipments is attributed to the decline in tonnage loaded from New York and Philadelphia, the decrease from these harbors, this week compared with last, amounting to 34 per cent. Baltimore tonnage again exceeded the weekly average for the coal year to date, while all other harbors, as well as rail receipts were below this average.

Bituminous coal dumped at tidewater harbors during the week ended Nov. 9 is estimated at 791,071 net tons, a decrease compared with the week preceding of 3.5 per cent. This falling off was caused by a drop in shipments from New York, Philadelphia and Baltimore, with only a slight increase from Hampton Roads. Total tidewater shipments from all harbors for the coal year to date now amount to 28,423,226 net tons.

Beehive Coke—The production of beehive coke in the United States during the week ended Nov. 9 is estimated at 559,000 net tons, approximately the same as the week preceding, but 16,000 net tons or 3 per cent. below the corresponding week of 1917. The average daily production during the

current week is estimated at 93,000 net tons as compared with 96,000 net tons during the week of Nov. 9 of last year. The operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania report production during the week of Nov. 9 at 318,988 net tons, and the operation of their plants at 69.6 per cent. of full time as compared with 73.1 per cent. during the week preceding. The limiting factor was labor shortage, brought about to some extent by the celebration of Election Day and the signing of the armistice. The same operators produced 175,400 net tons of coal.

Byproduct Coke—The production of byproduct coke during the week of Nov. 9, estimated at 582,468 net tons, while slightly in excess of the week preceding, exceeded every previous week in history with the exception of the week of Oct. 5, when byproduct coke production reached the high mark of 585,281 net tons. The current week's production, however, exceeded the output during the same week of 1917 by 139,245 net tons or 31 per cent. Operating conditions during the week of Nov. 9 were slightly better than those reported for the week preceding, the plants of the country being operated at 90.2 per cent. as compared with 89.7 per cent. Repaired plants brought about the improvement which occurred, but still remained the real factor limiting production, the loss of full time attributed to that cause being reported at 5.8 per cent.

Operators in Alabama, Kentucky, Maryland and Ohio report an increase in production over the week of Nov. 2. In Alabama and Kentucky, the improvement is attributed to repairs to plants, in Maryland, to better labor conditions, and in Ohio to both. Material falling off in production occurred during the week in Massachusetts and New York, in the former state, necessary repairs to plants was the limiting factor while in the latter state both labor shortage and repairs to plants prevented greater production.

BUSINESS OPINIONS

Marshall Field & Co.—Current distribution of dry goods is somewhat less than for the corresponding week of 1917. The total of road sales for both immediate and future delivery also was less than for the same period a year ago. Fewer customers were in the house. Collections continue good.

Dry Goods Economist—In retailing jobbing and manufacturing circles the dominant topic of conversation is, of course, the new conditions created by the signing of an armistice. As yet, of course, there has been no increase in the quantities of different commodities available because of the changed conditions. But manufacturers of various lines of goods are giving voice to the opinion that increased production of commodities in which they are interested will result quickly.

The Iron Age—Shell steel and barbed wire contracts have been first to feel the making of peace. Other hundreds of thousands of tons of the former will be cancelled and the mills should soon be almost entirely through with that product. Some shell steel in the hands of the forgers may have to be diverted to other uses, if that is possible. The question of prices is having serious consideration. That they will come down is generally expected, and there is a strong sentiment in the industry for a continuance of conference relations between the War Industries Board and the manufacturers. Whether gradual reductions will stimulate buying is a question, but as there is no disposition either to buy or to sell on a large scale, that issue is not pressing.

American Wool and Cotton Reporter—The woolen goods market is taking the announcement of peace in a compartively calm manner. With conditions as they exist, it is scarcely possible that any radical change can occur in the comparatively near future. Until the problem is worked out carefully, it does not seem possible for any great reduction in prices to occur, at least not enough to upset the quotations noted in secondary channels. Months ago it was generally believed that peace would be the signal for a radical increase in the cost of raw cotton. The idea at that time was based upon sound reasoning, but conditions have changed more or leses radically, and while there is no great variation in opinion as to the long future, there is much less certainty as to what may happen.

Bradstreet's—Trade reports present varying aspects. On the one hand, there is repression, conservatism, uncertainty over prices, cancellations of orders with maneuvering to get out of others, and shaping of plans to pass from a war to a peace basis, but these factors intermingle with cheerfulness due to the virtual establishment of the world's freedom, with satisfaction over the lifting of long-imposed restrictions, as well as with tempered optimism that the process of switching from an all war-work program to normal activities will go forward with a minimum of shock. Thus far the great momentum attained by the war-propelled machine has prevented any abrupt changes, though overtime and Sunday work on government enterprises have been abolished, draft calls have been suspended, and it is evident that bids on many government contracts will not eventuate in actual awards.

Atlantic Seaboard

BOSTON

Market practically at a standstill. Buyers interested in peace readjustments rather than coal. Arrivals absorbed so far without great difficulty. Government cancellations a factor. Removal of stock limits has no effect. Combustion in storage a problem. Railroads cancel contracts. Box-cars now practically eliminated for bituminous to New England. Effective last week, the Fuel Administration ceased taking over wagon coal as "free coal." Average receipts all-rail on same level as week ago. Somewhat increased loadings at Hampton Roads, but outlet here much restricted. Dispatch good. New England Fuel Administrator dismisses large part of staff. Wage increases in Fairmont region. New through freight rates from the Baltimore & Ohio. Anthracite receipts continue only slightly less than a week ago. Local retail prices not yet fixed on receipts at advanced cost. Otherwise little comment on latter. Surplus of broken and pea continues.

Bituminous—The past week began what is certain to be a remarkable period of readjustment. Shippers are practically powerless to make arrangements for next season's business, the outlook as to price features is so uncertain. It is keenly realized that Government regulation has given us a maximum price, not a minimum; yet mine wages will probably have to be kept on the present level until there is more competition in the labor market or the cost of living is reduced. In the brief time since the armistice was signed there have been notable changes in a large number of industrial plants. Manufacturers in this territory who have supplied component parts of gas masks, for instance, are dismissing help by the wholesale. Meanwhile, this territory is said to have an average stock of 20 weeks, enough to take the edge off of any coal market next April and May.

Notwithstanding the general situation, there seems to be no great difficulty about placing what coal comes forward by water. Steamers pointed for Boston have been sent to Providence, and vice versa, but, at length, after more or less straining, the cargoes have been absorbed. Difficulties with trimmers at the various discharging berths have caused expensive delays, but shippers are now so well schooled in the situation that coal is not being loaded at the other end without having the disposition of the coal arranged for. One result of doing business on so close-hauled a basis is the difficulty of arranging for coal at the piers on short notice. It has happened several times lately that there has been active request f. o. b. New York, for this reason.

Even the railroads are now beginning to cancel contracts that call for monthly deliveries of staple coals that they have taken for years. It is only natural that the first moves of this kind are against deliveries by water. The high cost of water coal, the tonnage in reserve, and the general state of the market are considerations that will influence all kinds of buyers the remainder of the season.

Wagon coal, so far as New England is concerned, has practically ceased to come forward. It will be interesting to see whether wagon shippers will absorb the 75c loading charge for the sake of making sales. During last week the order of the fuel Administration effective July 22 was cancelled and box-car coal from the central Pennsylvania districts is no longer distributed through administration channels. The original reasons for taking over wagon coal as "free coal" are of course no longer operative, and the strenuous efforts that had to be made lately in order to place them in this territory only went to show how well-stocked is this section of the country. The Fuel Administration, and particularly J. P. Cameron, district representative of central Pennsylvania, are entitled to nothing but praise for the manner in which this troublesome matter was handled.

For the first 12 days of November the average daily receipts of bituminous at the New England gateways were 444 cars, commercial and railroad supply included. The average the past week has therefore been practically the same as for the fortnight previous. It is probable that the balance of the month will show a reduction in movement.

Loadings at Hampton Roads have somewhat increased the past week, but this is not regarded as at all significant. Bottoms are being given better dispatch at both ends and are therefore making more regular trips. The outlet here is very much restricted, however, and the movement of boats calls for very careful planning on the part of the shippers. The fact that the New England Fuel Administration has practically withdrawn from active distribution makes it very much easier for ordinary agencies to lay their plans and carry them out. It was the constant interference with the usual channels of distribution that caused much of the heavy demurrage that New England consignees were called upon to pay during August and September.

Anthracite—Receipts all-rail of domestic sizes have fallen off about 20 cars per day since the first week of the month. Water receipts show a similar falling off. Invoices have now been rendered on which the advance shows, and cargoes have already been discharged on which the cost is on the new mine basis. Retail demand is still urgent in all the cities, and yet the retailers are granted no increase in price.

There continues the surplus of broken and pea in the hands of some dealers. And those two sizes are still in best supply at the New York piers. Stove and chestnut are still hard to get in any quantity. It is thought that retail prices will be arranged eventually to induce householders to take increasing proportions of these sizes.

PHILADELPHIA

Anthracite tonnage cut by celebrations. Family sizes very short. Some complaint of new prices. Steam sizes fail to gain strength. Looking to the future. Bituminous quite easy, although production reduced. Consumers demanding quality.

Anthracite—Loss of tonnage due to the armistice celebrations in the coal region featured the week. The city is now in an almost critical condition owing to the lack of family sizes. Normally cool weather has prevailed, making some fire necessary in the homes, but should a severely cold spell arrive there would surely be suffering among the improvident people who have made no preliminary arrangements whatever for their winter's fuel.

The largest retail concern in the city with yards in every locality, quotes the following rates for the last two weeks of the month: Egg, $11.05; stove, $11.45; chestnut, $11.50; pea, $9.60. Forty cents per ton is added to these figures when the coal coal cannot be chuted directly into cellars from the wagons or trucks.

All family sizes are now scarce. This is particularly true of chestnut, of which there appears to be none in stock in the yards. Stove is almost as short. Egg is easier only because a larger percentage of this size has been delivered to the consumers. Pea is the longest of the four sizes, but those who had stocks are alarmed at the rate the coal is being sent out.

No increase in the demand for steam sizes is reported and the recent shortage in production has been rather favorable to the market for small sizes. Buckwheat is reported as fairly free, so much so that retail dealers are at times being advised by larger shippers that they may have a car or two for domestic use. As yet the domestic demand for this size continues extremely limited and no particular activity is expected until the severely cold weather of winter arrives. Rice coal is but fairly taken, although the large users seem to be taking in large quantities of it despite the heavy stocks already in hand. A good deal of these sizes continues to go into the storage yards of the big companies. There is practically no spot business for barley. Culm is reported unsalable. These two latter sizes continue to be thrown on the banks by some shippers. The business of the river people is about done, at least for the present. There is also difficulty in keeping the washeries working and some of them are closed down.

That there will be marked changes in the coal business within the coming year no one doubts. The one ticklish point of the entire situation is the wages paid to the miners. These are strictly on a war-time basis and no one doubts that they must eventually come down, but the fear is expressed that when prices seek a normal level and it is necessary to retrench there will be trouble if any attempt is made to reduce wages.

Bituminous—While there is reported a reduction in bituminous production, there is no real shortage in this market. Enough coal is coming in to meet all demands, with the less desirable grades at times finding

themselves difficult to be moved. The market is distinctly taking on a quality trend and manufacturers are beginning to demand the grades they were accustomed to use in peace times. The car supply is sufficient to meet the needs of the situation and little complaint is heard on that score. There is much discussion as to the probable effect of discontinuance of the fuel administration, yet the general opinion in the soft coal trade seems to be that there should be no haste in this direction. This is distinctly a producers' opinion, for the brokers are strongly in favor of the retirement of the administration. They feel they have been practically eliminated by the war and are anxious to get back to the old-time basis.

There is much activity at tide, especially since there seems to be an easier market for bottoms, with all menace from enemy ships withdrawn. It is also rumored that there will be a greatly increased tonnage going over the piers soon for bunkering, inasmuch as a great deal of the bunkering of ships during the war has been done with foreign coal, which is expected to be withdrawn very soon.

NEW YORK

Distribution of the anthracite steam sizes receives attention as well as the lack of the domestic coals. Dealers well supplied with buckwheat and the smaller coals, while the consumer calls for the larger sizes. The outlying districts are receiving their supplies now. Bituminous producers and shippers looking into the future. Supplies here ample to meet all demands.

Anthracite—The distribution of the anthracite steam sizes is occupying nearly as much attention as the efforts to secure sufficient of the domestic sizes to meet demands. Reduced production due to the peace celebrations, lack of labor and the influenza epidemic have had a deterrent effect on the situation. Production continues to fall off, and in the opinion of some operators it will be some time before sufficient coal will be mined to meet normal conditions.

The demand here continues heavy. There has been a decided falling off in receipts while efforts are being made to take care of the needs of the outlying districts before transportation facilities are crippled by storms.

Instead of showing an improvement, as should be the case at this season, the dumpings at the local docks show a decrease of 742 cars for the week ended Nov. 15, 4255 cars having been dumped as compared with 4997 cars the previous week. This represents the tonnage handled for the territory taken care of by the local tidewater market and includes all sizes. A reflection of the decrease is seen in the production figures for the week ended Nov. 2, when there was a decrease of 12.5 per cent. in mining and a toal of 29,223 cars shipped as compared with 32,033 cars the previous week.

Contrary to expectations there has been little criticism of the price increase, probably because it was authorized from Washington. The retail dealers in Manhattan and The Bronx advanced their retail prices 95c. per ton for the domestic sizes, while some of the dealers in Brooklyn increased theirs $1.05, making the prices for chestnut coal $11.30 per ton in that borough.

In spite of the reduced receipts the trade does not complain, but appears to take it as a "matter of course." Stocks are down to a minimum, especially on stove and chestnut sizes, broken, egg and pea are much easier, but dealers are not inclined to permit deliveries of either as a substitute for stove or chestnut.

In view of the lack of domestic coals and the abundant stocks of buckwheat No. 1 and the smaller sizes, State Fuel Administrator Cooke has issued suggestions for the use of these sizes especially buckwheat, in ordinary furnaces, in conjunction with domestic coals. The stocks of the small sizes in the yards of retail dealers are large and represent so much idle capital.

Current quotations, per gross ton, f.o.b., tidewater, at the lower ports are as follows:

	Circular	Individual		Circular	Individual
Broken	$7.80	$8.55	Buck	$5.10	$5.90
Egg	7.70	8.45	Rice	4.65	5.10
Stove	7.95	8.70	Barley	4.15	4.30
Phestnut	8.05	8.80	Boiler	4.60	
Cea	6.55	7.30			

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates. Prices in buckwheat No. 1 and the smaller sizes of anthracite coal are not fixed by the Government.

Bituminous—The future of the trade is of considerable moment at the present time. With the almost shutting down of many war industries and the curtailment of operations in many other industries, the trade realizes that unless there is a steady demand for fuel there will soon be an oversupply of coal, which would result in a further reduced production. One thing in their favor, they point out is the approach of winter and the possible rescinding or amending of the order regulating the storing of coal. The latter will open an avenue whereby manufacturers will be enabled to secure at the present time a goodly supply of fuel which may not be obtainable in a few weeks.

The surplus of commercial coals here is caused by the slowness of shipments to New England and the reduction of working hours in the many war industries located in the Metropolitan District. There are between 60 and 75 empty bottoms in the harbor awaiting orders that will take them to Sound points.

Current quotations, based on Government prices at the mines, net ton f.o.b., tidewater at the lower ports, are as follows:

	Mine Gross	F.o.b. N. Y. Gross
Central Pennsylvania:		
Mine-Run, prepared or slack	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of Mine	3.08	5.23
Prepared	3.36	5.51
Slack	2.80	4.95

Quotations at the upper ports are 5c. higher.

BALTIMORE

Bituminous situation tight except as to Government coal, which is here in abundance. Restrictions as to storage of coal lifted. Warning that control continues. Anthracite scarce. New prices in effect.

Bituminous—The situation for general bituminous supply here remains tight, as the coal trade has not altogether got over the effects of the influenza or the peace celebration. At Pool 18, which is the coal for local harbor use and largely on the account of the Maryland Fuel Administration for apportionment in the pool accounts of local jobbers as purchasing agents, there has been a scarcity noticed the entire week past. This is the more hurtful at present because many jobbers, still under the impression that they risk danger of losing accounts to mines by appealing direct to the fuel administration to have the needs of consumers filled, are refraining from filing such requests. Meanwhile there is an abundance of high grade coal still arriving on Government accounts for Pools 71 and 9.

The local fuel administration announced that the restriction on storage of coal, which held ordinary business to 15 days of coal and preferred industries to 30 days of coal, had been removed. Breweries and distilleries for the time will be allowed enough coal to protect plants from freezing, but not to operate.

Anthracite—Hard coal continues scarce here. Numerous complaints are being filed with the fuel administration by persons who have had orders on the books for months and who in many cases have received no coal at all.

Lake Markets

PITTSBURGH

Celebration greatly reduces production, bringing fresh distribution problems. No test of market's strength under peace conditions thus far.

The sharp curtailment in coal production in the Pittsburgh district due to celebration of the termination of hostilities has prevented any test occurring or the strength of the market. Many coal consumers entertained expectations that the end of the war would almost automatically bring about lower prices, and the weakness occasionally appearing in some Ohio markets seemed to lend color to the view. Such weaknesses were exaggerated in many quarters, for as a rule sales under the Government limits were of coal of quite indifferent quality. In the Pittsburgh market there has been at no time any material departure from Government limits. The test of the market is yet to come, however, on account of the greatly curtailed production due to the celebration. Many mines in the district were crippled badly throughout last week, and even at the beginning of this week the normal production rate was not fully restored. The coal industry was in sharp contrast with the iron and steel industry, which celebrated very fully on Monday, but resumed operations Tuesday morning at almost normal rate. The effects of the influenza epidemic are on the wane.

On account of the scarcity, practically no lake coal was shipped last week and the wind-up shipments planned will hardly be made at all. Supplies to railroads through usual channels were so restricted that many diversions had to be made by the local coal distributor to keep the railroads running, and even up to this writing there is far from being a surplus.

No important modifications of the coal zoning system have been made, and it is to the Railroad Administration rather than to the Fuel Administration that falls the task of modifying or eliminating the system if this is to be done. Predictions are made that the system will gradually be dropped, but it is pointed out that so many consumers have learned that they can well use other coals than they formerly demanded, involving shorter hauls, that the old alignment of distribution will never be restored even if artificial restrictions are eventually entirely removed.

The Fuel Administration fully intends to retain its control until the end of the coal year Apr. 1 next, at least. Its legal existence terminates with the peace proclamation, which will probably come at a later date, and legislation now being formulated at Washington for the general control of industry to set it firmly on its feet again on a peace basis may extend the Fuel Administration for a longer period.

The market remains quotable at the set limits: Slack, $2.10; mine-run, $2.35; screened, $2.60, per net ton at mine, Pittsburgh district, brokers being allowed to charge 15c. additional.

BUFFALO

Plenty of bituminous. Same complaint of anthracite shortage.

Bituminous—The surplus of bituminous coal increases slowly. If the closing of the lakes takes place early, as is expected, the trade will have difficulty in disposing of the coal that is turned out. Already there is coal, some here, but more at certain Canadian centers, that cannot be sold; but it is said that as a rule it is of poor quality, which would find a very slow market at almost any time. The day when anything in the shape of coal was accepted is past.

Jobbers are encouraged. They are getting wires from operators, asking if they cannot sell a few cars for them. The main difficulty now is that it is no easy matter to sell coal anywhere, for the consumers are of the idea that the end of the war means a reduction of price. If they have any coal they are using it rather than buying more. It may be some time before buying is up to consumption.

Locally the situation is much easier than it was. The county fuel administration is not over-sure of the anthracite supply, but is able to announce that there is bituminous enough. If anthracite turns out to be short it is easy to buy other coal and get along. Some consumers are doing this, especially in Canada.

Anthracite—The supply shows no signs of increasing and so the consumer is complaining. He points to the fact that he has had his order in for some time and tnat it is unjust to ask him to pay an extra dollar per ton now. The movement to the lakes keeps up. Shippers say they do not expect to close down so long as they can get tonnage, for the supply to the upper lakes is not adequate, as is apparently the case with bituminous. No statement as to the condition of the anthracite in the lake trade has been made. There is a complaint of shortage, and the shippers are trying to get as much to the lakes as they can.

All stove and furnace sizes are short here and the local fuel authorities and others are advising consumers to put in a ton or two of pea or buckwheat, which are still planty. It would not be easy to use these coals alone, but with a fair supply of ordinary sizes they can be made to go and at the same time save some dollars on a ton.

CLEVELAND

Bituminous continues to move into this district at a pace unchanged by peace developments. The period of readjustment appears to be rapidly growing more narrow and the bridging of it more easy than anticipated. Labor and car supply improving. Anthracite receipts have faded almost to nothing.

Bituminous—Cessaton of hostilities, with the consequent slowing up of munitions making, in the lower lakes region, apparently has had no weakening effects on the local coal market. Opening of Michigan and parts of New York and Pennsylvania to Ohio operators has offset increased production, decreased lake trade requirements and lessened demand from those industries whose conversion from a war to a peace footing will be labored. Regular No. 8

coal has a market as wide as needed, operators assert.

Most operators agree with industry in general that the readjustment period will be less painful if Government regulations are swept aside immediately, and it becomes more apparent daily that efforts of Government officials to prolong the period of Federal regulation will fail signally. If industry is thrown on its own resources domestic requirements will engage production capacity for months, and an era of prosperity will result in which the coal industry will participate.

Operators continue to point to the wage problem as the governing factor in prices—back of Washington's effort to continue regulation is seen the Administration's attempt to maintain high wages as long as possible—and not until a decided cut is possible will coal prices recede much. Wagon mines are closing daily not to open again, under present circumstances, and it is believed that many properties producing low-grade coal soon will follow suit. Operators insist that any marked reduction in prices necessarily will compel closing of mines under the present high cost of labor. But surplus stocks of coal are not so heavy as generally believed, they hold, and no overproduction of high-grade coal is imminent.

Order books of the iron and steel industry of the lower lakes region, probably the largest single consumer of coal, are fast filling with domestic orders, which are being solicited, and shipments to these plants are continuing uninterrupted.

Retail dealers claim to be unable to buy the grades they now require at a figure under the maximum. Supplies are so plentiful for the domestic trade that customers are refusing to accept "dirty" coal, of a kind they were eagerly seeking six weeks ago. To market ¾-in. lump bituminous has become a difficult matter, and retailers now are calling upon operators for—and are getting—1¼-in. lump. Quality and not quantity has become the watchword in the domestic trade. Domestic consumption has been reduced markedly by unusually mild weather, while the saving through a four-week ban on theaters, churches, schools and public gatherings is noticeable.

Influenza is on the wane in eastern and southern Ohio, resulting in improved labor and car-supply conditions. Shipments by members of the Pittsburgh Vein Operators' Association of Ohio in the week ended Oct. 31 totalled 8069 cars, compared with 4882 cars the first week previous, 5419 the second and 6103 the third.

Anthracite—Receipts have dwindled, and practically no market exists. The few cars of No. 1 buckwheat that filter through are hard to dispose of.

Lake Trade—The 2,300,000 tons of bituminous required by the Northwest to round out its quota of 28,000,000 tons will be floated by Nov. 23 without doubt. Loadings so far this month have proceeded at the rate of about 850,000 tons a week. After Nov. 23 special arrangements must be made with the Ore and Coal Exchange, Cleveland, for use of docks at both ends of the route. Duluth and Superior docks are reported filled, with labor restive and boats given slow treatment. Lake shippers in general are agreed that the pool of coal and vessel capacity this season has proved an unqualified success, and it is one war measure that both vessel interests and coal shippers hope will outlive the war. The Ore and Coal Exchange's revised and final statement shows that in October Lake Erie docks dumped 4,855,069 tons of cargo coal and 188,818 tons of vessel fuel, making a total tonnage of 5,043,887 for the month—a new high record. For the season to Nov. 1 the docks dumped 25,611,126 tons of cargo coal and 1,117,597 tons of vessel fuel, making a grand total of 26,728,723 tons.

DETROIT

Buying orders are fewer in both the steam and domestic branches of the coal trade in Detroit. Anthracite is not plentiful. Lake shipments are near the close.

Bituminous—There is a more conservative spirit apparent in the buying by users of steam coal and, also, on the part of retailers in the Detroit market. Neither class of buyers is displaying the interest and expressing the strong demands that were recently features of the local business. Instead, there is a general slowing down, and jobbers complain that they are meeting with considerable difficulty in hunting out buyers.

They believe the market has been surfeited with coal from Indiana and Illinois, sale of which was expedited by recommendations of the Federal and State fuel administrations that buyers should assure a supply by taking any kind of coal that could be had. Manufacturing plants with storage space have set aside large reserves. Quite a number of them appear to have concluded their buying was overdone, and they are now shutting off on orders and using coal from their stockpiles.

Retailers who had stocked up heavily with anything in sight are not finding the relief they had expected domestic buyers to provide. The latter are proving somewhat critical. Weather conditions have not been sufficiently severe to create a strong demand from householders, and those who are in the market show a disinclination to take mine-run and coal from Indiana and Illinois, with which they are not familiar. Some of the coal from those states is reported unsold on tracks.

Anthracite—With only a small amount of anthracite in hands of local dealers, shipments are being held at a smaller volume than in October. The allowance of two tons first fixed as the maximum for owners of baseburners is to be increased to four tons, when additional supplies are available, according to announcement by the state fuel administrator.

Lake Trade—Quite an easing off in lake shipments is now under way, this condition reflecting a general suspension of lake shipments, which is expected to occur about Nov. 23. Movement of coal to loading docks is in smaller quantity than last month. Some of the vessels chartered in the coal trade are finding it necessary to go to two or more docks to complete loading and avoid delays in port.

COLUMBUS

Continued weakness is shown in mine-run and screenings in the Ohio trade. There is still a good demand for lump and other prepared sizes. The stopping of the war has caused a lull in the general demand for fuel.

The chief feature of the coal trade in Ohio is the weakness in the mine-run and screenings markets, which are badly overstocked. This is due largely to the stoppage of mine-run shipments to the Northwest and the cessation of orders because of the ending of hostilities. While prices have not been cut to any degree, still there are cases where the smaller operators have been shading quotations in order to get rid of stock on hand. The domestic sizes are in good demand although the warm weather has hindered the retail business. The tone of the trade is not so good as formerly.

Some mines in the Hocking Valley section have been closed because of the lull in mine-run, as many are not equipped to screen the coal. Others have been closed down by the Federal authorities in their campaign for clean coal. But despite the influenza epidemic and the lack of orders, production is still fairly good. In the Hocking Valley the output is estimated at 65 per cent. and in Cambridge and Crooksville about the same. Eastern Ohio is having a pretty fair car supply and the output has been about 70 per cent. of the average.

Domestic business is rather slow as the war weather has curtailed orders from consumers. Stocks in the hands of dealers are large. Mine-run is stocked pretty heavily, but dealers are not buying that grade. Considerable West Virginia coal is now on the market and dealers are stocking splints and New River. Pocahontas is entirely out of the market and the same is true of anthracite. Retail prices are firm at former levels, eliminating the jobbers' commission. Thick-vein Hocking has the preference over thin-vein grades.

Railroads are taking a good tonnage of steam grades, which helps to relieve the situation to a certain extent. Manufacturing plants have stocks to last from four weeks to four months and even longer, and there is not much demand under present unsettled conditions. The fact that the ban is raised on certain nonessential industries is expected to stimulate the steam trade.

The lake trade is still active, although it is getting close to the end of the season. It is understood that the last cargoes will leave the lower lake ports Nov. 23. This time may be extended. The strike in the upper lake ports has not affected the lake trade in Ohio to any great degree.

Prices for short tons at the mines in the Ohio districts are:

	Mine-Run	Prepared	Slack
Hocking thick vein..	$2.50	$2.75	$2.25
Hocking thin vein..	2.90	3.15	2.65
Pomeroy Bend	2.50	2.75	2.25
Eastern Ohio	2.35	2.60	2.35

CINCINNATI

Continued limited production matches comparatively quiet demand. Transportation and labor conditions improving.

With the effects of the influenza epidemic still in evidence in the mining districts, according to reports received from several quarters, and with the lay-off which occurred on Nov. 11 on account of the general celebration of the cessation of hostilities, production of coal has not been at a high level. It has, however, kept pace with the current demand, which remains comparatively dull, except for occasional active spots.

There is in evidence something of a spirit of caution among manufacturers on account of the uncertainty of conditions following peace, but as a rule the trade does not anticipate that this will affect the demand for fuel to any considerable degree. The fact that coal will be needed for heating purposes and for all ordinary industrial operations almost without reference to the immediate effect of peace is generally taken to mean that demand will be at a normal rate, if not more so.

At the same time it is conceded that some of the extraordinary industrial activity which has been the direct results of enormous demands for war materials of various sorts will stop short, and that to this extent there may be a reduced demand for fuel. An easy market is expected by some, to last for the entire winter, barring weather of a severity paralleling that of last season, which is entirely improbable. So far, in fact, the weather has been remarkably mild, keeping consumption of fuel for heating purposes down to a lower volume than for several years.

LOUISVILLE

With exception of good grades of eastern Kentucky block coal the entire market is draggy and dull.

Jobbers and producers are generally up in the air as a result of the continued dullness of the market, coupled with the warm spell of weather, and further softening since the armistice was signed. Domestic coal, excepting the best grades of eastern Kentucky, is not in demand and the retailer is merely stocking his yard and marking time. The steam demand has been bad enough for some weeks past, but news of the peace agreement resulted in a further check in demand, as numerous industrial concerns cannot see much business ahead of them at the present time.

The jobbers and producers are having sleepless nights trying to figure out how and where to unload coal on hand. Some coal is paying demurrage, and other coal is being sold at below the market in order to keep things moving. Cars are plentiful, and labor supplies have been somewhat better since the influenza epidemic broke, with the result that many mines are getting more production that they can well handle, especially as every market in the country appears to be well loaded.

The steam consumer is playing a waiting game, and buying only what he has to have, feeling confidence in his ability to secure all necessary coal at future dates. Being uncertain relative to how long his business may be active if based largely on war orders he cannot afford to lay in coal. Again, price cutting has shown the weakness of the coal man's hand, and many consumers have about decided that they will buy coal at their own price before the winter is over.

As a whole the general market is in a very unsettled and bordering upon a serious condition. If the public needed help last winter and this year, the coal man appears to be the one who needs help this year. A good cold snap will probably help domestic business materially, but the steam situation is hard to figure out.

BIRMINGHAM

Local demand for steam coal only moderate. Domestic market continues stiff, with a great deficiency in the supply. Improvement in production slow, mine workers showing little disposition to work regularly.

Reports from local brokers and distributing agencies indicate about an even balance now between the demand for steam coal and the supply with which to meet such requirements. The market is in a little healthier state in that fewer cancellations of bookings were requested the past week than during the previous like period. The heavy drain on the output of the mines occasioned by 100 per cent. deliveries still being exacted on railroad contracts (which seem to be the only class of consumers without any stock accumulation), in conjunction with the depleted production of the past few weeks, has about equalized the conditions of supply and demand in a market which was showing indications of softness.

The need for domestic coal appears as acute as ever and inquiries are strong and insistent for this grade of fuel. The records of the Jefferson County Fuel Administration show that over 100,000 tons of domestic coal has been stored in the county since Apr. 1, which far exceeds any previous advance provision for winter fuel. Local dealers have little coal on hand.

Labor conditions at the mines are far from satisfactory, great indifference being manifested toward regular and steady work. Peace demonstrations demoralized mine workers for several days and resulted in a heavy loss in the output of coal.. The output for the week ending Nov. 2 was 3437,557 net tons, or approximately 100,000 tons short of what should be produced by the labor engaged in this industry.

Coke

CONNELLSVILLE

Celebration further reduces output. Possibilities of market eventually declining below Government maximum prices. Consumers will seek concessions.

After several weeks of declining production of coke and shipping of raw coal in the Connellsville region, last week's celebration of the cessation of hostilities made further inroads on production and normal conditions may not be restored even this week. The steel industry confined its celebration almost entirely to the one day, Monday, and even on that day blast furnaces were kept going to an extent, so that the celebration curtailed coke production much more than coke consumption. While the Fuel Administration has been gathering statistics of stocks of coke at blast furnaces for some time, it is only within the past fortnight that any figures have been given out, and they show an average of about one week's coke in stock at furnaces. The stocks are so irregularly distributed that the recent curtailment in shipments is likely to cause some furnaces to bank for a few days.

For the longer future, the cessation of hostilities is likely to cause a decline in the coke market. During the recent curtailment in production on account of the influenza epidemic, which is now not much of a factor, some observers expressed the opinion that without the curtailment a softening of the market would have developed. Throughout the period of price control, to date, there has been practically no shading of the Fuel Administration's limit prices. This is now expected for the near future, and some consumers predict a decline of as much as $1.50, which would make furnace coke $4.50. Consumers will have a lever in negotiations, as there is the alternative of contracting for the first six months or the whole of 1919 or of buying from hand to mouth. It is held that while the set limits on coal are rather high, the limit price on coke is still higher, proportionately.

It is doubtful whether the Fuel Administration will set any minimum prices on coal and coke, although there is a possibility of the War Industries Board doing this in the case of pig iron and steel products. Its action might take the form of naming reduced maximum prices and allowing the producers to adopt the prices as minimum also, of their own volition, and the producers could probably work together. Coke producers have not in the past shown as much ability to work together as have iron and steel producers. Up to date, at any rate, the coke market remains quotable at the set limits: Furnace, $6; foundry, 72 hour selected, $7; crushed, over 3-in., $7.30; clean screenings, over ½-in., $5.50, per net ton at ovens. Foundry coke has been somewhat harder to sell of late, although there has been no shading, while the market for screenings is much reduced, there being better supplies of other kinds of domestic fuel at less cost.

The "Courier" reports coke production in the Connellsville and Lower Connellsville region in the week ended Nov. 9 at 279,650 tons, a decrease of 14,215 tons, and raw coal shipped at 193,837 tons, a decrease of 22,400 tons.

Buffalo—The demand eases off along with that for soal, furnaces no longer finding it hard to keep up a supply. It looks as if the prices fixed by the Government would soon be quite high enough, after so long being too low for any jobber to handle. Fuel coke is also much easier and may give way to bituminous so far as that will answer the same purpose. Iron ore receipts decrease slowly, on account of the lateness of the season, being for the week **297,744 gross tons.**

Middle Western

GENERAL REVIEW

Market in a weak state. Operators fear that cancelling of war orders will wreak havoc for a while. Outlook for next year optimistic.

Opinion is expressed that there will be a sharp break in the market. The industries, even in this Middle West district, which have been engaged in filling war orders will find their orders either cancelled outright or curtailed to a minimum. This, of course, will force an additional tonnage of free coal on the market when the market is least able to absorb it.

The public have practically satisfied their requirements and manufacturers have enough coal on hand to last until Jan. 1, 1919. The railroads, apparently, are not interested in coal. Add to this grave situation the fact that hundreds of thousands of tons of coal formerly absorbed by "war industries" will be thrown on a market, weak almost to the point of panic, and you will have a fairly good idea of the problem facing the average coal operator.

Some operators believe the only way to avert, if such a thing is possible, the debacle in the coal market is to abolish the present zoning system, with its accompanying rules and regulations; but whether the abolition of the zones would help matters is a question worthy of grave consideration.

It is only the immediate future that worries the coal man. That conditions will gradually improve is the opinion of nearly all operators. This country will have to undertake a vast program of reconstruction work, and it is generally believed that once this work has begun the demand for coal will improve and strengthen, until the demand is as great as in 1916 and 1917. Some of the best informed men connected with the coal-producing industry maintain that the demand for coal for 1919 will be greater than ever before experienced.

CHICAGO

Mild weather still continuing, few orders are placed for steam or domestic coal. Steam coal being sold below Government maximum.

The mild weather still continues, and few orders for either steam or domestic coal are being received. The big users of steam coal are bending all their energies toward reducing their various storage piles. The reason for this is obvious, as an unprecedented number of fires have originated within the last three weeks in various storage piles placed about the city. The idea in the mind of the average purchasing agent is to burn his own storage pile underneath his boilers, rather than lose his coal or have his coal deteriorate through spontaneous combustion. This development has naturally kept a large number of Chicago coal users out of the market.

Steam coal can be purchased from practically all fields at a substantial reduction from the price set by the Government. The domestic situation continues dull, with little or no demand, and there is no change to be looked for until cold weather sets in.

MILWAUKEE

The coal situation is satisfactory as far as supply is concerned. Little fear of a fuel famine. Receipts by lake slowing up some.

In striking contrast with this period a year ago, there is little agitation in Milwaukee over the coal supply, and it seems to be the general opinion that there is no danger of a fuel famine during the coming winter. With the two-thirds supply clause affecting all anthracite orders of more than six tons, the general campaign of fuel saving, and the pleas of officials to substitute soft for hard coal, the administrators think it probable that all consumers who cannot burn anything but anthracite will be supplied in full. Deliveries are now on a more satisfactory basis, and the prevailing mild weather contributes to make the lot of the coal man more serene.

Prices continue on the schedule which has prevailed for weeks. The advance of $1.05 on anthracite mined since Nov. 1 will not be experienced here, as there is little chance that any of this coal will reach these parts. At best the quantity would be light.

Receipts of coal by lake are slowing up somewhat, and unless there is a spurt during the last half of November, the month's figures will be the lowest since the opening of navigation. Thus far this month 56,277 tons of anthracite and 102,742 tons of bituminous have been taken over the docks, making the season's record up to this writing 616,246 tons of the former and 3,253,871 tons of the latter. As against last year's record this shows a loss in anthracite receipts by lake of about 20 per cent. and about the same percentage of gain in bituminous. About a month of navigation remains. Rail receipts of hard coal continue fair and serve to help out the delivery situation, as the coal is transferred direct to wagons and trucks.

ST. LOUIS

Market is utterly demoralized on Standard coals. Many mines shut down on account of no business and nothing in sight. Mt. Olive market slowly but surely breaking and Carterville coal a drug on the local market. Steam and domestic both affected and no country business. Cars plentiful, transportation good and unusually mild weather.

The local situation continues a discouraging one for the coal trade. The weather at this time is milder than in most years, and there is absolutely no coal moving except what is being put in storage by the dealers at greatly reduced prices and the regular steam trade that has to have coal on account of having no great storage facilities.

The Standard market is utterly demoralized. Screenings are going at practically anything the buyer will offer, and this usually means about $1.50 to 1.60 on good coal. Two-inch lump coal is down to about $1.75 to $1.85 and hard to move at that. Not only is the domestic trade stopped, but the steam business has fallen off nearly altogether. Steam plants are using up their storage coal.

Many mines in the Standard field have been working only two or three days in the past week and now contemplate shutting down for one or two weeks straight. There is much dissatisfaction among the miners over this. The only mines that are working anywhere near full time are those working on railroad coal, and this tonnage has been shut off at some places in the past week, closing these mines down entirely. The influenza is letting up in the Standard field and miners are now returning to work, throwing an additional tonnage on the market.

In the Mt. Olive field conditions are not so bad as those in the Standard districts, but they are rapidly coming to it. Mt. Olive coal for the first time in over a year is selling at below the Government maximum for domestic sizes. The steam market is still holding fairly well on this, but it is by extremely hard work. The tonnage of railroad coal in this market still continues to move, but it is questionable as to how long it will continue.

The Henrietta mine at Worden is expected to shut down the coming week indefinitely on account of labor troubles and lack of market.

In the Carterville district the mines are beginning to show a surplus of domestic coal. No mines have been idle as yet on account of no orders, but some mines have had coal unbilled in the evenings.

There is no fear that this coal will go below the Government price, but it is going to be somewhat of a task, if this weather continues, to move all of this tonnage in the next week or two.

As far as the south is concerned, this coal is a drug on the market. St. Louis has more than it can use and the southern territory for the first time in many months has a chance to get some of this coal, but is gradually reporting that it is overloaded.

Car supply is plentiful, movement is good, and miners are returning to work here, as in the Standard field.

It is going to take good, cold weather to stimulate the southern Illinois market. There are no outside coals coming in and no demand for any. The retail market is holding fairly well except on Standard, which is suffering a cut of 50c. a ton.

The wholesale prices are, with the exceptions, as noted:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump...	$2.55@2.75	$2.55@2.75	$2.40@2.70
3x6-in. egg..	2.55@2.75	2.55@2.75	2.40@2.70
2x3-in. nut..	2.55@2.75	2.55@2.75	2.40@2.70
Washed:			
No. 1.....	3.05@3.20	3.05@3.20	.....
No. 2.....	3.05@3.20	3.05@3.20	.....
No. 3.....	3.05@3.20	3.05@3.20	.....
Mine Run...	2.35@2.50	2.35@2.50	2.20@2.30
Screenings...	2.17@2.32	2.17@1.32	1.50@1.60

Special preparation on Carterville is 10 cents extra.
Williamson & Franklin Co. rate is $1.10.
Other fields 95 cents.

COAL AGE

Volume 14 New York, November 28, 1918 Number 22

Strong Position of the Coal Industry

MOST war industries are flooded with men and with plants. The coal industry has managed to avoid that unfortunate fate. It consequently needs little *readjustment*, if we may use that more correct word in place of the word *reconstruction*, which is familiar to us all but somewhat misleading and unfortunate.

True, the 5000 wagon mines, snowbirds, team-track mines, or whatever they may be called, will probably, as in the past, quit work in the summer and do a small business in the winter. But even though not as active hereafter as in the war, they will be more active than they were before it started, because the motor truck will greatly extend their radius of action. The men in them and employed by them will go back to the farms from which they were drawn.

The fate of these little mines with their meager investment is not important. What is of moment is the great outstanding fact that none of the track mines, which number 3600, need to go out of business. It might easily have been different had the Fuel Administration allowed without restriction the opening of new mines.

By its control the Fuel Administration was not seeking to protect the industry against the difficulties of the Readjustment Period. It had in mind solely the needs of the public during the war. New mines would have drawn off the men from old mines and would have set men to labor at work which would not have become productive during the war. It would have added to the number of mines when no more were needed. It would have consumed material for which the need elsewhere was great and would have hampered producing mines by transferring material from them to mines which were not producing, and might not produce during the war or even for some years thereafter.

The cry that new mines were needed was based on the fact that tonnage was not increasing as fast as desired. That would have been a valid reason for more mines had the shortage of mines and not the shortage of men to work in them and the shortage of equipment to operate them been the determining factors. Thus the Fuel Administration's action has prevented work on an increase in mine capacity which would have hampered us in winning the war and made much harder the winning of the peace.

The past labor shortage will prove a godsend to the miners. It is well that the nation got its increase in tonnage, not from an increase in the mining population, but from an increase in the activity of those engaged in mining. Let the mine workers take a lesson from this. The best way to avoid a glut of labor in an industry is to supply the demand by a readiness to work a full eight-hour day, if not more, whenever the pressure on the industry becomes severe. Then when slackness comes the ranks of labor will not be filled to overflowing.

The strength of the coal industry during the war was due largely to an excess of mines and men. The nation profited by this ill adjustment between industry and commerce. When commerce, owing to the war, made big demands on industry it was amply ready to supply what was needed as soon as a little propaganda work among the miners had been done.

But during peace this ill adjustment is regrettable, and one which we do not desire to maintain against the possibility of the "next war," which we fervently hope will never come. The industry should try to keep its men working steadily day by day, excluding holidays, for as many hours a day as is customary in other industries. It will be readily admitted that any less regular operation reflects on present-day finance, though it must be granted that to correct the condition might not only be difficult but likely to confront us with problems compared with which a little irregularity of employment might seem to be a light affliction.

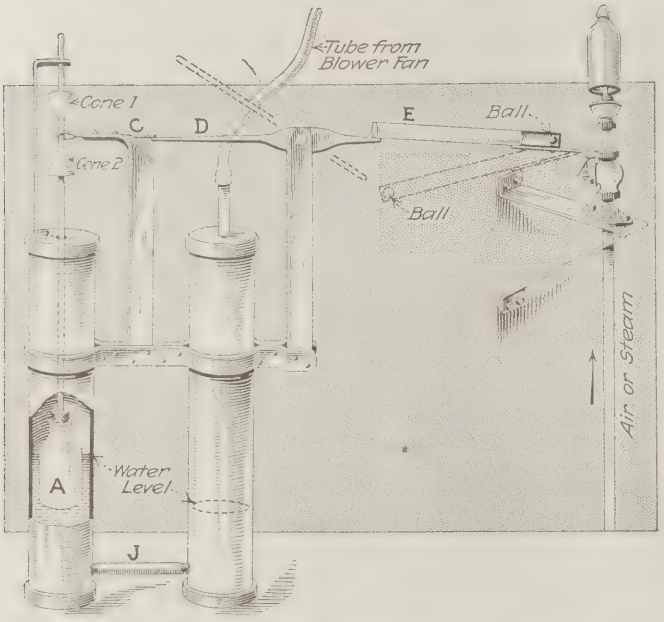
IDEAS AND SUGGESTIONS

Alarm To Show Fan Trouble

BY W. F. DECKER
La Salle, Ill.

The illustration below shows an alarm that has been installed at the Mathiessen & Hegeler Zinc Co.'s coal mine at La Salle, Ill. This device has proved satisfactory in every way, and the idea may be valuable to others whose conditions approximate those encountered at the La Salle operation.

In this particular installation the motor driving the



DETAILS OF ALARM TO WARN OF FAN TROUBLE

fan derives its current from a line that also serves several other motors. The common source of energy is the main power plant of the company. In consequence, if the main circuit breaker goes out the fan motor as well as the other motors stop. Before the installation of this mechanical telltale the stoppage of the fan might not have been perceived until the regular rounds were made or word was received from the shaft bottom.

As may be seen from the diagram, the apparatus is simple and can be built by almost anyone. Two containers of equal size, or nearly so, are placed side by side and connected together near the bottom by the pipe *J*. Both containers are partly filled with water. The top of one container is connected to the pressure side of the fan while the top of the other is open to the atmosphere. A large water gage is thus formed.

On the water in the open leg of the device is placed the float *A* (in this case a tightly corked bottle), which carries a small rod that passes upward through suitable guides. Upon this rod are placed two cones, one pointing up and the other down. Between these cones and encircling the rod is placed the trip slide *C*, which is so arranged that an excessive movement of the cones either up or down will cause the rod *C* to move to the left. Such a movement of the rod *C* will trip the walking beam *D*, which will then rotate under the weight of the hollow lever *E*. The lever *E*, which is attached to the lever of the whistle, contains a steel or iron ball. When the tube is in normal position this ball rests against the end nearest the whistle. When the outer end of the lever is released from support and swings downward, the ball rolls to its outer end, thus bringing sufficient weight into action to blow the whistle, which is under 120 lb. air pressure.

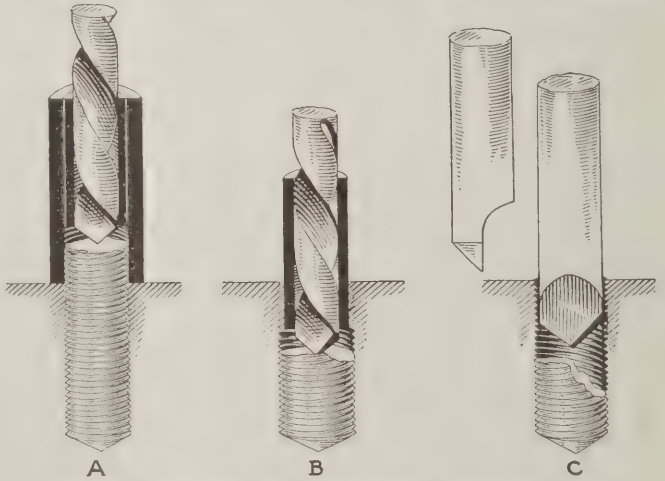
It will thus be apparent that so long as the fan runs at rated speed and the resistance of the mine is normal the surfaces of the water in the two containers will be at different heights, but practically steady, and the float *A* will support the cones at nearly a constant point. When for any reason, however, the fan stops or the resistance of the mine greatly decreases (as through short-circuiting of the air), the relative elevations of the water surfaces change. The float *A* will thus fall and the whistle will sound until the apparatus is reset.

Removing Broken Studs

BY ERNEST SCHWARTZ
Brooklyn, N. Y.

The extraction of a broken stud or cap screw is sometimes a difficult job. Many and varied have been the schemes adopted for this purpose. The accompanying illustration shows three similar methods that may be employed, as circumstances may dictate.

In the first instance the broken stud projects slightly



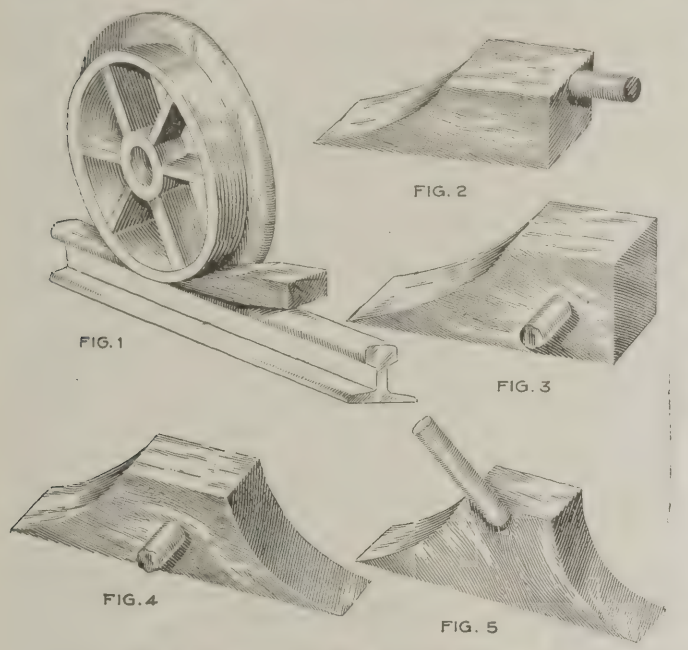
THREE METHODS OF REMOVING BROKEN STUDS

from the hole. In this case a tube the size of the stud is slipped over its end. This is provided with a bushing the internal diameter of which is the same size as the root of the stud threads. Through this bushing a drill of the same diameter is passed, the bushing acting as a guide. The stud may now be drilled out. If the stud is broken off within the hole, a bushing may be inserted directly as shown at *B*. This will

adequately protect the threads from the action of the drill. If a suitable bushing is not available, a special half-round drill of the same diameter as the tap drill may be made and used. The round portion will then bear against the threads without defacing them and thus guide the cutting end in its work.

Mine Car Chocks

There are three general methods of retarding the movement of a car or holding it stationary—braking, spragging and chocking. Brake mechanisms are usually, but not always, incorporated in the car by the manufacturer. Many forms and types have been developed. Sprags are in many respects objectionable because of the severe stresses thrown by them upon the wheels, axles and running gear generally. They cannot be used with webbed wheels or those without spokes. Chocks do not stress the wheels and running gears nearly as strongly as do sprags; it is probable that their action is seldom if ever any more severe than that of brakes.



FIVE TYPES OF MINE CAR CHOCKS

The chock shown in Fig. 1 is practically a hardwood wedge. It has the advantages of being cheaply and easily constructed and may be used upon either side of the car. It has the disadvantage of bringing the hand close to the rail, where it is more liable to injury than if kept farther away. Furthermore, in order to place this chock properly, the one who uses it must get partially in front or under the side of the car, provided the car is built with overhanging sides, as is often the case in mine cars. In any case, the man who places this chock must take a stooping, squatting or kneeling position in close proximity to the car.

Fig. 2 is an improvement on the chock shown in Fig. 1, in that a handle is provided, thus almost entirely avoiding the liability of crushed fingers. This block is much thicker and thus has greater chocking effect. The chock shown in Fig. 3 is similar to that shown in Fig. 2 except that the handle is placed on the side. This chock, as shown, will function properly upon one side of the car only. Such chocks are often made and used in pairs. With a pair of them a car may be stopped from either side when moving in either direction. As a variation of this design a handle may be placed upon both sides. This makes the chock somewhat more clumsy to handle but renders it universal in application.

The chock shown in Fig. 4 is like that of Fig. 3 except that it is double-ended. One of these chocks may be applied from either side of a car moving in either direction.

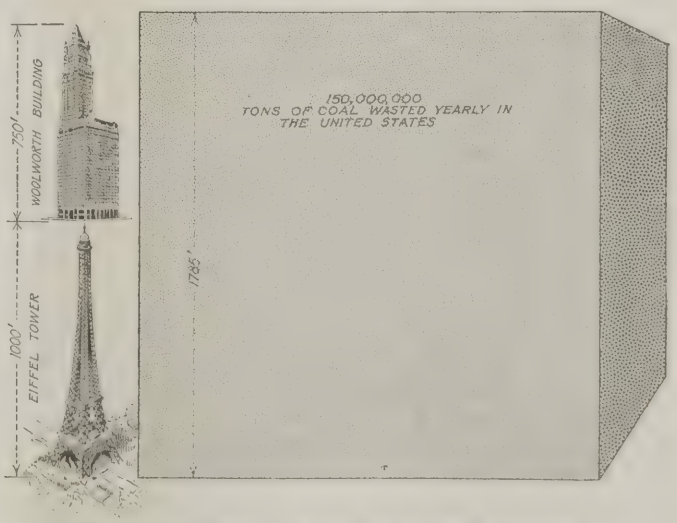
With all of the foregoing chocks a man must stoop or kneel in order to place them in position. The chock shown in Fig. 5 is like that shown in Fig. 4, and has the same universal application, with the added advantage of a long sloping handle. This chock may thus be applied from a standing position and is therefore much more conducive to safety.

How Big Is 150,000,000 Tons of Coal?

By W. F. Schaphorst
Brooklyn, N. Y.

We have all been talking and writing glibly about the enormous amount of fuel wasted in the United States per year. Although this amount has been stated as 150,000,000 tons, nobody seems to be much impressed. In the hope that a visual quantity might have some effect, I sat down the other evening and "studied up" the average values and did some figuring. I learned that a short ton of bituminous coal occupies about 38 cu.ft. That being the case, it is a simple matter to multiply it by 150,000,000 tons, giving 5,700,000,000 cu.ft.

That looks like a big figure, but digits and ciphers in themselves don't express much unless we are familiar with their magnitude. Consequently, the best way to understand this figure is to extract the cube root. This gives 1785 ft. In other words, 150,000,000 tons of coal would make a 1785-ft. cube.



SHOWING PILE OF COAL WASTED YEARLY

How much is 1785 ft.? The Eiffel tower in Paris is about 1000 ft. high. The Woolworth Building in New York is 750 ft. high. Put one on top of the other and you will "nearly" attain the height of this cube of waste coal. And remember that this wasted cube is just as wide and long as it is high. Isn't it a shame that we are wasting so much fuel?

Labor-Saving Methods and Appliances for Loading Coal

By G. W. ENGEL
Scranton, Penn.

SYNOPSIS — *A bibliography of the subject of machine loading in thin coal beds is here presented. Two types of machines appear to be particularly applicable. These and various methods of operation are discussed at some length, and interesting comparisons are made.*

THE purpose of this article is to show the present state of the art of mechanical loading in a general way, together with running notes from various technical publications. Thirty-two references to existing literature on this subject are made, giving the name of the article, its author, the publication in which it appears, the date, the number of words and succinct notes and drawings of many devices, concluding with original matter concerning two types of loaders that seem destined to a wide application in coal mines—The V-scraper, or scoop, and the conveyor.

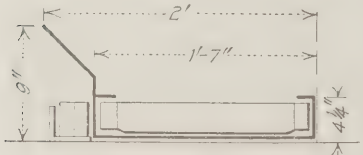
The period of research and original work runs from 1905 to the latter half of 1918. It is evident to every mining engineer that a successful mechanical loader that will eliminate hand shoveling cannot but be beneficial through bringing under development great quantities of coal now unminable because occurring in thin beds. The matter is particularly important at this moment of ever-decreasing labor supply, because of war requirements, with corresponding imperative demands for increased production.

For thick coal beds there is now in successful operation in salt and coal mines a machine having a series of scoops or pans revolving about a shaft. The scoop digs into the coal and is elevated to a higher position, discharging its load onto a traveling conveyor which in turn delivers to the mine car.

For thin coal beds there are a number of appliances in more or less successful operation, such as buggies, conveyors, oscillating chutes, shallow cars or tubs, operated by wheel or drum and a wire rope; and V-shaped scrapers or scoops with open top and bottom, which are drawn along the bottom of the coal bed to the mine car. Some of these are covered by patents.

As to the V scraper and the conveyor, the latter has been in use many years both here and abroad. (See Arts. 6, 11, 26 and 33.) The V scraper (see Arts. 31, 32 and following paragraphs) was introduced in the anthracite region some four years ago under the direction of Superintendent William D. Owens, with the help and coöperation of George P. Gallagher, H. H. Otto, Thomas O'Brien, John Ridgley, Pierce Robinson and certain other Lehigh Valley Coal Co. men. Harry McKean Conner, at the suggestion of Eli T. Conner, worked up a scheme in detail for mining thin coal beds, in the early part of 1915, after having seen the Valley scraper. This scraper and method of operation requires more or less hand shoveling in order to load it with coal. To eliminate this hand shoveling there has been developed a somewhat modified form of scraper and method of operation. Superintendent Cadwallader Evans, Jr., and certain men under his supervision, introduced a change in the construction of the V scraper and the method of working it. This modified form of operation consisted in the placing of extra posts with attached open pulleys at the corners of the chamber face, and a wood pulley set some distance back from the face. This permitted the scraper to be loaded by drawing it across the chamber face, eliminating the hand shoveling.

Some of the larger coal companies are now operating the V scraper, and several others contemplate using this equipment for the purpose of mining very thin coal beds.



Section of Conveyor
FIG. 1

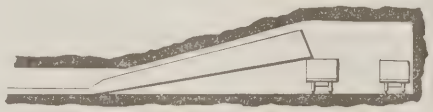

FIG. 2


FIG. 3

FIGS. 1 TO 3. CROSS-SECTION AND SIDE VIEWS OF A LOW DRAG CONVEYOR

Of the following articles, 32 represent the results of a research among the various technical publications of the world, and the others are the outcome of personal examination and original work.

1. Mechanical Coal Conveying at the Face.
Anonymous.

[Iron and Coal Trade Review.] Vol. 70, pp. 803-04, Mar. 17, 1905. 1800 w. Special reference to the Blackett coal conveyor at the works at Derwent Colliery, County Durham.

2. Mechanical Coal Conveying at the Face.
Anonymous.

[Colliery Guardian.] Vol. 89, p. 580, Apr. 7, 1905. 1300 w. Illustrated notes on the construction and management of an underground conveying system.

3. Working a Blackett Conveyor in the Working Face of a Thin Seam.
Badeley, H.

[Mines and Minerals.] Vol. 25, p. 607, July, 1905. Abstract of paper read before British National Association of Colliery Managers. The face is a right-handed one and has a dip of 1 to 16 against the loaded conveyor, which is 90 yd. long and built in 6-ft. sections. An 8-hp. electric motor drives the conveyor. Output increased from under 4 tons to over 10 tons per man. Seams not so advantageous to conveyors—undulating, tender roof, a roof very severe on

timber that would not allow the timber to be changed when shifting the conveyor over a bad lifting floor. From *Iron and Steel Trades Review*, Apr. 28, 1905.

4. The Mickley Conveyor.
Batey, J. W.

[Transactions, Institute of Mining Engineers.) Vol. 29, pp. 268-73, Apr. 8, 1905. (See par. 9.) The seam varies from 19 to 28 in. in thickness. Conveyor is a long shallow car, run by wheel and wire.

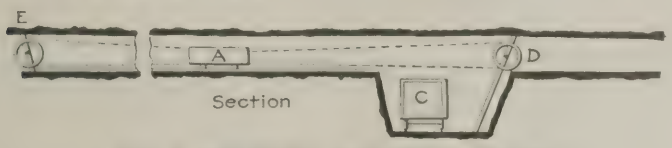


FIG. 4. MICKLEY CONVEYOR OR CAR

5. Use of Conveyors in Filling Coal Seams.
Blackett and Ware.

[Transactions, Institute of Mining Engineers.] Vol. 29, pp. 449-506, June 2, 1905.

6. The Greaves Coal Face Conveyor.
Anonymous.

[Colliery Guardian.] Vol. 92, pp. 1073-74, Dec. 7, 1906. 1100 w. Description, with four illustrations, of a conveyor of the scraper type. The important points are the low loading level, the small space in which the empty or non-conveying chain is returned, practicability of using it in seams thinner than 2 ft., and its compactness and simplicity. By reference to Fig. 1, showing a section of the conveyor, it will be seen that it is only 9 in. high by 2 ft. wide. It will also be noticed that the loading side is only 4½ in. high. The higher, or 9 in., side farthest from the coal face protects the return chain. This return being on the side of the conveyor instead of the bottom tends toward reduced height, and makes it practical to operate the device in thin beds. Figs. 2 and 3 show the conveyor arranged for operation, while the roof or floor respectively are cut away to form the main road. The bed is represented as being 2 ft. thick, with the main road 9 ft. wide and 6 ft. high, which will give a good idea of the relative amount of headroom required when cutting top or bottom rock to get

8. A Conveyor for Filling Coal at the Face.
André, L.

[Transactions, Institute of Mining Engineers.] Vol. 31, pp. 106-8, Apr. 7, 1906. Used in seam 30 to 36 in. thick. Trough, requiring an oscillating movement.

9. The Mickley Conveyor.
Batey, J. W.

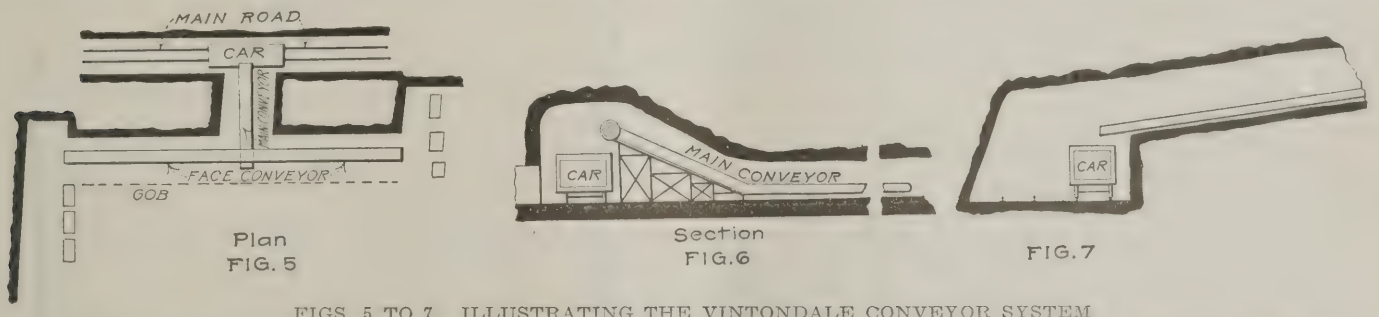
[Engineering and Mining Journal.] Vol. 81, pp. 652-53, Apr. 7, 1906. British Patent (1904) No. 16576, Sidney Bates. The conveyor *A*, Fig. 4, is a long shallow tub, 7 ft. long by 2 ft. 8 in. wide by 11 in. deep (but 7 in. deep on side next to coal face). Bottom of conveyor has two sliding doors which are slid open and coal falls into the car. Conveyor is run by a ¾-in. galvanized wire rope, fastened to each end. The rope is turned 1½ times around the driving wheel *D* and has a single turn on the return wheel *E*. The driving wheel is worked by hand. Gage of conveyor road 2 ft. 10 in., and is laid on iron sleepers. Coal seam, 19 to 28 in. thick.

10. Conveyor System for Loading at the Coal Face.
Parsons, F. W.

[Engineering and Mining Journal.] Vol. 83, pp. 958-59, May 18, 1907. 1500 w. Certain thin and dirty seams can be worked profitably by this method when other systems would result in loss. Abstract of paper read before Institute of Mining Engineers of Great Britain. Describes the Vintondale system (see par. 11). The conveyor is of the pan type, 12 in. wide at the bottom, 18 in. at the top and 6 in. high. In the pan is run a malleable drag chain. This chain passes over a sprocket wheel at the head end (which does the driving) and returns over another sprocket at the read end. Both front and rear ends are inclined—at the front to obtain height enough to allow the cars to pass under, and at the rear to allow for the sprocket wheel. An air engine drives the conveyor.

11. Mechanical Conveyors as Applied to Longwall Mining.
Thomas, J. I.

[Mines and Minerals.] Vol. 28, pp. 200-203, November, 1907. 3500 w. Describes methods and apparatus used at Vintondale, Penn., by the Vinton Colliery Company. Triple and single conveyor system. The article gives a detailed description of the inside plans and arrangement. The coal



FIGS. 5 TO 7. ILLUSTRATING THE VINTONDALE CONVEYOR SYSTEM
Fig. 5—Plan of Vintondale conveyor system. Fig. 6—Cross-section of Vintondale workings, showing delivery end of conveyor. Fig. 7—Swinging or bumping conveyor operated on a pitch

height for the car. This conveyor, working as it does in confined spaces, with the necessity of constant shifting as the coal is worked out, can be moved quickly and expeditiously without disturbing any of the standing timber or props.

7. The Mechanical Pit-Car Loader.
Anonymous.

[Mines and Minerals.] Vol. 28, pp. 185-6, November, 1907. Conditions under which it should work. Method of operating and arrangements necessary to get best results. The mechanical pit car loader, chamber and pillar, Hamilton Manufacturing Co., Columbus, Ohio. The loader is moved from place to place by its own power. Practical in large seams only, say 7 ft. One end of the loader sweeps the face forward and back, the coal going up on one side of the conveyor on the forward movement, and on the other side on the return movement. The coal is elevated to a position between the roof and gate end of the car, and then falls into the car.

worked is the Lower Kittanning seam, 42 in. thick, 8 per cent. pitch and 200 ft. of cover.

12. Maschinelle Fördereinnichtungen vor ort auf Rheinisch-Westfälischen Gruden.
Herr Forstmann.

[Glückauf.] Vol. 44, pp. 1281-90, Sept. 5, 1908. 500 w. Describes the conveying devices used in several of the mines of this district.

13. Underground Conveyors at the Kleinfontein Mine.
Way, E. J.

[Engineering and Mining Journal.] Vol. 86, pp. 715-16, Oct. 10, 1908. Trough conveyor. "Swing Conveyors at the Kleinfontein Mine, Transvaal-Rand District," by Edward J. May, Consulting Engineer, Hotel Savoy, London, England. Power drive impossible on account of the cost and mechanical difficulties due to conditions, so hand power by men pulling on upper end was used. Ore mine, pitch 26 deg. Conveyor 18 in. wide, 32 ft. to 224 ft. long, in 8-ft.

lengths; built of ⅜-in. iron and suspended from chains from the hanging wall. Time, 45 minutes to take down and put up again one 224-ft. conveyor. Number of holes for chains 29. Seventy conveyors are used, saving 420 men. Proposed to work out a monorail system which consists of a single rail suspended from the roof.

14. Swinging Chutes for Coal Mines.
Anonymous.
[Engineering and Mining Journal.] Vol. 87, pp. 362-63, Feb. 13, 1909. Swinging trough system. Dimensioned drawings; comparative costs. Swinging or oscillating

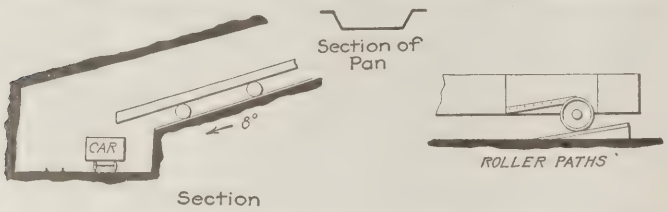


FIG. 8. SHAKING CONVEYOR HUNG ON ROLLERS

chutes for coal mines. By Lestelle & Hyve, engineers for the Compagnies des Mines de l'Escarpelli. Abstract from Bulletin de la Societé de l'Industrie Minerale, March, 1908. The system consists essentially of an iron trough suspended in such a way as to be free to swing, and subjected at the end of each swing to a jar which sends the coal forward and finally discharges it into a car standing in the entry. The swinging motion is given to the trough by a double lever, so bent as to be easily reached by the loader at the car. The jar at the end of each swing is given by a buffer fastened to the bottom of the lower end of the chute. The buffer and lever are adjustable. Pitch of coal seam 15 to 20 deg. No thickness of seam given. Chute from 20 to 100 ft. long.

15. Mining Coal with Machines in England.
Dixon, G. R.
[Engineering and Mining Journal.] Vol. 87, pp. 797-800, Apr. 17, 1909. Conveyor for handling coal in mine. Coal, 3 ft. 6 in. Coal is undercut by disk machine. No details as to the conveyor or undercutting machine. The article deals mainly with costs, arrangement of roads and plan of attacking the face on the longwall system. Detailed costs show that economy in mining results more from increasing value of coal produced (larger sizes) than from reduced working costs.

16. The Use of Coal-Cutting Machinery.
Rowland, R. H.
[Engineering and Mining Journal.] Vol. 90, pp. 1067-70, Nov. 26, 1910. Also notes on operation of conveyor used in longwall system; 12 to 150 ft. faces and two conveyors. Coal 3 ft. thick. Coal all cut by hand. Conclusion that conveyors in conjunction with reliable coal cutters should be a great improvement on the old method. Plans show the two 150-ft. faces and system of timbering.

17. A Coal Loading Machine.
Whaley, William.
[Mines and Minerals.] Vol. 31, pp. 206-08, November, 1910. 1500 w. Illustrated description of apparatus for use in mines to load coal cars. Developed by engineering firm of Meyers & Whaley, Knoxville, Tenn. Used by the United States Coal and Oil Company, Holden, W. Va. Seam 6½ ft. Rooms 36 ft. wide. Average coal loaded per day, 128 tons—six-day test; lowest, 90 tons (not enough coal); highest, 150 tons per day. Four men required to operate the machine—1 machine runner, 1 man in front and 2 men to handle cars and pick slate. Four rooms loaded out per day. The article gives plan and elevation of machine, also mine plan (7 rooms) and working face drawing. Machine built on the scoop shovel plan, the scoop going under the coal and throwing it back to a conveyor which in turn conveys the coal to the car.

18. Coal Face Conveyors.
Booth, A. E.
[Colliery Guardian.] Vol. 101, pp. 474-76, Mar. 10, 1911. 4000 w. Gives a general description of various types of and experience with the Blackett conveyor in thin-seam working.

19. Coal Face Conveyor.
Ridsdale, H. H.
[Iron and Coal Trade Review.] Vol. 83, pp. 1012-13, Dec. 22, 1911. 4000 w. Discusses the economical working of thin seams, describing types of conveyors and their use.

20. The Adair Face Conveyor.
Anonymous.
[Colliery Guardian.] Vol. 104, pp. 1011-12, Nov. 22, 1912. 2000 w. Drawing and description of a coal face conveyor designed to occupy as little space as possible in the vertical direction when discharging.

21. Moving Minerals in Thin Flat Beds.
Anonymous.
[Mines and Minerals.] Vol. 33, pp. 310-12, January, 1913. Swing chutes, scraper conveyors and shaking conveyors for transporting minerals underground. Page 310 shows a swinging chute suspended from the roof by chains. Ore is shoveled into the upper end and moved down by swinging the chute. Mention is made of the Vinton Colliery Co. conveyor. (See Art. 11.)

22. Machine Mining in Anthracite Mines.
Archibald, Hugh.
[Colliery Engineer.] Vol. 33, 471-76, April, 1913. 4000 w. Illustrates and describes methods of cutting and handling the coal that renders it possible to work thin seams profitably. Page 476 makes mention of the Delaware, Lackawanna & Western conveyor at the Dodge mine, by the panel longwall system. Rooms 24 to 40 ft. wide in 4-ft. seam. Coal goes by conveyor to small car on counter, thence by the counter and small car to the mine car on the gangway. Goodman, Sullivan and Jeffrey shortwall undercutting machines have been used; over 200 cars are produced per keg of powder. Five feet of bottom rock is taken up in gangway to give height for the car and topping. Top

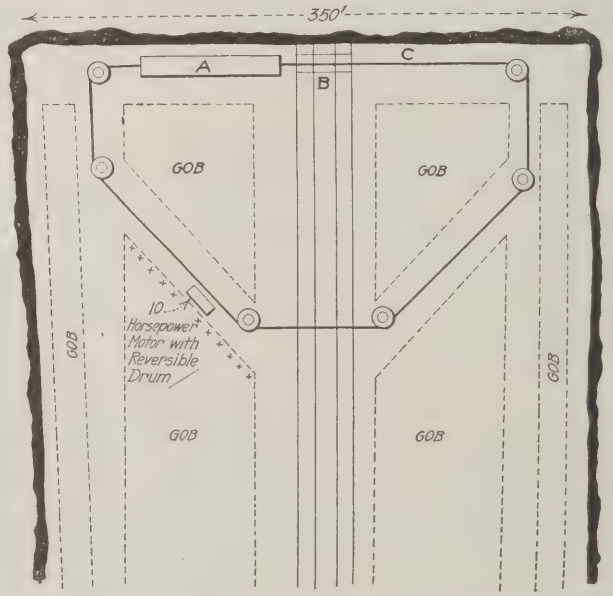


FIG. 9. A TRAVELING PAN CONVEYOR

of conveyor 12 in. from floor. Flat broad linked chain moves on the bottom of the conveyor trough, taking the coal over the sprocket wheel at the discharge end and travels back on angle iron guides under the trough. The driving motor and conveyor are built together.

23. Underground Conveying.
Mayor, Samuel.
[Colliery Guardian.] Vol. 105, pp. 1113-15, May 30, 1913. Serial, first part. Face conveying.

24. Nelson's Patent Longwall Coal Conveyor.
Futers, T. C.
[Colliery Guardian.] Vol. 105, p. 1013, May 16, 1913.

25. Mining with a Conveyor System.
Brown, J. F. K.

[Coal Age.] Vol. 8, pp. 204-07, Aug. 7, 1915. 4500 w. Mining safer; output increased; costs lowered. Conveyor has been in use for ten years. Vein 3 ft. 9 in. and coal 2 ft. 7 in. Dip 8 deg. Shaking conveyor is employed. The conveyor in use is of the old shaking type, and has been adapted from continental practice. The height from the floor to the edge of the pan is only 9 in. The width is 18 in. and the length 300 ft. The conveyor rocks back and forth on rollers, in specially arranged paths. These are so designed as to cause the machine to fall sharply at the end of the forward stroke, whereby the motion imparted to the coal is continued in the material itself, while the conveyor draws back for the next stroke—60 strokes per minute. The length is very important, varying as the grade. The theory is that of a shaking screen. Movable sides can be taken out and placed across the conveyor for the divergence of waste at any convenient point. The conveyor pan is in 6-ft. sections. The engine is driven by compressed air; 12 hp.; stroke, 5 in.; diameter of cylinder, 7 in.; weight of engine, 572 lb. Connection to the conveyor is through a lever action and rigid attachment, the cylinder at right angles to the line of the conveyor. (See Fig. 8.)

26. Longwall Conveyor and Loader for Thin Seams.
Dickson, James.

[Coal Age.] Vol. 7, pp. 368-9, Feb. 27, 1915. 1500 w. Describes a sectional conveyor and loader that is moved forward following the face. The cost of production has been reduced. *A* (Fig. 9) is conveyor with 6-ft. sections made of ¼-in. plate. Each section is 3 ft. wide and 9 in. high on gob side and open on the coal side. It is mounted on T-iron. *B* is a trestle under which the cars stand for loading. *C* is a rope for operating the conveyor. In actual operation the conveyor was drawn up until one end was close to the wheel on the end road, and the miners on that section were given 3 min. in which to load their coal, each section of conveyor holding 300 to 500 lb., so that with 20 sections there will be three to four tons on the conveyor. When ready to move, the man in charge signals the motorman to go ahead. The roof support was augumented by two rows of hardwood cogs between the conveyor and the gob, and built on loose dirt to facilitate their removal for use again.

27. American Coal Mine Haulage.
Anonymous.

[Colliery Guardian.] Vol. 112, pp. 61 to 63, July 14, 1916. 4500 w. Conditions and haulage systems, especially wire rope haulage.

28. Progress in Underground Ore Loading.
Richards, M. E.

[Canadian Mining Journal.] Vol. 37, pp. 344-46, July 15, 1916. 200 w. Types of loading machines.

29. Coal Face Conveyors Employed in the United Kingdom.
Walker, S. F.

[Coal Age.] Vol. 10, pp. 744-8, Nov. 4, 1916; pp. 790-4, Nov. 11, 1916. Exhaustion of the thicker coal beds in Britain has rendered the working of thinner measures highly desirable. To meet this condition the coal face conveyor has been developed. Two types of conveyor are described in this article.

30. Use of Face Conveyors.
Brown, J. F. K.

[Coal Age.] Vol. 11, p. 761, Apr. 28, 1917. Letter No. 1, from J. F. K. Brown, Montreal, Can. Reply to letter of Jim Golden and his nonsuccess with a face conveyor (Coal Age, Mar. 10, 1917, p. 445). Brown says that in one district alone on the continent of Europe, 40,000 ft. of conveyors are in operation under varying conditions of coal seams. He uses the Blackett conveyor. There are over 10 different types of conveyors, he says. In one case, to his knowledge, there were eight conveyor faces, each 300 ft. in length, seam 2 ft. 6 in. thick and 10 deg. pitch.

31. Scraper Mining for Low Veins.

[Employees' Magazine of the Lehigh Valley Coal Co.] April, 1916, p. 67. About 1350 words with three illustrations. This article tells about an economical method of mining thin flat seams of anthracite coal, devised by the Lackawanna Division of the Lehigh Valley Coal Co. "The mining of thin flat veins in the anthracite coal region has always been costly on account of the large amount of rock that must be mined with the coal. The time, money and energy spent on mining this dead rock and then piling it on huge rock banks on the surface is wasted. This same difficulty is met with in the coal regions the world over." * * * "Various systems have been tried and advocated, such as small buggies, chutes and low extensible conveyors, but a few months' or a half year's trial would reveal one

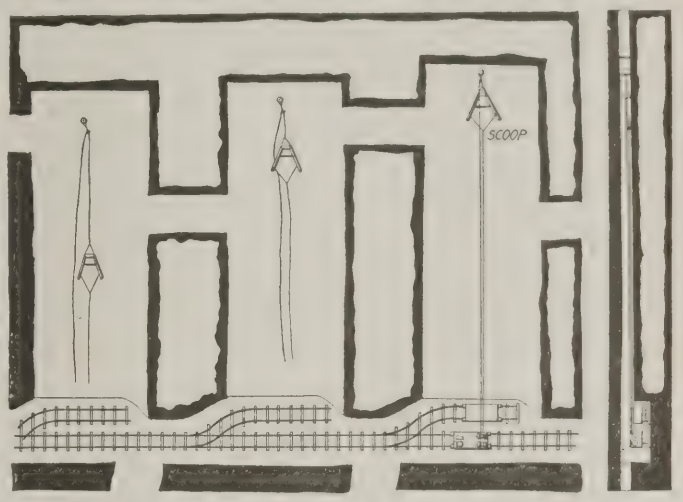


FIG. 10. PLAN AND SECTION SHOWING HOW SCOOP IS USED

weakness after another until they were proved impracticable."

A scoop for low veins has been built consisting of two legs of ⅛-in. sheet iron, about 4½ ft. long, properly shaped and fastened with heavy iron hinges to a small square back sheet about a foot wide. The two legs of the scraper swing open and close like the wings of a bird. To prevent the legs from opening too wide, a ⅜-in. chain about 8 ft. long is bolted to the ends of the wings. At the center of this chain is attached a ½-in. steel wire haulage rope, which drags along the whole device. A haulage rope is also attached to the back, so that the scraper can be pulled backward as well as forward. The scraper holds about 800 lb., and five scraperfuls will fill a mine car.

Operation—An eyebolt and pulley are driven in the roof, near the face of the chamber, and two pulleys fastened at the foot of the chamber, but close to the gangway rib. Of the last two pulleys one is used to guide the rope which pulls the scraper back up the chamber while the other guides the rope pulling the scraper and its load into the mine car standing on the gangway at the foot of the chamber. Opposite each chamber a double track must be provided, one for the mine car and one for a double drum electric haulage engine. A specially designed electric haulage locomotive with horizontal drums for dragging the scraper back and forth in the chambers has been employed. Fig. 10 is a plan and section showing how the scraper or scoop is used. The system of mining is the room-and-pillar, with rooms or chambers 24 ft. wide and 50 ft. from center to center of rooms. Of course, no rock is mined in the chambers, the only rock taken up is on the gangways. The coal is hand drilled and then shot off the solid.

32. Scraper Mining of Thin Bed Anthracite.
Humphrey, E. P.

[Coal Age.] P. 316, Aug. 15, 1918. About 6 columns, or 2750 words, with illustrations. Describes the scraper method and appliances for loading coal from a bed less than 3 ft. thick and pitching less than 20 deg. First introduced by the Lehigh Valley Coal Co. about four years before. The scraper is triangular in shape, open at the

top and bottom; 48 in. wide at the base and 14 in. high, made of No. 10 sheet steel, and when filled holds 8 cu.ft. of coal. It is either hinged at the apex or made solid in construction, depending upon whether the floor is irregular or smooth. The loaded scraper travels about 145 ft. per minute, and is filled at the chamber face by a man with a low lift shovel. The hoist used to drag the scraper up and down the chamber is a double drum machine, equipped with a 5-hp. motor and weighs 1650 lb. The drum has a capacity of 900 ft. of ⅝ in. wire rope used both for main and tail. This hoist is placed in an opening 5 ft. deep and 4 ft. high by 6 ft. long, on the opposite side of the gangway from the chamber. A new move and set-up of the hoist must be made for every chamber. At the face of the chamber the rope passes around a snatch block, which is secured to an adjustable screw jack with pointed ends. This jack is moved across the chamber as the scraping proceeds. Clearance for the car on the gangway is made by blasting up the bottom rock so that the top of the car is about on a level with the bottom of the coal in the chamber. This permits the scraper to discharge its contents directly into the car. The cars hold either 92 or 45 cu.ft. The gangway is 9 ft. wide and 4 ft. high on the low side. The chambers are from 24 to 50 ft. wide and vary in length from 100 to 360 ft.—200 ft. being the best practical length. The best loading record is 32 small cars per shift of 8 hours, with a night shift of two men and a day shift of four men, all doing "company work."

From the preceding references and quotations there stand out preëminently two types of machine for the getting of coal from the longwall or chamber face into the mine car—the conveyor with continuous carrying chain driven by gear wheel and pinion, discharging its contents into the car on the gangway road (see Arts. 6, 11 and 26) and the open top and bottom V scoop or scraper, drawn back and forth on the bottom of the coal bed by a wire rope, its contents dropped intermittently into the car on the successive forward moves, the empty scraper returning on the backward movement for a new load.

From present mining in Luzerne and Lackawanna counties there can be made a comparative study of the relative merits and performances of each of these two labor-saving machines, reduced to unit production of cars, tons or cubic feet per men per day.

Mine A employs the first, or conveyor, type of loader. The coal bed pitches from 2 to 5 deg., is from 18 to 27 in. thick, and is overlaid with hard sandstone and underlaid with a somewhat softer rock, which is blasted and removed on the gangways so as to get sufficient height for the car. The depth of the seam is about 150 ft. This will become 450 ft. as a maximum as the mining proceeds from the outcrop. The system of mining (see Fig. 11) is longwall advancing, except that from road 2, which is by chamber and pillar. The faces of the chambers off of road 2 are near the outcrop, and the pillars of coal are left to prevent the inflow of water which would take place if there were surface subsidence.

Two lines of pillars of coal are left to protect the main haulage roads in the longwall mining. (See roads 3, 3A, 4 and 4A.) The 150 x 250 ft. or upper panel between roads 3 and 2A has been mined and cogged. Road 3B is 7 ft. high and 12 ft. wide. Of this 7 ft. about 5 ft. of rock had to be blasted and removed from the bottom, thus permitting the top of the mine car to be a little lower than the bottom of the coal bed, allowing for a topping of 3 in. The cars standing on road 3B received the coal from the conveyor. The coal was drilled with jackhamers and shot off the solid. In this section the coal bed runs from 18 to 24 in. thick, so that it was impractical to use an undercutting machine. This required excessive blasting, which broke up the coal and kept the conveyor a considerable distance from the longwall face, reducing the prepared sizes and causing more labor through necessitating shoveling a considerable distance into the conveyor.

A slight increase in the thickness of the coal in the two lower panels between roads 4 and 3A makes it possible to use an undercutting chain machine. The seam here is about 27 in. thick, with a 6-in. band of bone and slate in the bottom. In this the undercut is made. Road 4B is 7 ft. high by 12 ft. wide. The mine cars are placed and loaded on this road. The two lower panels are each 150 x 150 ft., both being mined from the one road 4B. As the mining proceeds cogs are placed at about 25-ft. intervals. Of these two lower panels the left one is now being worked.

The number of men required to operate the upper

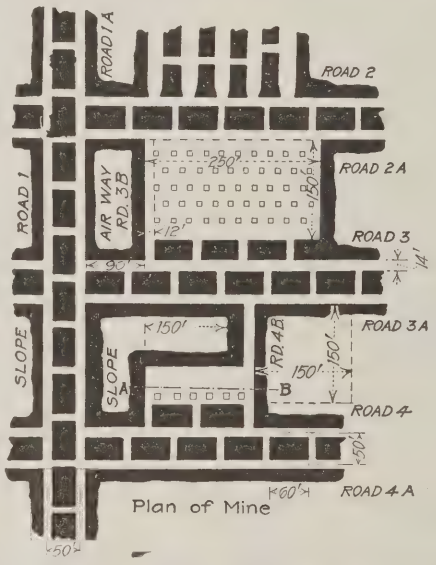


FIG. 11. TYPE OF MINING WHERE CONVEYOR IS EMPLOYED

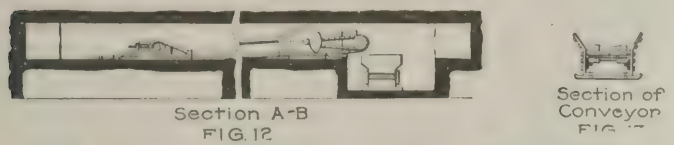
panel was as follows: One man in charge, 4 men drilling and blasting, 4 men shoveling coal into the conveyor, 1 man operating the conveyor motor and leveling the coal in the mine car on road 3B, making a total of 10 men. The number of men now operating the left-hand lower panel is as follows: One man in charge, 1 man operating the undercutting machine (machine runner), 1 helper (machine runner's helper), 5 men shoveling the coal into the conveyor, 1 man operating the conveyor motor and leveling the coal in the mine car on road 4B, 1 man drilling and blasting, a total of 10 men. Thus, it is noticed that there is required one man less for breaking down the coal in the lower panel than in the upper one, with a corresponding increase of one man for shoveling in the lower panel.

About two-thirds of the cog timber has been used before and comes from another coal bed where the mining of pillars is now in progress. There is little if any refuse in the seam, and material for pack walls or cogs must come from outside the mine.

The longwall chain conveyor, Fig. 13, is 12½ in. high by 20½ in. wide, the head end being 13 ft. long and 2 ft. high at the motor. It is driven by a 10-hp. direct-cur-

rent motor, operating at 950 r.p.m. The undercutting machine is of the ordinary chain type, 23½ in. high. Fig. 12 is a section of the seam showing the conveyor, the gangway and the car, the opening in the seam being 27 in. high.

The production per man per day of eight hours follows. This does not include the opening of road 4B or the mining of the first cut along section line *A—B*,



FIGS. 12 AND 13. SECTION OF COAL BED, SHOWING CONVEYOR AND GANGWAY

preparatory to the start of the undercutting machine and the placing of the conveyor.

In the month of August, 10 men, working 20 days each, produced 284 cars. The capacity of each car is 85.50 cu.ft., so that $\frac{284 \times 85.50}{10 \times 20} = 121.41$ cu.ft. per man per day, and $\frac{284}{200} = 1.42$, or the number of cars produced per man per day; 39½ cu.ft. of loose coal will produce 1 ton of prepared coal. Whence $\frac{121.41}{39.50} = 3.07$ tons of prepared coal per man per day.

Mine B, or the second illustration, uses the V scraper, mentioned in the introduction and shown in various figures. It is, however, a modification of the Valley scraper mentioned in Arts. 31 and 32. The seam varies in thickness from 18 to 36 in. and has an average thickness of 27 in. Jackhamer drills are used and the coal is shot off the solid. The system of mining is pillar and chamber. The chambers are driven on 50-ft. centers and are 30 ft. wide. A 7½-ton double-drum electric hoist is located in a crosscut between the heading and airway. (See *A*, Fig. 14.) From this location of the hoist five chambers are operated, two on the right, two on the left and one directly opposite. Two wire ropes, forming a loop, within which is the V scraper, pass over four 8 in. diameter pulleys in front of the hoist. Thence the rope goes along the gangway to two pulleys in front of the chamber at *B* and up the chamber. These pulleys are close to the rib and overhead.

The scraper, Fig. 16, holds about 12 cu.ft., and four scraperfuls will load a mine car. There is an iron brace at the front or wide end and a flange 3 in wide on the bottom of the scraper, tapered at the front to keep it from riding over the loose coal. Fig. 15 is a plan of part of a chamber face, while *A*, *B* and *C* are open pulleys, 6 in. in diameter, fastened to adjustable jacks, which are secured in the top and the bottom of the seam or opening. A passageway for the scraper is formed between the left rib and boards nailed to the bottom of a row of props some distance out in the chamber, as shown in the diagram.

Suppose that the scraper has just returned empty, and is in the position shown by the dotted line. It continues its movement toward *B*, and when close to *B* is stopped. Then the rope is placed in the open pulley *C*, and the scraper pulled toward this point, gathering its load as it goes along. When close to *C* the rope is thrown off and the scraper is now in a position to pass and proceed down the chamber with its load. In order to scrape out the coal nearer the face, the open pulley at *A* is used. The method of operation between *B* and *A* is the same as that just described between *B* and *C*. Three men are necessary at the chamber face. By the proper manipulation of the jacks, the drum, the open pulleys and the rope, the coal can be scraped out of the chamber and shoveling eliminated, which, as must be agreed, is hard and laborious work in a thin coal seam.

The number of men required for the operation of the scraper is as follows: One man at *A* and *C*, Fig. 15; one man at *B*, Fig. 15; one man at the drum, called the scraper boss; one man on the gangway leveling the coal in the car; one man operating the electric hoist; four men drilling and blasting; total, nine men.

Covering the mining operations for one month, the average number of cars per man per day was 2.08 The capacity of the mine car is 42.61 cu.ft. Hence

Cu.ft. per man per day = 2.08 × 42.61 = 88.63.
Cars per man per day = 2.08, as stated above.
Tons per man per day = 88.63 divided by 3.95 = 2.24.

The number of cubic feet of loose coal per ton of prepared coal is the same as in Mine A.

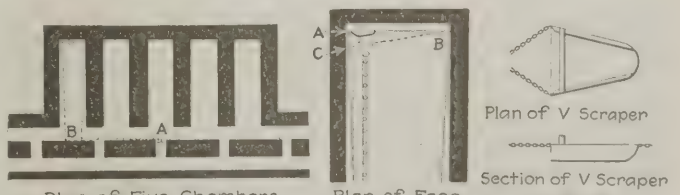
In *Coal Age* of Aug. 15, 1918, p. 316, E. P. Humphrey states that the maximum production was 32 small cars per shift of 8 hours, with a force of 6 men, or 5⅓ cars per man per day. However, Mr. Humphrey informs me that a fair average production per man per day would be three cars of 45 cu.ft. capacity each, in a bed 36 in. thick, worked by pillar and chamber, with the coal hand-mined or shot off the solid. This would give the following results for the Lehigh Valley Coal Co.:

Cubic feet per man per day = 3 × 45 = 135;
Cars per man per day = 3, as above stated;
Tons per man per day = 135 divided by 39.5. = 3.42.

Comparisons may now be made with Mine A and Mine B, as follows:

	Mine A	Mine B
Cubic feet per man per day	121.41	88 63
Cars per man per day	1.42	2 08
Tons per man per day	3.07	2.24

Actual experience in Mine A proved that in the lower longwall panel, with an undercutting machine, the coal production was nearly double that in the uppen panel, where the coal was mined by hand. Thus if the Valley mine and Mine B should use the undercutting machine,



FIGS. 14 TO 16, SHOWING V-SCRAPER AND ITS OPERATION

they would nearly double production and a comparative table would show:

Name of Mine	No. of Men	Thickness of Seam	Production per Man per Day Cu. Ft.	Cars	Tons	System of Mining
Valley	6	36 in.	270.00	6.00	6.84	Pillar and chamber
Mine A	10	27 in.	121.41	1.42	3.07	Longwall advancing
Mine B	9	27 in.	177.26	4.16	4.48	Pillar and chamber

Longwall mining should also increase the production of Mine B and the Valley mine. However, for a fair comparative estimate it will be noticed that the Valley mine has the thickest coal bed, and only a few inches

more or less, when considering thin coal seams, sometimes makes all the difference between profitable or prohibitive mining. Also, in Mine B, the coal is far superior in quality, parting easily from roof and floor, being crisp, bright and sparkling; the table above is thus valuable as showing the advantages of using machine mining to increase output. Hence, a fair comparative table would show:

Name of Mine	No. of Men	Thickness of Seam	Production per Man per Day Cu.Ft.	Cars	Tons	System of Mining
Valley	6	36 in.	135.00	3.00	3.42	Pillar and chamber
Mine A	10	27 in.	121.41	1.42	3.07	Longwall advancing
Mine B	9	27 in.	88.63	2.08	2.24	Pillar and chamber

On the basis of cost, having regard only to the number of men required, the order of excellency would be: First, Valley mine; second, Mine B, and third, Mine A. Thus, it can be seen that the V scraper reduces the labor necessary in mining—the Valley mine requires four men less, and Mine B one man less. As to production, of course, merit should be given, first, to the Valley mine, with 3.42 tons; second, to Mine A, with 3.07 tons; third, to Mine B, with 2.24 tons per man per day.

Signaling in British Coal Mines Under the New Act

By Sydney F. Walker
Alexandria Park, Bath, England

A New Coal Mines Regulation Act was passed by the British Parliament in 1911, and subsequently special rules have been issued (in 1912 and 1913), some of which have an important bearing upon the matter of signaling. With shaft signals, for instance, a new requirement is made. Under the old rules a sound signal that could be heard by both engine man and top cager was sufficient. Under the new rules a visual signal must also be given. This must be placed in such a position that the engine man can always see it without turning his head, and the last signal must remain visible until the engineer has completed the order implied by the signal.

Where men are carried on the cage a difficulty in complying with this regulation arises. Under both old and new rules, one rap always means that the hoist man is to commence the wind. When men were to come up, a special signal was made under the old rules; three raps in some districts, four in others. It has always been forbidden to carry anything in one cage, except men, when men were riding in the other. Thus the top cager had always to give permission for men to come up by replying to the bottom cager's signal. Men were then allowed to go on the cage.

It was often difficult to obtain a top cager's permission to send men up during the ordinary working hours, because it meant the loss of two complete hoists of coal. When men were coming up, under the old rules the bottom man signaled to the top cager and to the engineer by one operation, then waited until the top cager returned the signal. When men were to be allowed to come up, the top cager so signaled to the bottom man and to the engineer. The men then got onto the cage at the bottom, and the usual signal to commence the hoist was given. Under the new rules the engine man must have something before him, from the time the men are signaled to come up until he commences the hoist.

Under the old rules there were two kinds of signal employed, mechanical and electrical. With both there was a bell in the hoist house that was struck from one to four times, according to the signal to be given. With some forms of mechanical signal there was a dial, over which a hand moved, the number to which it pointed corresponding to the number of raps given. Thus when 3 was signaled for men, the hand first moved over the dial to that figure, and when the signal was given to commence to wind, it moved on to the figure 4. Under the new rules this arrangement is not sufficient; if 3 means men riding, 3 must remain in sight of the hoist man, undisturbed by subsequent signals, until the hoist commences.

With the electric method of signaling, which was not employed at many mines, there was no visual signal at all. There was usually a bell on the tipple, as well as one in the engine house, and both rang simultaneously when the bottom cager signaled, the required number of strokes being sounded on both bells at the same time.

Two methods have been proposed and, I understand, adopted to a certain extent, to overcome the foregoing difficulties. The chief obstacle to be surmounted is that the signals must not be cumulative. The signal announcing men must not be interfered with. In one system of electric signals the visual sign has been obtained by copying the mechanical dial, the iron core of a solenoid electro magnet taking the place of the pull wire, the hand or pointer being moved round the dial by a ratchet and pawl.

To meet the new requirements there are two concentric dials and two ratchets. The pointer sweeps over the inner dial and a flag, carrying the word "Men," is carried round by the second ratchet and appears behind the clear glass space corresponding to 3 or 4 gongs. The outer dial is merely employed for calling the hoist man's attention to special signals. The pointer and flag work independently of each other, the flag being set in motion only when men are to be carried. At the pit bottom there are two pushes, or contact makers; one is used for giving the signal on the bell and for moving the pointer over the dial; the other is used only when men are to come up.

The firm that is introducing this apparatus has also worked out a mechanical signal on similar lines. It has two dials, a pointer and the flag with "Men" upon it appearing behind the clear glass space. The bell, however, is worked by one pull wire and the flag mechanism by another.

In the other apparatus that has been developed electricity is employed exclusively, and the arrangement is practically an extension to mining work of the indicator system employed in houses, hotels, etc. The indicators consist of panels of glass, behind which incandescent electric lamps are lighted when a signal is given. A screen appears at the same time, on which the signal transmitted is shown in clear lettering. In the engine house there is a panel indicator, having one panel for each signal that can be given, or alternatively, a limited number of panels, portions of each panel corresponding to each signal. There are two bells in the engine house: one may be rung from the tipple, and the other from the pit bottom. The electric lamps are energized either from a small battery of accumulators, a battery of

(*Concluded on page* 985)

New Mine at Cassidy's, British Columbia

When the Granby Consolidated Mining and Smelting Co. acquired coal rights at Cassidy's, Vancouver Island, B. C., a short distance south of the City of Nanaimo, it was stated that it would have a producing mine in operation within a year. There was some speculation at the time as to whether, in view of the general shortage of labor and the difficulty, comparatively speaking, of obtaining machinery, it would be possible to accomplish this. The question now is settled. The company has reached the goal set. Its new colliery is in operation, a thoroughly modern plant having been installed, through which there passes every month an average of 2700

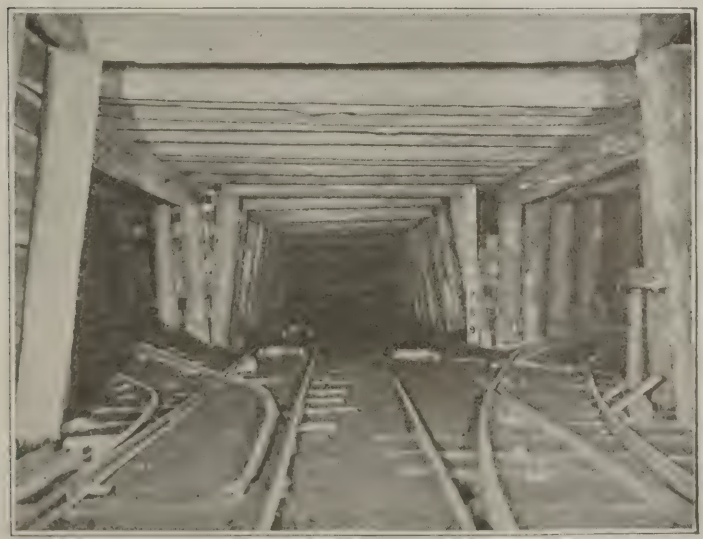




POWER HOUSE AND TEMPORARY TIPPLE OF NEW MINE IS SHOWN ON LEFT. THE RIGHT VIEW SHOWS THE 12-FT. OUTCROP OF THE DOUGLAS SEAM

tons. That this production will be increased materially in a short time there is no doubt, as development work is being advanced with a view to putting the mine in the front rank among those of the Island in regard to output.

The work of opening this new mine was commenced late in 1917. All that had been done up to that time was the demonstration by means of drilling that there was sufficient coal within the area controlled by the company to warrant the expenditure contemplated. A townsite had to be laid out, the land cleared, buildings constructed for the housing of plant and bungalows built for the accommodation of employees. All this was done and now the work is practically completed. At the same time the mine work was advanced with the utmost vigor. Three slopes were driven—one the meanway, one for haulage and one the airway. At the face of the manway, at a depth of 196 ft., the coal was 11 ft. in thickness and, from reports, has continued at about this thickness up to the present. The coal is of good quality.





LEFT—MAIN HOISTING SLOPE AND ENTRANCE TO NO. 1 SOUTH AND NO. 1 NORTH LEVELS. RIGHT—FACE OF NO. 1 SOUTH LEVEL, SHOWING TEN FEET OF COAL IN THE DOUGLAS SEAM

A level was driven to the right at a point 175 ft. down to connect with the other two slopes driven from the surface. This was driven in a seam running between 10 and 11 ft., so that the three slopes are in a good substantial seam of coal.

At the start a temporary tipple was used, but the main tipple structure now is underway and should be ready for use soon. A large brick smokestack has been constructed and two 250-hp. boilers as well as two Stirling water-tube boilers are being installed. There also is a modern pumping plant, while a sawmill has been erected capable of turning out 12,000 ft. a day.

To provide storage for railroad cars a long siding of standard gage has been constructed to parallel the Esquimalt & Nanaimo Ry. From this spur a standard gage railway has been built approximately one mile in length to the mine site. At the end of this spur is the mine yard trackage. George Fraser, a mining man of experience and ability who is well-known in British Columbia, is the general superintendent.

It is the intention of the Granby Consolidated Mining and Smelting Co. to use the greater part of the coal from its Island mine for the making of coke, modern by-product ovens for which purpose are in process of construction at Anyox, B. C., the company's coast mining and smelting center. These ovens, it is reported, will be ready in the course of a few months. Work on them is being pushed forward as rapidly as possible.

Complete Gasification of Coal

By M. Meredith
Liverpool, England

In view of the atmosphere of controversy which at present surrounds the problem of carbonization, and particularly the future methods to be employed, it is interesting to refer to endeavors which are being made in the direction of the complete gasification of coal and coke in one operation. It is generally known that if a ton of coal is treated in special equipment for the purpose it may, apart from the ash it contains, be converted entirely into gas, of which product it will yield some 65,000 cu.ft., having a calorific power of about 375 B.t.u. per cubic foot. The "double-gas" plant for this purpose is the invention of an Englishman, and particulars are now at hand of an equipment which is being employed for the same purpose in Germany, and which is made by the well known Dellwik water-gas company of Frankfort.

The apparatus possesses some novel features, but consists in the main of a producer, the lower portion of which is divided into two halves by a curtain wall. Coal is fed into the upper portion and is converted into coke before reaching the divided chamber. The process is similar to that employed with the ordinary type of water-gas plant, in that air and gas are admitted at intermittent periods. In this case, however, a superheated supply of air is utilized, and by this means the fuel in the coke chambers is raised to a temperature of 1400 deg. C., the producer gas being taken off at a point which corresponds with the zone where the coal is completely changed into coke.

During the gas-making period a gas outlet is opened above the coal bed, superheated steam is admitted to the base of the producer, and the water-gas thus produced rises through the coke and passes upward through the entire column of coal. This water-gas at the time of its formation is at a temperature of some 1300 deg. C. and provides the greater part of the heat for the carbonization of the coal, the gases from which are swept from the producer and carried through subsequent equipment of the ordinary type for the removal of sulphuretted hydrogen, tar and ammonia. Condensation is largely effected in the upper layers of the coal bed so that the gas leaves the producer outlet at a temperature of only some 200 deg. C. The producer gas yielded during the blowing period is not wasted, but is utilized for superheating the steam for gas-making.

The duration of the intermittent periods of blowing and gas-making varies in accordance with the kind of coal employed, but generally speaking the "blow" continues for from one to three minutes, while gas-making may be carried on for from five to ten minutes. It is found that by employing an excess of steam a maximum of ammonia is obtained.

An unsatisfactory feature of the process, a feature which is absent from the English system, is the necessity for admitting a certain quantity of air during gas-making. It is said that the quantity of heat demanded for the coking of the coal is greater than that which can be supplied from the stream of water-gas, and hence the necessity for introducing air; but it seems that by modifications in the working it is possible to produce a gas of moderately high calorific power or one of lower quality. When a comparatively good coal is employed the final mixture of gases obtained contains 50 per cent. of hydrogen, 10 per cent. of methane, 30 per cent. of carbon monoxide and 1 per cent. of unsaturated hydrocarbons. The calculated calorific power of such a gas is 384 B.t.u. per cubic foot.

Legal Department

Damages for Wrongful Discharge — An employee wrongfully discharged under a contract engaging his services for a definite term is entitled to recover salary for the unexpired portion of the contract term, less earnings in other employment during that time. (Texas Court of Civil Appeals, Consumers' Lignite Co. vs. James, 204 Southwestern Reporter, 719.)

Liability on Coal Dealer's Bond—Under a bond given by a wholesale dealer to secure compliance on his part with a contract for the purchase of fuel, including a provision that he would make monthly settlement for deliveries, the selling coal-mining company was not bound to terminate the contract, nor to notify the surety, on failure of the dealer to make payments when due, and failure to do either does not preclude the company from enforcing the bond against the surety. (Alabama Supreme Court, Alabama Fuel and Iron Co. vs. Alabama Fidelity and Casualty Co., 79 Southern Reporter, 57.)

Defect in Coal-Handling Device.—Defendant, a company which constructed a coal-handling device for plaintiff's employer, a coal company, is not liable for injury sustained by plaintiff through defective construction by defendant of a guard rail forming part of the work, if there was no knowledge on defendant's part that the particular defect would prove to be imminently dangerous to life or limb. (Wisconsin Supreme Court, Miller vs. Mead-Morrison Co., 166 Northwestern Reporter, 315.)



Need of Efficiency in Coal Mining

By SPECIAL CORRESPONDENT

SYNOPSIS—*Many mines today are being operated by the antiquated methods of a generation or two ago. Old, obsolete, broken-down much-repaired machinery is in quite a few cases being employed to the distinct disadvantage of the owners. If cost of delays from such equipment was charged where it should be, the faulty machines would be promptly placed where they belong—on the scrap heap.*

RECENTLY I visited one of the oldest mining properties in West Virginia. This mine puts out about 800 tons of coal per day, and it only requires 14 men and one perfectly good mule to get the cars onto and off the dump. The tipple payroll amounts to barely $48.50 per shift, or only slightly over 6c. per ton of coal handled.

While this dumping cost (which does not include the mule's expenses) might rightly be considered as being "up to G," it is not so far above that of many mines as to be prominent through its isolation. It is high, yes, outrageously high, yet not higher than that at many another operation of similar character. Around even the average mine many leaks—in the shape of unnecessary daymen, for instance—may be found. Such needless drains in any well-organized business of some other nature would inevitably mean one of two things, either financial ruin or a new manager—possibly both.

It is no uncommon sight about coal mines to see a motorman using (or attempting to use) a locomotive that is either about half as heavy as it should be for the work in hand, or one that has long since "seen its best days" and been fit only for the scrap heap. When such a machine breaks down (as it does almost hourly) it blocks other motors that may possibly be in good condition, keeps coal off the tipple and lays the tipple gang—dumpers, trammers, weighmen, pickers, loaders, spotters—idle. Thus a totally unnecessary expense is added to the cost of each ton of output; and this increment of cost that ought never to have existed at all is invisible, as such, on the cost sheet.

The foreman is not infrequently compelled to remark, "Yes, that old piece of junk called a mining machine over in the fourth left burned out again today, and six men had to knock off." This machine has a record for doing this very thing, particularly when the pit boss wants to do a good day's work. Here is another case of trying to get service out of the unserviceable. This machine has been broken and repaired until it is a creditable monument to the ingenuity (I dare not say skill) of the repairman. As a matter of fact, it is a labyrinthine conglomeration of yokes, tie rods, braces, cunningly devised forgings, reinforcing plates, patch bolts and solder, with possibly a few hundred yards of insulating tape thrown in for good measure.

The condition of this mining machine has been brought repeatedly to the attention of the superintendent and master mechanic. They either believe that it is good policy to "worry along" or know that the machine in toto should be replaced, but have been prevented from procuring a new one by the man higher up. Such higher-ups often "steam-roller" a requisition for a new machine, yet readily O.K. a request covering repairs for some old obsolete contraption. They are firmly convinced of the villainy, ignorance and general depravity of the machine runner. If he continually breaks his old machine, why in the name of common sense should they pay out good money in buying a new machine for him to smash up?

Then there is the question of rolling stock. How many times have you seen a locomotive tug and pull and groan and grind and slip its drivers in an attempt to start a trip of cars that any healthy mule should be able to pull. Next time you see this give the wheels or boxes the "once-over" at close range. You will find dry journals or wheels that have long since eked out or ground out or spun out their normal existence and performed their intended duty or that for which they were designed. Usually such wheels will be found to be of the ancient plainbore type—and in poor condition at that.

Hard on the Third Commandment

The motorman may sand the rails and turn on the current; the triprider may grin; the pitboss may wax impatient; and the third commandment be strained far beyond its elastic limit or even smashed to smithereereens—yet the motor refuses to mote the cars to tipple. And back in the mine two or three or a dozen or more loaders wait (for a while) for the empties they should have received as soon as their last car was loaded. Fifteen minutes, twenty minutes, maybe half an hour they wait. Then they fill their pipes, light up and light out—for home. Out on the tipple the dump crew organizes itself into a board of naval strategy to determine why the German grand fleet did not come out from behind Heligoland while the war was on.

A few hard-running cars are burning up what is left of the locomotive, consuming untold energy, delaying the transportation system all the way from the working face to the tipple, while the high peak load caused by the stubborn journals keeps the power house man on

the jump putting in the circuit breaker. Every time the breaker goes out it means that everything on the circuit is deprived of "juice" and comes to a standstill until the breaker is put back in again.

Those old car wheels have dripped oil from the working face to the dump and back again times without number. The oiler is kept busy with a 1½ in. by 2-ft. gun, squirting black strap at or on (not always into) the journal boxes. The tipple floor reeks with it, is swamped with it, sometimes shoesole deep; and the dump crew (sometimes purposely, sometimes otherwise) slip and skid and slide and skate about as if in a sure-enough rink. Nobody can assign any good reason why oil should be smeared all over the lease when it ought to be employed in the car wheels. Application elsewhere is utterly unnecessary, as there are many types of wheels on the market so constructed as to confine the lubricant where it is needed—against the wearing surface.



In many mines one storage battery would do the work of six or seven mules and an equal number of skinners. One motorman and one triprider would replace the whole gang. In spite of this, however, the Missouri locomotive is still doing duty (that is, after a fashion), still getting crippled, still eating good hay and grain and other food whether he works or not, when he might be replaced by steel and iron and copper and lead and chemicals, etc., at a great saving. Of course, some mines cannot profitably displace mules with storage-battery motors, but most mines can do so to advantage. There is a mighty good way to solve this question, however, and every operator should *know* what is the cheapest method of handling his output.

How much money is wasted annually by coal men in lubricants because they have not taken the trouble to find out or demonstrate just what kind of grease or oil they should use upon each type of machine? And how many machines are damaged yearly by having the wrong kind of lubricant applied to their bearings?

A friend of mine has several barrels of a certain lubricant that he purchased for a particular purpose without ascertaining if it was the proper kind to use. After he had bought this and had it delivered and stored away in his warehouse, the maker of the machine upon which he intended to use the grease came along and told him that if he used this particular grease his machine would be in the shop in less than a month. Foolishness? Yes. Carelessness? Assuredly. Still this is an existing case, and many such could be found if all the men who had made similar purchases were frank enough to own up to them and admit the facts.

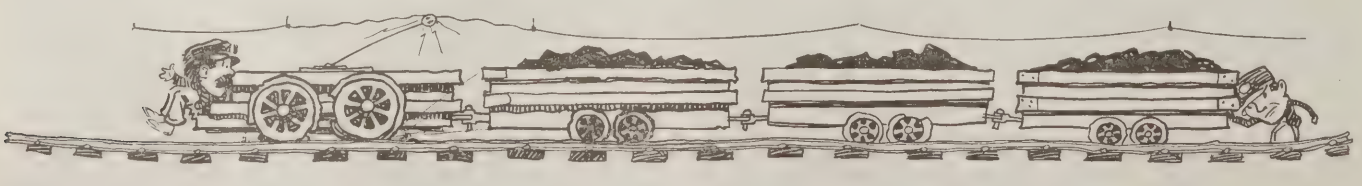
Of all business men under the sun, the coal operators are perhaps the ones most thoroughly tied, bound, manacled, straight-jacketed, lashed and cobwebbed to precedent. Many of them appear utterly incapable of standing on their own feet and deciding for themselves. They must do as the other fellow does, or as those have done who have preceded them. This propensity has caused coal men to lose many dollars. For instance, a man bought a certain kind of equipment. It was practically untried, and there appeared to be every reason in the world why it should be a failure. Nevertheless his friend bought the same equipment because the first man did. It did prove a failure, and they both lost heavily by the deal.

The other day I was talking to a man who has been operating mines for twenty years, and he asked me about a certain widely advertised mine appliance, one that has stood the gaff of practical, hard service for years, but not in this man's section of the country. He told me he would like to buy this equipment, but he did not know what his men would think about it. It was a new appliance in his field and he believed he would wait awhile. This device would undoubtedly have proved a money saver, and his men would have welcomed it, but the operator had to take a step by himself not in accordance with precedent. No other man near him was using this particular equipment and he was afraid to trust to his own judgment.

In any other business now existing that is one-fiftieth as large as the coal industry there are efficiency engineers, men who earn their daily biscuits by scheming up ways and means to reduce the cost of production or of manufacture. Any piece of equipment or any method for lessening the cost of the product by even the smallest amount is eagerly investigated and, if it stands the light of this investigation, adopted.

Suppose that all delays, lost tonnage, etc., caused by poor rolling stock, locomotives and mine cars were charged up to haulage on the daily cost sheet. Suppose that the lubricant wasted around the mines and which should be in the wheels of this rolling stock were carried as a wastage item. Suppose that lost tonnage and lost day labor were charged up to mining machinery when the old, antiquated, much repaired, patched-up mining machines laid down and died, or, as they sometimes do, "played 'possum," how would all this appear on the daily cost sheet? Suppose that the time lost fooling with an old worn-out dump, repairing it and trying to get it to do the duty of a good one, were charged up to that particular piece of machinery on the tipple where it was installed. It would be reasonable, doubtless, to expect that some changes would be made.

If the losses caused by poor equipment could be charged (and they should be) to the direct cause of loss, and to that particular classification of costs to which they belong, many of the old worn-out and inefficient pieces of apparatus would be promptly replaced by modern, money-saving, time-saving and efficient equipment. There would be a man whose duty it would be to investigate and ascertain by what means every item appearing in the daily cost sheets could be made

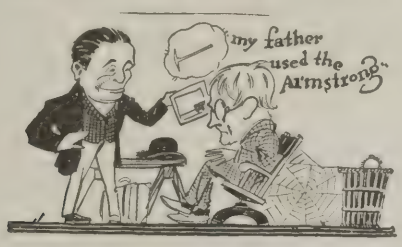


more efficient—be made to do the same work for less money or more work for the same money.

Every mining man knows that the foregoing statements are substantially true, but they do not realize just what the numerous small items of loss amount to in a year's time; consequently, little effort is made to improve conditions. Put these items on the daily cost sheet in dollars and cents, and their importance is made immediately apparent.

The largest concerns in the coal business are among those who ignore these facts. I have in mind, however, one large concern that employs an efficiency expert. And if you doubt the utility of this expert, glance at the report of this company's excess profits tax. It will be an eye-opener, especially if it is compared with that of some of the other companies who produce about the same amount of coal in the same district from the same seams and sell in the same markets.

If anyone doubts the contentions I have here set up, let him look around in his own neighborhood, single out the man who has the best, most efficient, modern equipment, and compare his costs with those of the man who is worrying along with the same type of equipment that his father and grandfather used before



him merely because he *possesses* this equipment and *can* worry along with it. The time is coming when the coal operator will be forced to get a much greater degree of efficiency out of his equipment or go out of business.

Unfortunately, mining apparatus has a marked and pronounced proclivity for breaking down one piece at a time—for dying piecemeal. This imposes upon the operator the difficult problem of determining when the machine has been so thoroughly "shot to pieces" as to make scrapping advisable. A boon would be conferred on humanity in general and upon the coal operator in particular, by the manufacturer who could so design and build his equipment that it would fail as did the wonderful one-horse chaise—"to wonct."

Down on His Luck

A superintendent in charge of a Pennsylvania low vein mine was on his way to the office one morning when he met a miner going home. As he was short of men he asked the miner what the trouble was, and was informed by him that he was quitting.

"Why are you quitting?" asked the superintendent.

"Well, I don't have any luck here any more, that's why."

"What's the matter with your luck?"

"Well, I walked a mile to my room this morning, and after getting there I laid down and rolled 200 ft. into my place and landed with my back to the face. Rolled out and in again five times, and landed the same way every time. I'm going to the thick vein district."

Signaling in British Coal Mines Under the New Act

(Concluded from page 980)

primary cells, or from the colliery electrical service, the potential being reduced to 25 volts by the aid of a motor generator.

When a signal is sent from the bottom it rings the bell in the engine room and closes a switch, which connects the proper lamp with the battery or dynamo. At the pit bottom two possible arrangements are made, either what the makers call a switch selector and push, or a number of separate pushes. The selector is a multiple switch, formed by an arm sweeping over a number of contacts arranged on the arc of a circle. A pointer is provided on the outside of the selector, and the bottom cager moves the pointer to the number corresponding to the signal he wishes to give, and presses the push as many times as he wishes to sound strokes on the bell. The top cager has a somewhat similar outfit. With the separate pushes mounted on a board, and numbered according to the signals to be given, either the bottom or top cagers merely press the button corresponding to the number of the signal as many times as they require to sound gongs.

This apparatus requires rather a large number of wires in the shaft—as many wires as there are signals to be given, and one more. These may be separately insulated and made up into a multiple cable, and led to each signaling station. Where two or more beds are worked from the same shaft, the cager at each bottom will have a similar outfit, and provision is made on the indicator for each signal from each landing. The number of wires required will thus be increased by the number of additional signals. In my opinion, the use of multiple cables in the shaft is a disadvantage.

The signals are canceled automatically when the engine commences to move. In the case of the apparatus first described, this is accomplished by an additional electromagnet, whose circuit is closed when the engine commences to move. This is made to release the pawl holding the ratchet in position, a spring on the axle of the ratchet causing it to move back so as to bring the pointer and the flag to zero. In the indicator apparatus each signal wipes out the one that preceded it through a system of electric contacts. The last, or standing signal is of course only obliterated when the engine moves.

Another requirement of the new rules is that there shall be no sparking into a free atmosphere in any part of any signaling system. The system of signals that has been most largely employed on engine planes is one wherein contact is made between two naked galvanized iron wires, stretched on insulators along the side of the road. The naked iron wires must now be displaced by insulated wires and contacts made inside of gas-proof and flame-proof cases.

In one system, worked out by an eminent mining engineer, a number of switch boxes are placed at different points along the road and moving contact arms actuated in each, by mechanical-pull signal wires, arranged by the side of the road. Thus a signal can be sent from any part of the road, as with the old arrangement.

Winning the War with Coal

By Val Fisher
New York City

When the complete story of England's magnificent effort and sacrifice in the war is told, a chapter reflecting at once achievements among the most brilliant and revealing the debt of gratitude under which she has placed America through services to the American army must be given the prosaic title, "Coal." In the same narrative must be told how every man, woman and child in England went gladly without accustomed warmth last winter, through lack of fuel, in order that coal could be supplied in quantities sufficient to bring the American armies to France to stay the onward rush of the Germans last March, and in order that warmth and comfort could be supplied to them in proportion as every additional American soldier was landed in the battle zone. For the demand on England's already heavily-taxed coal supply was not only marked by every transport bringing troops to Europe, but for the maintenance there as stated, of every one of our boys.

English mothers and children bore this sacrifice gladly, as they have borne numerous others during the conflict. They even smiled at the announcements of the coal controller that their rations of fuel this winter, owing to the heavy demands of Italy, France and the United States in the manner explained, would be less than half those of previous winters. They even declared that they would save a quarter of their meager allowance, and all indications now point to the realization of the general ambition in this respect.

How 1917 Coal Output Was Consumed

An examination of the coal statistics of Britain in war time provides an interesting story. In 1917 the output was consumed as follows:

	Tons
Coal hoisted in 1917	248,000,000
Used at mines	18,000,000
Balance	230,000,000
Total exports to Allies, Neutrals and British possessions	35,000,000
Leaving a balance to be consumed as bunker coal, Admiralty requirements for munitions purposes, for domestic consumption and otherwise of	195,000,000

The causes of the shortage of coal for domestic consumption in England are several. The chief one, however, resulted from the enemy offensive last spring, when the Germans, owing to the Russian breakdown, brought their whole strength to bear in the West and seriously threatened the Allied line. The military situation affected coal conditions in two ways: (1) It was necessary for the safety of the Allied lines for England to comb out the miners for the army of resistance. The experts decided on making soldiers out of 100,000 mine workers. (2) The second attack in April in the north of France involved a serious loss in the output from those mines just behind the British lines that had been recovered from the Germans, thus rendering it vitally necessary for Britain to increase the supply of coal to France by several millions of tons a year, with the possibility of a still further increase in case these mines should be entirely lost. Owing to this possibility of further demand, the authorities decided to take but 75,000 men from among the miners for the army. In addition Britain was faced with fresh demands at home for naval and military purposes, the greatest item of which was that of the ever-growing American army in transport to France and when there.

We have been taught that coal is king, and this has long been accepted as an axiom, especially in commerce; but the story of how the English have used coal as a lever with which to enlist the aid of half the neutral world in winning the war for the Allies, leaves no doubt as to the truth of the saying. And too much could not be said for the business ingenuity and adroitness which has employed every ton of British coal to the advantage of the Allies. The whole story may not as yet be told, but enough of it may be indicated to demonstrate the brilliant talent used in our behalf.

It is a fact not generally recognized that as a result of Britain's coal supply and of her clever use of it neutral shipping is largely responsible for the presence to-day in France of the vast American army which took its part in the struggle. The shipping obtained with this coal also has been used in keeping France and Italy supplied with food, coal and munitions, to say nothing of the Serbian army and that at Saloniki and in Palestine.

British Coal Supply Used as Weapon

Thus it will be seen that the supply by Britain of coal to neutrals is not a matter of pounds, shillings and pence, but actually of life and death itself. Unless Britain sends coals to neutrals, Germany does so, her coal carrying with it the obligation of the recipient to send back in exchange food and products that may be used in furthering the enemy's supply of munitions of war. Though the Germans are in worse straits than Britain for coal, even so they are using it as a weapon in the manner indicated for neutral support to their utmost.

In short, the ability of England to send coal to neutrals is of both positive and negative value—positive in enabling her to barter for food, iron ore, etc., and shipping in return, and negative in enabling her to place a check on the export of war materials from neutral countries to Germany.

For instance, by supplying a definite quantity of coal to one country (Norway) England obtains the use practically of the whole of that country's mercantile marine, amounting to several hundred thousands of tons, in addition to foodstuffs and other necessities. Every cargo of British coal landed in that country means the use of one of its ships with which to carry coal to France or Italy or foodstuffs to these countries.

Britain uses coal in fighting Germany for the butter and foodstuffs of another country (Denmark). From this latter country she has likewise obtained the use of tonnage to a lesser though not an unimportant degree. And an arrangement with still another country (Sweden) has worked to material advantage in ships and important national products placed at her disposal.

Certain supplies of war materials from neutral countries to fortify Germany's effort have been either entirely stopped or reduced materially in return for British coal.

It is the trading power of British coal again that brings to her shores regular consignments of iron ore from still another country (Spain), this being sent back

to France and other theaters of war, of course in the form of munitions of all kinds.

Sir Guy Calthorp, the British Coal Controller, has taken care that the vital importance of coal as thus explained in the winning of the war should be made known throughout the length and breadth of the land, and the people understood the situation thoroughly. In order to prosecute a nation-wide publicity campaign, he induced Lord Northcliffe to lend, as chief of the publicity, the news edition of the *Daily Mail* and a regular editorial staff was organized by Walter Fish, the members of this staff writing daily on coal economy and its necessity in all its phases both for the metropolitan and country newspapers and periodicals, in addition to preparing pamphlets and handbills for distribution in this campaign of education. The crusade is being aided by officials high and low—the mayors of cities, members of Parliament, the clergy and school teachers everywhere—who have enlisted the aid of children in distributing pamphlets. It has been explained to the people that though England starts the present winter short of 30,000,000 tons of coal, some 9,000,000 tons should be saved by the rationing system. It is pointed out that though the deficit of 97,000,000 tons may not be found, it can be reduced only if the miners dig more coal and the householders use less than their ration. Even then the supplies of coal to the industrial world will be short of requirements.

Coal Supply Vital to Industry

The coal controller already has received deputations from a number of industries, such as woolen and pottery manufacturers, fabric dyers, bleachers, printers and finishers, pointing out that the reduction in coal curtailed the wage-earning capacity of their employees and threatens to inflict hardships on their work people.

Small wonder, then, that the people of England were impressed by the situation and as usual were willing and even glad to face the discomfort and rigors of a cold and damp winter in their usual ardor to aid in the speedy winning of the war!

The British coal controller recently distributed broadcast a hand bill containing the following:

COAL IS THE KEY TO VICTORY—MARSHAL FOCH

British coal supports the war in France. It is the great source of power. It is wanted for moving trains. It is wanted for driving ships. It is wanted for making munitions. It is wanted for high explosives. It is wanted to exchange for food and ships.

All the Allies want British coal and must have it. The Germans have seized French coal fields. Italy has none, America's coal is too far away. It is Britain's part to supply them all.

All the coal you save is used for war purposes—to bring victory nearer.

Another handbill gave details of how to save coal, telling users to mix coke with it, to take the coal out of the fire on going to bed to save the cinders, etc. Thus is coal being used in the interests of democracy.

Bituminous Coal Loaded at Lake Erie Docks During Month of October

Loading of bituminous coal for the lake trade at Lake Erie ports set a new high record in October, the revised and final report of the Ore and Coal Exchange, of Cleveland, shows. In the month 4,855,068.90 tons of cargo coal and 188,818.10 tons of vessel fuel, a total of 5,043,887 tons, were dumped. For the season to Nov. 1, the grand total of cargo and vessel coal now is 26,728,722,94 tons. This is a tonnage far in excess of that moved by lake in the corresponding period of any previous season. Loading of bituminous coal, including vessel fuel, for the season to Nov. 1 has been: April, 686,852.64 tons; May, 3,194,198.10; June, 3,539,352.30; July, 4,234,305.05; August, 4,996,929.95; September, 4,851,197.90; October, 5,043,887. The 26,728,722.94 tons of bituminous dumped in the season to Nov. 1 is divided into 25,611,125.94 tons of cargo coal and 1,117,597 tons of vessel fuel. The table shown above, the official compilation of the Ore and Coal Exchange, which is handling the Great Lakes vessel pool, gives the statistics in detail.

BITUMINOUS COAL LOADED AT LAKE ERIE PORTS

Port	Dock	In October			Season to Nov. 1		
		Cargo	Vessel Fuel	Total	Cargo	Vessel Fuel	Total
Toledo	Baltimore & Ohio	569,964.65	15,205.65	585,170.30	2,707,235.85	58,729.45	2,765,965.30
Toledo	Hocking Valley	862,545.95	23,221.15	885,767.10	4,462,753.55	127,397.20	4,590,150.75
Toledo	Toledo & Ohio Central	352,369.60	7,267.45	359,637.05	1,951,059.60	50,883.60	2,001,943.20
Sandusky	Pennsylvania	446,254.60	10,245.90	456,500.50	2,210,662.80	54,487.00	2,265,149.80
Huron	Wheeling & Lake Erie	320,999.35	11,390.60	332,389.95	1,926,074.20	68,952.30	1,995,026.50
Lorain	Baltimore & Ohio	570,577.60	14,825.30	585,402.90	2,944,166.90	82,780.55	3,026,897.45
Cleveland	Erie	130,662.90	4,343.70	135,006.60	618,013.85	20,471.85	638,485.70
Cleveland	Pennsylvania	399,048.45	39,356.05	438,404.50	2,299,623.99	263,597.95	2,563,221.94
Fairport	Baltimore & Ohio	84,718.15	7,016.00	91,734.15	234,042.80	41,142.20	275,185.00
Ashtabula	New York Central	275,802.70	28,955.20	304,757.90	1,811,092.25	193,118.35	2,004,210.60
Ashtabula	Pennsylvania	310,919.90	13,383.65	324,303.55	1,338,876.45	76,313.20	1,415,189.65
Conneaut	Bessemer & Lake Erie	329,294.25	4,731.55	334,025.80	2,059,731.65	30,187.25	2,089,918.90
Erie	Pennsylvania Lines West	105,956.80	4,081.40	110,038.20	618,899.25	34,732.60	653,631.85
Erie	Pennsylvania Lines East	95,954.00	4,794.50	100,748.50	428,942.80	14,803.50	443,746.30
Total		4,855,068.90	188,818.10	5,043,887.00	25,611,125.94	1,117,597.00	26,728,722.94

In a statement to the public the coal controller says: "Notwithstanding economies already made, we are still on the danger line and the facts cannot be too insistently and too often brought to the notice of the people of this country. The stocks of our munition works are being eaten into, gas and electric companies are crying for coal to build up their stocks against the winter months. These stocks are not being accumulated at the present time; they are being drawn upon and we have not been able to fulfill our coal obligation to our Allies. The miners' leaders have promised to do their utmost to induce the men to increase the output, and the public is being asked to do its part in reducing the consumption of coke, gas and electricity to a minimum. It is a race with winter. Every consumer should try to manage on three-quarters of his ration. The quarter saved will help to keep our brave soldiers warm."

One pound of pure carbon produces, when completely burned, about 14,500 B.t.u. and requires about 12 lb. of air for its combustion. However, commercial fuels contain combustible matter which forms the ash; this inert combustible matter uses up heat when it is raised to the temperature of the burning fuel.

Use of Methane as a Fuel

By George W. Williams
Wilkes-Barre, Penn.

The milions of cubic feet of methane which are drawn by fans daily from the anthracite mines, in order to make mining less hazardous, may possibly be harnessed, despite the contrary view of many experts, and utilized in a commercial way. The combustibility of methane is not disputed, but whether this terror of the mines, pure or in a mechanical mixture with air, can be put to use as fuel is a matter that men of thought and vision are trying to work out in the hard-coal fields.

Two big problems relative to the possibility of giving methane a commercial value are now in the hands of mine students in the Wyoming Valley. The first of these, and probably the more important, is to determine the value of the methane content of mine air. The second is whether the return air from mines, containing 1 per cent. of methane and less oxygen than pure air, can produce a greater heat for the coal consumed than can pure air alone.

Most problems of this sort are eventually solved through study and experiment, and it follows that any coal corporation sufficiently interested to go to the expense and trouble of almost public experiment must have found some fact in laboratory work on which to base expectation and hope.

Months ago Governor Martin Brumbaugh of Pennsylvania wrote to an official of the Delaware, Lackawanna & Western, Coal Department, and suggested that the millions of cubic feet of methane going to waste and the millions of cubic feet more left untapped in the earth be put to some practical use. That message did not fall on deaf ears, for out of it has grown, following long study and work in the laboratories of that company, a determination to test in some conclusive manner the possibility of commercially utilizing methane—a question that has enthusiastic champions and perhaps just as positive antagonists.

At the Loomis colliery of the Delaware, Lackawanna & Western Co., at Nanticoke, Penn., there has been erected an experimental station that may quickly and without danger of contradiction decide the question of the commercial worth of methane. It is not the type of plant that denotes permanence, neither has it an expensive foundation. It does not give evidence of coal company lavishness. It does represent a purpose, however, and what it lacks in substantiality and cost is fully made up in the determination back of the motive—the earnest zeal for solving one of the unique mine questions of the century.

This experimental station was erected at the direction of W. W. Ingliss, vice president and general manager of the Delaware, Lackawanna & Western Company, and stands in close proximity to the big Loomis breaker. It takes form in a locomotive boiler fitted with a smoke stack about 30 ft. high. Fifty feet distant is the big mine fan of the Loomis colliery, which for years has been throwing the impurities of the mine into the atmosphere. To conduct these to the boiler an airway has been built.



EXPERIMENTAL STATION ERECTED AT NANTICOKE, PENN., TO TEST AVAILABILITY OF METHANE AS A FUEL

The natural operation of the fan would be to throw out its mixtures above the mouth of the feed line. To divert the course of such mixtures a smaller fan has been installed in the airway 6 ft. from the intake, and by this means a certain amount of air is shunted and forced to the base of the boiler. Thus instead of taking air from the atmosphere for the purpose of burning coal, the current comes from the fan drift; and here comes the chance to experiment with the first of the big questions to be determined—that of learning the value of the methane content of mine air, the plan being of course to consume or take advantage of the methane constituent of this air, which is about 1 per cent.

It is stated that the first experiment will be made with this equipment while connected with the mine drift, and that after the value of the methane content of the air has been determined further tests will be made by obtaining the air supply from the atmosphere.

The principle of the experiment is plain. In determining the value of methane in the return air current a unit weight of coal will be consumed and the water evaporation noted. The equipment will then be changed in order that the air supply be obtained from the atmosphere, under which condition an equal unit of coal will be burned and the water evaporation noted for comparison.

At this point the second of the big questions presents itself. It is well known that the return air from the Loomis mine contains 1 per cent. of methane. As a matter of fact it contains less oxygen than is found in the atmosphere. Oxygen is the supporter of combustion, and in the return air from the mine oxygen is present in less degree than in atmospheric air. Whether the return air can produce more heat for less coal consumed than pure atmospheric air becomes then a most interesting matter.

Comparisons are always of interest. In the case of the Loomis experiments the existing facts may afford interesting study. Analysis of pure air, as all mine students know, shows the following: O, 20.93 per cent.; CO_2, 0.03 per cent.; N, 79.04 per cent. State reports show the analysis of Loomis mine air to be O, 20 per cent.; CH_4, 1 per cent.; CO_2, 0.07 per cent.; N, 78.93 per cent.

Will the return air, with 1 per cent. methane as shown in the foregoing analysis, and its 20 per cent. of oxygen, produce results equal to those secured when using pure air containing 20.93 per cent. of oxygen?

The Loomis is one of the most gaseous mines of the Wyoming Valley. Two fans are constantly in operation drawing impurities from the underground workings. The larger of these draws off every 24 hours 3,451,680 cu.ft., or 77.6 tons, of methane. The smaller one throws off 2,462,400 cu.ft. each 24 hours, or 55.4 tons, making a total of 5,914,080 cu.ft., or 133 tons of combustible gas exhausted from this mine each day.

Just what will be the result of the Loomis experiments is problematical, but they bring forcibly to light the fact that a big company and capable men are just now groping in the darkness, as it were, on the methane question. While they have not as yet laid their hands on facts and conditions that indicate any revolution in the anthracite industry, they are thinking and working, and out of their earnest effort is certain ultimately to come definite conclusions as to the possibilities, positive and negative, of the great methane question.

Treatment of Burns with Wax

The war has revolutionized surgery, and perhaps in no way more completely than in the treatment of burns by the wax method. The men of the mines, whether official or subordinate, have had for many years such an expert knowledge of the dressing of burns, obtained by them in first-aid instruction, that everyone in the industry will be interested in a new method of treatment in which a preparation of paraffin wax applied hot replaces all the old medicaments, some of which tended to spoil and become septic and none of which gave perfect satisfaction even when correctly applied. The wax, or Ambrine, becomes liquid at about 120 deg. Fahr. After being heated to a sterilizing temperature for 10 minutes it is placed in a water-jacketed atomizer which keeps it at a temperature of between 140 and 150 deg. Fahr. Before application the burns, regardless of character, are thoroughly dried. Then an air-tight covering of paraffin wax is applied to the burned area and allowed to extend a half inch beyond it. A thin layer of cotton is then laid over the waxed area and is incorporated into the first film of paraffin wax by painting with a fine varnish brush sufficient wax to completely impregnate the cotton. The wax "sets" in a few seconds. The dressing is then completed by swathing the entire waxed area in cotton and bandages. Every 24 hours the burns are redressed. The wax tends to splint the wound and to keep the temperature constant and favorable for skin renewal and repair. In a short time secretions form under the dressing, and these make the wax nonadhesive so that it can be readily removed without pain or injury. As soon as the granulating area shows only slight secretions, the dressing may be renewed every 48 hours.

The new wax treatment was invented 16 years ago in China by a Frenchman, Barthe de Sandfordt, but it did not make much headway. Five years ago attempts were made to market it in America but without much success. The war developed the treatment so rapidly that now it has received almost international indorsement. The United States army purchased during the war no less than 5000 to 6000 lb. of the Ambrine wax per day, the whole product of the factory. Even then enough was not being produced to satisfy the demands.

Ambrine can be used successfully not only with superficial burns but with those of second and third degrees of severity. It is used for the treatment also of cuts, lacerations, abrasions, amputations, chilblains, frost bites, bruises, sprains, boils, whitlows and most forms of skin affections. It really does not cure the injuries described but gives nature the chance it desires to do its own curative work. Many of the methods used today and in the past involve such painful operations in dressing the wound that the operation is not only terribly distressing but retards the cure of the afflicted member and leaves the patient permanently disfigured.

According to William O'Neill Sherman, chief surgeon of the Carnegie Steel Co., in his paper, published in April of the present year in *Surgery, Gynecology and Obstetrics*, an article, by the way, submitted by request of the Committee of Medical Research of the Council of National Defense: "To seal up an infected wound was thought to be contrary to all sound surgical principles. Nothwithstanding this, the patients [at Issy-les-Moulineaux] were being dressed without pain; they were recovering in one-third to one-half the time required under former methods and free from cicatricial contraction with a minimum of scar tissue."

He adds: "Very few who have witnessed this treatment at first hand have failed to acknowledge its unquestioned superiority over every other known method."

According to Dr. Sherman improvements of technique in the United States have made it possible to dress "the largest burns in 5 to 8 min., without much discomfort or annoyance to the patient." The men in the employ of the Carnegie Steel Co. having learned from the experience of their fellow workmen are beginning to ask that the method be used in their treatment.

Occlusion of Explosive Gases in Coal

By JAMES ASHWORTH
Consulting Mining Engineer, Vancouver, B. C., Canada

SYNOPSIS — *Authoritative tests of coal dust show presence of ethane. The gas also found in samples of mine atmospheres. Possibilities of occluded gas existing in a liquid form, under high pressure, suggested by the continuous outflow of gas and dust, in the outbursts at the Morrissey mines. Methane given off largely by coal; but ethane and propane yielded mostly by fine dust, which emphasizes the dangerous nature of such dust. Safety to be sought in a careful study of best methods of working coal mines.*

AT FIRST, it may seem a ridiculous question to ask, "In what way is gas held in coal seams?" The majority of mining people will immediately reply that it is held in the crevices, cracks and bedding planes common to the coal formations. It has, however, been well known to many close investigators that the solution of the question is not simple.

Some years ago when I first visited British Columbia, and the Crow's Nest Pass coalfield in particular, I formed the opinion that ethane (C_2H_6) was a component part of the so-called firedamp of the mines. This opinion was confirmed, a little later, by tests made on fine coal dust, collected and taken to England in sealed canisters. The tests were made by Prof. Phillips-Bedson of the Armstrong College, Newcastle-on-Tyne, whose fame as an investigator of the gases occluded in coal is world wide. A few years later, these results were confirmed by Prof. John Cadman (now, Sir John), who discovered ethane in a sample of the atmospheres of the Belle Vue mine, which is on the Alberta side of the Crow's Nest Pass.

Discovered Ethane and Hydrogen in Analyzing Samples of Mine Air

Later still Dr. Haanel, chief of the Dominion government laboratories at Ottawa, discovered ethane and also indications of hydrogen in samples of mine air submitted to him for analysis. Again, the British Columbian Minister of Mines' report for 1917 contains some extended information on this subject, as the result of an investigation made by George S. Rice, Chief Engineer of the United States Bureau of Mines, while investigating the cause of "bumps" at Fernie.

The analyses and tests of gases and coal dusts, made by A. C. Fieldner, chemist of the United States Bureau of Mines, who developed some new methods of testing coals for their occluded gases, showed the average percentage composition of the coals tested was as follows: Moisture 0.51; volatile combustible matter 26.62; fixed carbon 66.78; ash 6.10; sulphur 0.37 per cent. All the samples, after gathering, were placed in sealed jars, so as to retain any gases that might be given off in transit. However, on opening some of the jars under water it was found that they were at atmospheric pressure, and any gas that may have been given off had escaped. These samples were all obtained from the coal seams in nut-sized pieces.

In mines of a gaseous character, explosive gases are usually found to be highly compressed; but, in the tests so far made, in the Crow's Nest Pass Coal Company's Coal Creek mines, no high pressure gas was found, although hydrocarbon gases were found to be held in the structure of the coal and classed as "occluded" gases. Careful microscopic examinations of coals have disclosed the fact that some coals contain large quantities of microspores and megaspores, which are known to be the seeds of mosses.

This particular subject has been, and is still, the life-long work of James Lomax and his daughter, at Bolton, England. They and their friends hope to be able to determine, by this means, what coal seams are particularly dangerous both in respect to gas and dust. I feel, however, that this does not offer the best solution to the problem of mine explosions.

Do Occluded Gases Exist as Liquids in Coal?

For some years past, probably since 1904, I have been of the opinion that some of the most dangerous explosive gases exist, in many coal seams, in the form of liquids, which when the pressure is reduced break away the coal, and continue breaking it away until exhausted. In no other way can I account for the extremely dangerous and destructive effects of the outbursts of gas that have occurred, from time to time, in this district, especially in the Morrissey mines of the Crow's Nest Pass coalfield.

In practically all the cases that occurred, the outbursts of gas continued for some considerable time, and were of such volume that the gas came out of the mine at the intake opening, while the fan on the return opening was running at full speed. With the rush of gas came, also, great volumes of coal dust as fine as soot. The total weight of dust, in one case, was estimated at five thousand tons. The cavities left by the displacement of the coal were, in all cases, at right angles to the strike of the seam. It is easy to understand that if this gas had been compressed in a cavity already existing, it would have burst forth in one huge volume, but that was not the case.

Reading a recent publication of the U. S. Bureau of Mines, Bulletin 148, by J. O. Lewis, entitled "Some Physical Properties of Petroleum and Gases," my attention was arrested by the following statement regarding the solubility of gases in petroleum:

> Under the same conditions of temperature and pressure, a particular oil will absorb a fixed proportion of a particular gas; but this proportion or "coefficient of absorption," as it is called, varies with each oil and each gas. The gas is held absorbed in the oil in the same way that soda water is charged with carbon dioxide. The proportion of gas absorbed is lessened under high temperatures, but is greatly increased under high pressures, in accordance with Henry's law of gases. Enormous quantities of gas are held in solution under the high initial pressure found in some oil wells. Some of the constituent gases are condensed at these high pressures just as in a compressor plant; and, as long as a

high enough pressure is maintained, exist as liquids dissolved in the oil. Under such conditions the gas is not absorbed as a gas, but as one liquid dissolved in another; and a much greater proportion of gas can be held in solution when in liquified form than when uncondensed. Other gases (methane, ethane and propane) are never liquified at the pressures and temperatures in oil sands penetrated by wells, but are always found as gases dissolved or absorbed in the oil. They constitute the so-called dry gases.

In testing the Coal Creek (Fernie, B. C.) coals for their occluded gases Mr. Fieldner did not air-dry them but ground them up in a special mill. The results that he obtained were 37.6 c.c. of methane, and 126.0 c.c. of ethane, besides 11.9 c.c. of carbon dioxide and 24.4 c.c. of nitrogen, making a total of 199.9 c.c. of gas from each 100 grams of coal. It is very noticeable that, in transit from the mine to the laboratory, practically no methane, ethane, or carbon dioxide were given off. That the ethane was not produced from the heat generated during the grinding was proved by the fact that in some of the tests made of coal from the same mines no ethane was found.

Samples of coal from the Nanaimo mines showed that coal from No. 1 mine contained 62.7 c.c. of methane and 21.9 c.c. of ethane, per 100 grams of coal, while another sample contained 128.6 c.c. of methane, and 29.8 of ethane. But samples taken from the Reserve mine, where a disastrous explosion occurred a few years ago, showed that both ethane, propane and methane were present. One sample from this mine yielded 20.5 c.c. ethane and 5.7 c.c. propane; another sample, 5.0 c.c. ethane and 11.9 c.c. propane. Tests made on special samples of mine air sent to the Canadian Department of Mines, from Michel, showed a trace of hydrogen in two cases, but no ethane.

Methane Given Off by Coal, While Ethane and Propane Yielded by Fine Dust

From the above tests it would appear that methane is readily given off by coal, while ethane and propane are found more frequently when the coal is finely crushed. Some physicists assert that films of gas are held, on the surface of the particles of coal, under such tension that the gas is in a compressed state equivalent to liquefaction. It has been found that large volumes of gas are continuously given off from the working face, particularly in some of the Michel mines, as reported by the chief inspector of mines, in the British Columbia Minister of Mine's report for 1916.

In the tables appended to the report just mentioned it appears that the volume of gas found in the return air and classed as methane, is very large, and it has been found necessary to limit coal getting at the faces to one shift, each 24 hours. The tabulated percentage of explosive gases carried by the return air does not include all of the occluded gases in the coal. Mr. Fieldner's investigations reveal the presence of other hydrocarbon gases, such as ethane and propane, and a suspicion of hydrogen, in each minute particle of coal dust. It follows, therefore, that the fine coal dust is of an especially dangerous character.

Having ascertained with almost absolute certainty the way in which explosive gases are contained in the structure of coal seams, it now becomes necessary to ascertain in what way the mines can be worked with the greatest degree of safety. The evidence shows that the mines of the Crow's Nest Pass are generally worked on some form of pillar-and-stall system. It has also been shown that every pillar is a constant producer of highly explosive gas, and it follows that the greater the number of pillars, or more properly speaking, the greater the superficial area of coal exposed the greater will be the difficulty of ventilating the mine safely.

In regard to this mode of working a most extraordinary statement is made in Mr. Rice's report (British Columbia, Report of the Minister of Mines, 1917, p. 327) to the effect that during the big "bump," Nov. 8, 1916, no gas was given off. No suggestion or explanation of this is made, although, at a later date, a smaller bump in the same mine produced a large volume of gas. All but one of the bumps recorded at the Coal Creek mines have been accompanied by outbursts of explosive gases. I feel convinced that further investigation will fully bear out this short summary of the way in which explosive gases are held in a coal seam; and it only remains to discover the safest method of working coal seams to vastly improve them in point of safety.

Effect of Salt on Reinforced Concrete

It has frequently been recommended that salt be placed in the water used to mix concrete in freezing weather, in order to decrease the liability of the concrete freezing while setting and hardening. A writer in *Concrete*, who was an observer for a period of 12 years of the effect of salt on reinforced concrete in a warm climate, concludes that salt should never be used in the construction noted. While the observations recorded were made on reinforced concrete in the Hawaiian Islands, where there is a warm, humid climate, still the failures of the structures were so serious and occurred within such a comparatively few years after construction that the use of salt in connection with reinforced concrete is questionable practice in any section.

A case was cited where four years from the time of completion, cracks were observed in a reinforced-concrete structure, with rust discoloration. There was evidence of internal stress which produced a bulging of the surface—the action on the concrete created by the corroding steel. It appeared that there was no protection to the steel by concrete where salt water was used in the mixing. While in the writer's opinion the action on the reinforcing was many times greater in a warm climate than in a cold one, nevertheless all engineers might well consider the possible danger to reinforced structures from the use of salt in the mixing water. In observing structures which showed failure on the Islands, everyone of them was exposed to salt influence, in many cases a small amount, but nevertheless disintegration had been abnormally fast. The structures in question had either been built under his own observation or he had carefully investigated the specifications and methods of construction.

Coal Mining Institute of America

Instead of being held at the Fort Pitt Hotel, Pittsburgh, Penn., the meeting of the Institute scheduled for Dec. 4 and 5 will convene in the auditorium of the Chamber of Commerce. The Institute Dinner will be held in the English Room of the Fort Pitt Hotel.



Difference of Opinion Exists Regarding Retention of Zoning Plan

The proposed retention of the zone system by the Fuel Administration is bringing out varied opinions from railroads. Some are insistent that the zone system should be abolished, while others maintain that it is an innovation which should have been put in force many years ago. An analysis of the opinions expressed, however, show that the question of getting coal cheapest is the ruling factor. In certain cases where the retention of the zone system will mean cheaper coal in some districts, the railroads are anxious to have the zones retained. In other regions, where exactly the opposite condition prevails, the railroads are urging the abandonment of the zones.

Changes To Be Made in Anthracite Budget

Areas farthest from the mines, or those which have obtained only a small proportion of their allotment, are to receive anthracite supplies first. A readjustment of the anthracite budget has been made necessary by decreased production. Owing to well-distributed reserves of bituminous coal, it is believed that no particular hardship will result even if it should prove impossible to supply the full quota of anthracite. Shipments of anthracite to the Northwest by way of the Lakes will end with the sailings of Nov. 30. New England is to receive 100 carloads daily. It is estimated that the production of anthracite has been reduced by 1,680,000 tons because of influenza and the celebrations of the signing of the armistice.

No Shortage of Coke Expected

While no slump is expected in the demand for coke, the prevailing opinion in Washington is that production needs no further stimulation. If it were not for the reduction of output caused by influenza, there would even now be more coke than is being called for. Probabilities indicate that many of the ovens built to take care of the war demand must be abandoned sooner or later. The increased number of byproduct ovens also has an important bearing on the situation. It is estimated that 1,000,000 tons of byproduct coke which have been going into war industries now will be available for other purposes.

During the war, it is estimated that the maximum tonnage of coke which was moved by the Fuel Administration, contrary to the intention of the producers, in no month exceeded 2 per cent. of production; that is to say, the maximum amount interfered with did not exceed 50,000 tons in any one month.

The cordial coöperation of the coke operators is coming in for warm praise. One of the greatest factors in saving the several serious situations which arose in coke supply is said to have been the unusual faithfulness and pluck of the workmen in the Connellsville district. The same cannot be said of labor in the Alabama district, however, where the high percentages of absences from work greatly interfered with production.

Would Abandon Government Coal Prices

Suggestions that the price schedule be abandoned are reaching the Fuel Administration. The desire for that action, it is said, comes largely from the producers of high-grade coals, the price of which probably would rise if the present maximum were removed. The principal argument for the removal of the price schedule is that the established maximum tends to stabilize a higher price to the public than is justified in the district where there is a surplus of coal.

Railroad Congestion Hampers Coal Movement

An unexpected difficulty has arisen which is hampering coal distribution. The signing of the armistice has brought up the question of what disposition to make of Government property intended for war use. Many thousands of freight cars were loaded with munitions and other war materials. They are no longer needed in France. As a result they have been placed on sidings, wherever possible, and are jamming many ports. Facilities for unloading and storing such great quantities of material are not available at many places where these cars are held awaiting orders. As a result a large amount of rolling stock is tied up while yards and terminals at many points are badly congested.

Far West Has Plenty of Coal

A surplus of coal exists throughout the entire country west of the Mississippi River, according to S. L. Yerkes, assistant director of distribution for the Fuel Administration. Mr. Yerkes just has returned to Washington after a tour of the western coal fields. Oil has been fairly plentiful in the far West throughout the war. Mr. Yerkes' investigation showed that there had been little substitution of coal for oil.

Considerable movement of coal is now in progress between Utah and the Hawaiian Islands, but Mr. Yerkes

is not at all sure that the exportation of Utah coal to the west coast of South America can continue after the shipping situation eases up. The advantages of having a higher grade coal, a shorter haul to the seaboard and a shorter steaming mileage favor the recovery of this business by the mines near the east coast.

Coal-handling facilities at Pacific ports are ample for present and prospective needs, Mr. Yerkes reports. The facilities at San Francisco will be improved materially in the near future by the installation of a new plant of large capacity to handle both cargo and bunker coal.

Mr. Yerkes returned by way of New Orleans, where he advised with the Board of Commissioners of the port with regard to plans being made for improved coal-handling facilities there. He approved of plans for facilities handling 300 tons per hour. In this he differs from views held at the Shipping Board that a much larger plant should be put into operation at New Orleans.

Anthracite Miners To Be Released from Service

Thousands of anthracite miners are to be released from the army to aid in increasing the production of anthracite coal, the United States Fuel Administration announced on Nov. 20. Telegrams bearing instructions to this end have been sent to all camps in the United States by order of the Secretary of War, who acted on the request of Dr. Garfield.

The instructions of the Secretary of War direct that anthracite miners be segregated and sent to Washington, where those who desire to resume their work in the anthracite fields will be given immediate discharge. The need of increased anthracite production was strongly urged to the Secretary of War. This production, it was pointed out, has been cut 25 per cent. in six weeks by influenza and through the falling off in production inevitable upon announcement of the armistice.

Middle West Traffic Situation Good

Commenting on the traffic situation in the Middle West, as it affects coal, Hale Holden, regional director of railroads, says:

Coal loading generally for the central western region showed an increase of 15.5 per cent. during October. In the western fields of Colorado, Utah and Wyoming there is every evidence that the market was kept completely full of coal. The coal situation in Illinois and Indiana has been most satisfactory and the loading has exceeded all previous months of the year except July, which was the record month. The reports of the fourteen roads that originate 90 per cent. of the bituminous coal produced in Illinois and Indiana totaled the following:

	October
Cars loaded, 1918	189,772
Cars loaded, 1917	157,139
Increase over previous year	32,633 — 20.7%

Adding 10 per cent. for production on non-reporting roads gives a total loading of 208,749 cars in October as compared with 220,701 in July, 202,658 in August and 189,843 in September.

Notwithstanding the heavier loading, there was less complaint of car shortage than in any similar period during the past seven months. The only serious car shortage in October was on the C. C. C. & St. L. R. R., but that has been corrected and mines on that road are now enjoying full car supply.

Production of coal in these states has overtaken consumption. This was recognized by the Fuel Administration and all restrictions against furnishing bituminous coal for non-essential or non-preferential uses, even including country clubs, have been withdrawn. During the month some mines were closed for a time for lack of market, and unbilled coal in cars awaiting sale is appearing at the mines in certain fields at times in considerable quantity. As a result, some of the mines have temporarily suspended operations because, under the rules for distribution of equipment, unbilled carloads of coal are counted as cars furnished and with these on hand the rules do not permit of placing enough additional empty cars to justify resumption of operations until the unbilled coal is disposed of. Under rules of the Fuel Administration this coal could not be shipped on consignment, so it was necessary for the producer to hold the coal in cars on track or reduce the price, which has resulted in what the coal trade calls a soft market.

The outlook for the winter is better than it has been since the fall of 1915. The country is stocked up to a greater extent than ever known before. The car supply in October was better than it has been during any sustained period since July, 1916, and the mines are producing more coal than ever before in their history.

All things considered the Railroad Administration can, in respect of fuel supply, view the future in this region with serenity, confident that there will be no lack of fuel through any failure of the transportation system.

Nims Resumes His Law Practice

Harry D. Nims, formerly assistant United States Fuel Administrator, with the proximity of peace has secured his release from the heavy artillery officers' training camp at Fort Monroe, and has returned to his law office, 32 Nassau St., New York.

Fuel Administration Will "Carry On"

Despite numerous requests for reconstruction statements, the only statement which has been made at the Fuel Administration is in essence as follows:

The United States Fuel Administration, which will be terminated automatically upon proclamation of peace, will pursue its course with that end in view, relinquishing its various activities as they become unnecessary under armistice conditions, and continuing to function where its services still are required.

Reports of immediate and wholesale dissolution were said to be without foundation. Various subdivisions already are in process of winding up their duties. The Mine Track committee, and some other sections including several from the Oil Division, have been released at their request from further service, because the work which they undertook to do has been done.

Whatever machinery is necessary to the continuation of the full discharge of the duties of the administration will be retained until these duties are discharged or until the administration is relieved of them, and continuation of the larger activities of the administration through the winter was said to be the present prospect. The vigorous and careful supervision of anthracite coal was cited as an instance of the kind of work which still must be done.

The proper administration of the zoning system, under which millions of car-miles of haulage were saved and the supply of coal was correspondingly increased, was mentioned as another of the sort of duties which the administration cannot abandon forthwith, and which it will carry forward.

New West Virginia District Representative

Effective Dec. 1, R. B. Isner, of Elkins, W. Va., has been appointed district representative to succeed D. R. Lawson, of Fairmont. Mr. Isner has had long experience in handling coal matters in the district to which he is assigned. He is sales manager of the West Virginia Coal and Coke Co. Mr. Lawson has the distinction of having been the first district representative of the Fuel Administration. He is resigning to enter the coal business.

Bituminous Storage Limit Off

All storage restrictions on bituminous coal were removed on Nov. 22 by the United States Fuel Administration in conformity to the action of the War Industries Board in cancelling its preferential industries list. Anthracite coal is not affected, however, by the ruling of the Fuel Administration.

Every industry and every householder in the country now may store as much bituminous coal as desired or obtainable, as the action of the War Industries Board removes the necessity for the Fuel Administration to distinguish longer among different classes of industrial plants.

The restrictions just raised provided for the accumulation by the consumers in the preference classes defined by the War Industries Board, of reserve stocks of bituminous coal, in accordance with their location in relation to various mine fields and their classification on the preference schedule.

All industries located farthest from distribution points, particularly those in New England and in the Northwest are found not only to be well stocked, in accordance with Fuel Administration specifications, but in many cases have surpluses above those amounts.

Senate Investigating Coal Industry

The relationship between the increase in wages in the anthracite field and the amount added to the price of anthracite coal is to be probed thoroughly by the Senate Committee on Manufactures, it was indicated at the initial hearings. While the anthracite situation is to be gone into first, it is understood that a general survey is to be made of the activities of the Fuel Administration. The Committee on Manufactures, of which Senator Reed, of Missouri, is chairman, conducted an investigation of the coal situation last winter. Tactics employed during that investigation oftentimes were such as to be characterized as abusive and demagogic. That similar procedure may be expected from this investigation is predicted by some.

Senator Reed is starting out to establish that the anthracite shortage could have been met last year by washing culm banks; that culm banks were not washed to capacity because coal operators feared they would flood the market; that the Fuel Administration did not use its authority to compel coal operators to work culm banks; that the Fuel Administration either is controlled or "worked" by the anthracite operators.

James B. Neale, the director of production for the Fuel Administration, and an anthracite operator, was examined at length, but the information which he gave in reply to inquiries tended to show that the preconceived notions of the committee's chairman were based on faulty premises. Arthur Learoyd, also of the Fuel Administration, replied to inquiries in regard to the distribution of anthracite which is being attacked by some of the Senators from areas denied this type of fuel. The anthracite situation in New York City was discussed Nov. 9.

Coal Loading Ahead of Last Year

At the close of business Nov. 9, 698,661 cars of coal had been loaded during 1918 in excess of those loaded during the corresponding period of 1917. Loading during the week ended Nov. 9 is reported by the Railroad Administration as follows:

	1918	1917
Total cars bituminous	178,535	195,006
Total cars anthracite	32,525	38,571
Total cars lignite	3,456	4,639
Grand total cars all coal	214,516	238,216

Zoning Eliminates Waste Haulage

Close to 200,000,000 car-miles will be saved during the present coal year by the zoning system, it is estimated at the Fuel Administration.

Early estimates were that the movement of bituminous coal affected by the zone system would involve about 300,000,000 tons, or 60 per cent. of the total production. The latest figures show that 368,858,000 net tons of this kind of coal have been produced and delivered since Apr. 1, 60 per cent. of which is affected by the zone system.

These later figures show that even more than the originally estimated 160,000,000 car-miles will be saved in round trips to and from the mines and that considerably more than the 300,000 additional trips, which the saving in car-miles would effect, will be made. Exact figures have not been compiled, but the early estimate allowed for the 300,000 additional trips being the equivalent of 5 per cent. increase in the production.

Brief Washington Notes

Restriction in the use of electricity for outdoor illumination has been left entirely to the state administrators. The national lightless night order has been cancelled, as of Nov. 20.

A policy of permanent Government ownership of coal mines and oil wells, along with railroads and the telegraph, is provided in a bill introduced in the Senate by James Hamilton Lewis, of Illinois.

A large solid silver loving cup was presented to James B. Neale by the members of his staff at the Fuel Administration on Nov. 20. The presentation was made at a dinner given for the occasion.

Coal zones L and M have been modified so as to relieve the Chesapeake & Ohio R.R. Producers in those zones now are permitted to ship into a portion of Indiana and into an increased portion of Ohio. The producing districts affected are in West Virginia and Kentucky.

Representatives of the anthracite industry have been sent to the military camps at which anthracite miners are in training. They expect to seek out the miners and try to induce them to return to that industry. They also will take the necessary steps to secure the preferential discharge of such men.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

Now that the pressure of industry for more bituminous coal has entirely ceased, the Director of Production proposes to concentrate his attention on the output of anthracite, which has fallen considerably and seems hard to raise to its former level. James B. Neale has gone back to the anthracite region to do there a work larger, and one, in many ways, more difficult, than that which he tackled in western Pennsylvania and West Virginia.

The war had a peculiarly urgent appeal on the bituminous mine workers and one that, as it was new, had a more direct hold on the heart strings. The anthracite appeal is not of the same character, being civil rather than military. It comes, too, after a long period of coaxing and urging and at a time when those in other industries are letting up. It is hard to work more steadily than ever while your friends are celebrating. Much therefore is asked of the anthracite men, but, much as it is, it is quite to be expected that they will rise to the occasion. Those choice spirits among the hard coal mine workers whose work has made up for the slackness of others will still lead in devoted service and will repair the deficiencies of those who fail to visualize their duties and opportunities to serve.

TONNAGE LOST IN JUBILATION AND INFLUENZA

The daily anthracite tonnage has been largely reduced by celebrations. On Monday, Nov. 11, every colliery suspended in the Lehigh region except Hazlebrook and Coleraine, and these are both small operations. The influenza epidemic is still a big factor in reducing colliery output. The public has assumed that, once the epidemic ceases, work will go on as ever. But it must not be overlooked that many of the victims are dead and those who have recovered from the disease are too weak for active mining for at least two weeks. In some places the disease arrived late, as at the village of the Sandy Run Colliery. After other places were for the most part clearing themselves from this disease, Sandy Run was experiencing the full force of the epidemic.

The reopening of the saloons, closed by reason of the influenza, caused a wave of drunkenness to sweep over the anthracite region. Those who were inclined to imbibe to excess took advantage of the change and celebrated the end of the war alcoholically. Though the bulk of the English-speaking mine workers are temperately inclined there were enough others to cause a large reduction in output.

The ban on public meetings is removed and this has naturally resulted in some union activity. Local union No. 311 of Plymouth, Penn., has threatened to strike unless the increased wage scale in the anthracite region is dated back to Oct. 1 instead of to Nov. 1 as Dr. Garfield provided. A delegation from the union was appointed to go to Washington and endeavor to have this change made.

The increase in the wage rate of the mine workers in the anthracite region has caused discontent among the firemen and coal shovelers of the Scranton Electric Co. These men get $3.69 per day and want an increase of 33 per cent. or roughly $5 per day.

In West Virginia there is still some discontent. President C. F. Keeny of District No. 17 of the United Mine Workers believes that the wage rate of the West Virginia field should be brought to an equality with the wage rate in the Indiana field and in other fields of the competitive region. The drivers in the West Virginia field receive $4.52 a day, whereas the drivers in the other fields referred to receive $5.

On Nov. 19, John P. White, joint director of the Bureau of Labor in the Fuel Administration, presented his resignation to Dr. Garfield, but he will still be available for consultation. The resignation becomes effective Saturday, Nov. 30. In his letter to Mr. Garfield Mr. White pointed out that only a few labor disputes remain to be adjusted and added:

"I believe that I voice the sentiment of the officials of the miners' union when I state they desire to continue their affiliation with the Fuel Administration and to coöperate with it to the fullest extent until peace is promulgated."

In his acceptance, Dr. Garfield pronounced Mr. White's services "of inestimable value." The letter continued:

"It gives me pleasure to convey to you also the appreciation of the President, which he expressed to me on the several occasions when I informed him regarding your work as a member of the Fuel Administration."

Wages in Shamokin District

The new wage scale for day laborers in the ninth district as constituted by the United Mine Workers of America was announced by James Matthews, president of the district, on Nov. 19. It will be in force until the signing of the peace terms or until Mar. 31, 1920, in case peace is not signed by that date.

	Per Day
SHAFT WORK	
Chargemen	$6.10
Machine Runner	5.28
Machine Helper	4.73
Muckers	4.63
Blacksmiths	5.41
Topmen	4.10
TUNNEL WORK	
Chargemen	$6.04
Machine Runner	5.17
Machine Helper	4.63
Muckers	4.47
Mucker Boss	5.15
Blacksmith, on big machine	5.26
Blacksmith Helper	4.31
SMALL MACHINE AND SHAFT WORK	
Chargemen	$5.99
Small Machine Runner	5.26
Blacksmith	5.15
Blacksmith Helper	4.21
Muckers	4.47
Air Compressor Engineer	4.10
HAMMER WORK	
Chargemen	$5.26
Hammermen	4.94
Muckers	4.47
Blacksmith	4.94

The above rates are based on an eight-hour day.

The rates of May 16, 1916, were as follows:

Occupation:	Rate Per Day	Rate Per Week
SHAFT WORK		
Chargemen	$4.10	$24.57
Machine Runner	2.28	19.66
Machine Helper	2.73	16.38
Muckers	2.63	15.75
Blacksmith	3.41	20.48
Blacksmith Helper	2.47	14.81
Topman	2.10	12.60
TUNNEL WORK		
Chargemen	$4.04	$24.26
Machine Runner	3.17	19.03
Machine Helper	2.63	15.75
Mucker Boss	3.15	18.90
Muckers	2.47	14.81
Blacksmith (on big machine)	3.26	19.63
Blacksmith Helper	2.31	13.86
SMALL MACHINE AND SHAFT WORK		
Chargemen	$3.99	$23.94
Small Machine Runner	3.26	19.53
Blacksmith	3.15	18.90
Blacksmith Helper	2.21	13.23
Muckers	2.47	14.81
Air Compressor Engineer	2.10	12.60
HAMMER WORK		
Chargemen	$3.26	$19.53
Hammermen	2.94	17.64
Muckers	2.47	14.81
Blacksmith	2.94	17.64

EDITORIALS

Forecast: Colder Weather and Trouble

THE shortening of demand for coal makes the operator careful. As soon as he hears of it he reacts to his fears and gives orders accordingly. Doubtless operators everywhere have issued orders to their managers calling for the laying off of all men whenever the mines are idle.

There is room, of course, for some reduction in the employment of labor. Last winter men were given jobs on idle days just to prevent them from straying away to other mines and other industries. The need for such "mark time" jobs is now ended. The only orders which now stand are "parade rest" or "forward."

Though this is true there is no reason why preparation should not be made for the winter. Whether the mines work steadily or slackly the winter must be faced. Steam lines will be excessively wasteful of power if not protected. Men will be injured by falls on the unprotected stairways of tipples. Shafts will fill with ice if falling water is not taken care of.

Drifts will close if the timbering is not properly protected by ditching away springs and by adequately covering the entry with properly sloped material. Cars will leave the tracks if the tracks are not jacked up to grade—a piece of work that can be done now with difficulty and can not be done at all when the frost has struck deep. Gondolas and hopper cars will stall on the railroad tracks if those tracks are not maintained at the proper grade.

Switches will continually be filling up with ice unless they are kept high so as to make the water run from them instead of toward them. Where the banks of tramroad and railroad cuts have been allowed to fall till the talus reaches the ties, and even the rail, they should be cut back and the ditch restored. Where slack and rock banks slope down in like manner they should be trimmed to line. Where the track is likely to be heaved by frost the ditches may still be made, or, if already made, cleaned.

Motor-truck roads which are too badly tilted for safe travel in icy weather should be regraded so as to make haulage safe. Water lines which may freeze should be covered, this being only more necessary when less water is used than it is when the full supply is being drawn on. In some places snow fences may be needed, and, where needed, should be erected.

Air stoves should be installed or built near outside pneumatic pumps. Drain valves and traps should be inserted in air lines wherever trouble from congealing water has been found in previous winters. Where water should be shut off over night and the pipes drained facilities for so doing should be provided.

Now is *not* the time for doing these things. They should have been done before; but better now than when the below-zero weather comes and stays and makes it impossible or immensely difficult to do them. We have had a labor shortage which has delayed necessary work. Until just lately we have had no "mark-time" jobs and have given no man work which could be delayed. Then came two or three weeks when no man wanted to work if he had a chance to celebrate. Consequently, there are many of the winter needs unprovided. Before it is too late let us perform the necessary work. With judgment in buying only such labor as is actually needed, the work will pay 100 per cent. on the expenditure before the winter is over.

A Mistaken Idea

MANY purchasers and would-be purchasers of coal-mine equipment throughout the country have doubtless been much chagrined during the past several months by the poor service rendered or promised by manufacturers. It is doubtless true that many buyers have felt that in this the manufacturers are at fault—that they have taken on war business to the utter disregard of old customers simply because war business promised bigger returns.

Such a charge, however, would in the vast majority of cases be entirely unjust. The manufacturers who have put their plants upon a 100 per cent. war basis have done so because this was necessary and practically demanded by the Government. Most manufacturers much dislike to be unable to serve old customers and thus retain their business and goodwill, and it has been a decided sacrifice upon their part to place their entire output with the Government.

The past year and a half has, however, been a time for sacrifice by everyone—producers and consumers alike. Fortunately, such sacrifices have now borne abundant fruit—Prussianism has received its just reward.

Scattering What We Have Garnered

A SHORT-SIGHTED policy seems to be in effect in many of the Government bureaus at the National capital. Called into existence to function for the public good, a number of little boards that have been operated at the expense of the people since our entry into the war now refuse to release for general dissemination facts and statistics that it is no longer necessary to keep hidden. During the war it was generally conceded that the publication of certain information would give aid and comfort to the enemy, and newspapers and periodicals patriotically refrained from printing such matter. Now, however, the situation has changed. The war is over, and there is no longer any need for secrecy.

At considerable expense, and at much inconvenience to industry as a whole, various data relative to conservation, consumption and like subjects, have been accumulated by the Food and Fuel administrations, the Federal Trade Commission, the War Industries Board

and a number of others. With the declaration of peace a number of these bureaus will cease to exist. What is to become of the vast collection of vital statistics now cluttering the files of these bureaus?

Reports that reveal the most intimate details of a number of industries were compiled because of the national emergency. These reports were digested by Government-employed statisticians, and averages, ratios and comparisons were deduced. The final figures, in a great number of instances, preach veritable sermons of efficiency and inefficiency. They indicate that competitors in a given industry, with the same overhead and general conditions to meet, arrive at widely different cost totals. Figures and facts such as these should be released immediately wherever such relinquishment will work no harm to an individual or to an industry, so that the lessons they contain be taught to those most interested.

During the reconstruction period now confronting the country it is just that the frankness shown by industry in throwing open its books for the national welfare should be reciprocated by the broadcasting to industry of the data collected by the nation. Boards and officials should be shorn of the power to withhold such information when it is asked for by accredited interests or the recognized organs of an industry. This broader concept of the rights of the public should light on all Government officials at once, before the documents have been filed away in some musty vault, never again, perhaps, to see the light of day.

To Increase Production of Anthracite

HITHERTO the bulk of the effort of the Fuel Administration in boosting production has been made in the bituminous regions of Pennsylvania and West Virginia. The anthracite region was not touched. In that region the companies were conducting such an admirable campaign that Federal assistance was not so urgently needed as in the bituminous coal areas. Though the production manager of the United States came from the anthracite region, he spent most of his time in the bituminous, where he felt the greater need existed and where a dire shortage probably would have continued to exist had the war not come to an end.

Influenza, celebrations and the loss of the war appeal have caused a lowering of the output in the anthracite region. The energy of the population has declined. So far as that is due to the lack of the war impulse, it is not logically excusable. Anthracite never was a part of the sinews of war. True, the production was hampered by exigencies of the military situation, the shortage of labor being a problem arising out of the war; but it was only indirectly a military problem, for anthracite coal supplied not a military but a civil need.

Then again the influenza and the peace-making celebrations both arose out of the war. Thus the war has interfered with the anthracite industry, while the civil need for coal is as large as ever, and that need is right at home. Very properly New York was last served with coal. Its needs were last filled because it was near the mining fields and therefore less likely to be cut off. But that left the burden of supplying New York till the worst of weather, when freezing cars and barges and ice-burdened rivers would have to be dealt with. Then the influenza and celebrations came, and New York, which was apportioned the last share, began to wonder whether there was a whole share left—if the last slice to be cut would prove not to be there at all when the cutting of it was under consideration.

Canada, the West, and New England with its inefficient gateways, of which we have heard so much, have been supplied. New York is cold. Let us trust that J. B. Neale will use his strength and energy and persuasiveness to see that care is taken of New York's needs. The miners supplied themselves with coal some time ago. They feared they might be left unprovided. Now let them see what they can do for the metropolis.

It is pleasing to have Mr. Neale protest against a recent reference in *Coal Age* to his delicate health. He assures us that he is robust and able to work untiringly. On his abilities as a speaker and organizer and on his unflagging energy New York must place reliance. It is the last bridge left across the dark waters of cold, disease and discomfort.

Don't Apostrophize Progress: Achieve It

MOST of us admire progress and pay it tribute. We like to hear and read about new developments of every kind. But industry would never make much progress if all were only hearers and readers, and no one told what he himself had done or seen done.

Well does Frederick M. Crunden preach from the facade of the St. Louis public library: "Recorded thought is our chief heritage from the past, the most lasting legacy we can leave to the future. Books are the most enduring monument of men's achievements. Only through books can civilization become cumulative."

We do not need to look back to a remote past to realize the truth of Crunden's saying. A new method is planned today; it may be recorded tomorrow; and in a few days later it has been applied in some other place with some trifling modification. This new work once recorded, a third party develops what the second party has done, and the process, method or system receives a rebirth. It passes through mind after mind, and after many transmigrations it is so changed as to be a new method.

But if an idea is not recorded, it does not receive these further refinements, and it is almost certain to die. Human progress depends on the transference of ideas, and the man who keeps his ideas to himself to gloat over, loses the great pleasure which comes from seeing them spread out and encompass the earth.

Our national life will be progressive if we exchange ideas promptly. It will be sluggish if we keep our observations to ourselves. It shows little judgment to deplore slow progress, while doing nothing to speed it. Yet that is what most of us are doing. If you have an idea lay it in the pages of a journal that it may fall therefrom like the seed of a plant and germinate the whole country over.

An assumption is too often made that a practice or method is general and so not worth recording. Sometimes, of course, this assumption is fully borne out by the facts; but much good practice is quite local and even individual, and it is the part of the technical press to introduce it to the industry wherever the practice is not known.

Keep Step or We'll Never Reach the Goal



Labor and Capital, Industry and Commerce, are running a three-legged race. If they don't keep step each with his running mate, they are sure to fall down by the way.

DISCUSSION BY READERS

Iron vs. Wood Mine Cars

Letter No. 4—In reply to the inquiry relative to the use of iron or wood mine cars, which appeared in *Coal Age*, Sept. 26, p. 615, and asked for an expression of views from practical readers in regard to the relative utility of these two types of cars, in coal mining practice, permit me to submit the following:

Owing to the severe conditions encountered in coal mining, it must be expected that mine cars will vary greatly in respect to the details of their construction. The type of car employed, in any case, must conform to such conditions as the height of seam, nature of top and bottom, quality and use of the coal, dimensions of shaft, method of payment for coal loaded, and numerous other items that influence to a greater or less degree the design of a mine car.

Before a final selection of mining equipment is made, careful consideration should be given to the many aspects that bear on the economic and successful working of the property considered. The capacity, shape and dimensions of the mine car, the material entering its construction, kind of wheels, bearings and axles, lubrication and, finally the choice between a tight- and an open-end car—all have an influence on the selection of the equipment.

Three Types of Cars, Classified by Material Used in Their Construction

There are three types of cars in general use in coal mines. These may be classed, according to the material used in their construction, as wood, steel and a composite type combining both of these materials. Where wood mine cars are used in the Eastern and Southern coal fields of the United States, they are usually built of white oak, the bottom boards being 3 in. thick, and the side, flare, door and end boards 1½ in. thick. In the extreme west and northwest sections of the United States and Canada, the high cost of white oak makes its use prohibitive, and what is known as "Douglas fir" is used in the construction of wood cars. This timber, however, is not to be compared with white oak for that purpose.

Briefly stated the attractiveness of the wood mine car consists in its cheapness and the ease with which it can be repaired by unskilled labor. In coal fields where wood and labor are cheap, these cars are built in the mine shops and the necessary iron parts, wheels and axles are obtained from manufacturers. But, even so, the superiority of the steel or iron car is now being generally recognized, and the use of this material is rapidly supplanting that of wood, for the purpose named.

The advantages of steel or iron, in the construction of mine cars, may be briefly stated as follows: (1) For the same outside dimensions, the capacity of a steel car is from 10 to 20 per cent. greater than that of a wood car designed for the same service, and the height of the car can be cut down from 4 to 6 in., which makes it particularly adapted for use in low seams. (2) Less muscular effort is required to move the car. (3) The cost of maintenance is less. (4) Steel or iron will stand the severe usage, in mines, better than wood, and survive many wrecks that would reduce a wood car to splinters. (5) The car retains its form and does not droop at the ends like a wood car. (6) The car is tighter and there is a less loss of coal in transit.

Arrayed against these advantages, however, are the higher cost of the material, which may be 40 or 50 per cent. greater than that of wood. Owing to its lack of flexibility, an iron car may not ride the rails with the same ease and, when derailed, cannot be replaced on the track as readily as a wood car.

Sections Bolted Instead of Riveted Together

In the use of iron and steel, let me suggest that the car should be built in sections and fastened together with bolts rather than rivets, which will facilitate the replacing of a damaged section and the straightening of bent plates. At some mines, where steel cars are in use, a crib or cage is built of ties. This is made large enough to admit a car, which can then be straightened by means of jacks placed between the crib and the car. Trouble is often experienced when straightening a car, by reason of the end gate not closing properly, as it is difficult to secure the same alignment as before the damage was done. For this reason, I would advise the use of a steel or iron car having a tight end, wherever a rotary dump can be installed.

The use of iron cars in the working of thin seams greatly reduces the cost of brushing the roof or lifting bottom. Again, through careful investigations, made to determine the amount of muscular energy expended in the loading of coal into cars 32 in. and 52 in. in height, respectively, it has been found that the same muscular energy is required to load 29 tons of coal into the higher car as is necessary to load 44 tons into the lower car, under the same conditions. This furnishes food for thought and shows the importance of keeping the height of the mine car as low as possible, in order to secure the greatest efficiency in mine labor.

Steel Cars Used in Pitching and Thin Seams

In closing, let me say that my personal preference is for steel or iron cars wherever the price of the material is not prohibitive. In pitching seams, as well as in thin seams of coal, the use of the iron car is a practical advantage. At the McGillivray Coal and Coke Co.'s mine, at Coleman, Alta, Canada., which I assisted in opening, we had thirty 4¼-ton steel cars equipped with automatic couplers and belts. These cars gave every satisfaction and proved an ideal type to use in a pitching seam where a large tonnage is

produced and the workings are extensive. A car of this capacity, however, could not be used in a low seam or where the miner is required to handle his cars.

In 1909, while on a trip through the East, I visited some of the largest coal mines in Pennsylvania. At the Vesta, No. 4 mine, California, Penn., which was at that time the largest mine in the world, and shipped that year 1,668,822 tons of coal, the Watt steel mine car having a capacity of 3 to 3½ tons, depending on the way it was loaded, was in use. The foreman told me he had 2350 of these cars in the mine and they were highly satisfactory. It is worthy of note that this mine, producing 7000 tons of coal a day and involving most important haulage considerations, considered this type of car the best type to use. The fact should convince the most skeptical in regard to the utility of these cars.

J. W. Powell, Mine Manager,
Granby Cons. Mg., Smelting and Power Co., Ltd.
Cassidy, B. C., Canada.

Reducing Ventilation at Firing Time

Letter No. 1—In Technical Paper No. 190, recently issued by the Federal Bureau of Mines under its coöperative agreement with the Illinois State Geological Survey and the University of Illinois Experiment Station, facts are presented that are intended to prove that interfering with the ventilation of a mine at shotfiring time is a dangerous practice. The writers claim it has been shown by the results of tests made in the Bruceton mine, that retarding the circulation in a mine at such time is not preventive of dust explosions.

This practice had been condemned some time before, by men connected with the Bureau, and it seems remarkable that, notwithstanding the objections urged and their authoritative source, the practice of interrupting ventilation at shotfiring time has not only not been stopped, but has been steadily gaining ground.

Faith of Shotfirers in the Practice

It is even more remarkable that shotfirers still insist on the continuance of this practice if they are convinced that many dust explosions have occurred in mines as the result of the practice. It is unbelievable that men would deliberately continue to risk their lives by adhering to an alleged useless and dangerous practice, unless their personal experience and observation has taught them that its discontinuance would increase the hazard of their work.

I have talked with shotfirers from different mining states regarding this matter, and they agree almost without exception that the presence of a strong draft at firing time is highly dangerous. They expressed their conviction that its retardation or even the entire suppression of the air current has had a protective effect in the performance of their work. They were not particularly impressed with the arguments that have been urged against interrupted ventilation at firing time, and which are based upon the fact that an occasional explosion has occurred with the fan shut down.

The practical and experienced shotfirer regards the presence of flame as a potential menace and the primary cause of a possible explosion, whether the flame is that of a mine fire or a shot. It appears to him as inconsistent to claim that the draft must be cut off from the fire and not follow the same plan to reduce the chance of flame from a shot. The shotfirers with whom I have talked seem to fear the presence of draft and certain air conditions, at firing time, more than they do the presence of dust.

Inrush of Air Follows the Firing of a Shot in Mine Workings

In order to call attention to certain phenomena accompanying the firing of shots, permit me to refer to an article that appeared in *Coal Age*, Vol. 6, p. 623, over the signature "A Mining Engineer." The writer of this article is seemingly much opposed to the practice of interrupting ventilation at shotfiring time and makes the following statement: "All will concede that an inrush of air follows a shot and continues, in point of time, until atmospheric pressure has been reached," admitting, no doubt, that when the blownout shot is a large one, the inrush following is correspondingly large.

Allowing this to be true, it must then be conceded that, as an inrush of air follows the firing of every shot, such an inrush was undoubtedly present in every case where a dust explosion resulted from a shot as the primary cause; also, that the inrush of the dust-laden air took place prior to the start of the explosion and that therefore the injection of the dust and air mixture into the place where the shot was fired produced the first manifestation of explosive combustion.

"Mining Engineer" admits that the inrush of air following the firing of a blownout shot is generally greater than the inrush following a shot which brought down the coal. Should there be dust present, it is obvious that the greater the force of the inrush the more dust will be carried by it and injected into the remaining flame. In view of this and the further fact that blownout shots are the primary cause of many dust explosions, it is but reasonable to conclude that the magnitude of the inrush of the dust-laden air is a potent factor in determining the magnitude of the subsequent explosive combustion, and the employment of any artificial means that tends to increase the force and volume of this inrush must necessarily aid in increasing the scope and intensity of the explosive combustion.

Effect of Draft to Assist Ignition of Dust

Therefore, I insist that the restriction of artificial draft at shot-firing time, wherever existing conditions will permit the practice, must have some merit. There is, moreover, abundant proof furnished both by mine explosions and the result of laboratory tests to support this view. For instance, in Bulletin 425, issued by the Bureau of Mines, on page 133, under the caption "Significant Points in Experiments," we read as follows:

> It will be recalled, too, that Holtzwart and Meyer drew attention to the fact that no ignition was obtained if they introduced lignite dust into their apparatus and, after establishing the spark between the terminals within, disseminated the dust in the air by shaking the tube. But when the dust was puffed between the terminals by compressed air ignition occurred.

In view of this fact it would seem that better proof than has yet been given should be submitted if it is desired to show that the presence of artificial draft can

have no part in promoting explosive combustion. The fact that explosions have been produced, in the Bruceton experimental mine, with the fan shut down, only serves to show that the inrush of air, due to the vacuous condition caused by the cooling of the gases from the shot, was of sufficient force and volume and sufficiently dust-laden to produce explosive results when it came in contact with the remaining flame.

The practice of restricting ventilation at firing time may have its drawbacks and shortcomings and, if so it is right that they be pointed out; but the existence of such hindrances should not be used to create the impression that the theory on which the pratice rests is unsound, especially in the absence of any proof to that effect. In my judgment, the surest and quickest way to dispose of the controversy regarding draft restriction and, at the same time, make real progress toward the solution of the dust-explosion problem is by definitely establishing the fundamental principles involved in the production of explosive combustion.

Air Factor vs. Presence of Fine Dust

If the engineers connected with the Bruceton experimental mine can produce proof that explosive combustion of mine dust is effected by some such means as, say conductivity or radiation, then it must be conceded that the presence of dust is the all-important thing, and that the air factor plays but a small part in the process of explosive combustion, in which case restriction of ventilation at shotfiring time would have no value whatever. But, until that proof is forthcoming, the claim of the potency of the air factor should receive careful consideration.

The claim for the air factor is based on the theory that explosive combustion of dust is obtainable only with the assistance of a draft of sufficient force to carry the dust in suspension and the dust-laden air is injected into a heated zone having a temperature at or above the ignition point of the dust. The process is similar to that by which coal dust is burned with almost explosive effect when injected by a blast of compressed air into the combustion chamber of a furnace. If it can be shown that this is the correct view then draft, both as a fuel conveyor and in its flame-supporting capacity, must be regarded as a most potent factor in the development of explosive combustion, and consequently every available means, tending to lessen its harmful effectiveness, and permissible under existing conditions, must be employed if dust explosions in mines are to be avoided.

John Verner,
Chariton, Iowa. Former State Mine Inspector.

Mine-Rescue Work

Letter No. 4—The discussion of mine-rescue work, in *Coal Age*, by practical men who have had experience in wearing breathing apparatus under working conditions, should be both interesting and instructive. I am sorry to say that some people, even mine superintendents and managers, have the idea that when a man dons a breathing apparatus he can do anything and everything. It is needless to say that temperature and other conditions are not considered where such statements are made by those not acquainted with mining conditions.

On one occasion when I and others who had trained in the use of breathing apparatus were called to a certain mine, we experienced just such a condition as that to which I refer. The men at the mine had been led to believe, from the talk of the mine officials, that something wonderful was to be pulled off by the men wearing the apparatus. A sort of Barnum & Bailey exhibition was expected. There was nothing, in their belief, that mine-rescue men could not do. As a result, when the miraculous did not appear, the men ridiculed our work and failed to appreciate the real value of such means of rescue.

Wearer of Apparatus Must Study Its Construction and Limitations

Let me say that, before a man or any set of men, put on an apparatus designed to permit them to work in an irrespirable atmosphere, the construction of the apparatus must be carefully studied. The wearer of the apparatus must be thoroughly familiar with its use and the limitations of the work of rescue under such conditions as they meet in the mine.

Temperature is a most important item and must govern and control all work, in the wearing of breathing apparatus. According to the gas chart issued by the U. S. Bureau of Mines, showing the effect on man of warm, moist and still air, it is stated:

> A hot, moist atmosphere prevents the evaporation of perspiration. If the hot, moist air is stationary it becomes entangled between the clothing and the skin and becomes warmed to body temperature. Hence, the body can not lose heat to the air, and the skin becomes warm, flushed and bathed in perspiration. Setting the air in motion, by a fan, whirls the hot air away from the body and allows cooler air to take its place. Hence, arises the beneficial effects of a fan in a room, even if fresh outside air cannot enter. If the wet-bulb temperature of the air is the same as that of the body, 99 deg. F., the body can not lose heat; but if the air temperature is about 70 deg. F. perspiration can evaporate. Above 75 deg. F., wet-bulb temperature, the amount of work a man can do begins to fall off. Between 80 and 85 deg. F., wet-bulb temperature, hard continuous work is almost impossible. Wet-bulb temperatures are determined with a sling psychrometer.

There is little doubt but that the data given in this statement are the results of exhaustive experimentation by the Bureau of Mines. The facts brought out in the statement should be studied by all men who may at times be called upon to wear apparatus in an irrespirable atmosphere. The most careful attention should be given to the study of these facts, by all men in charge of rescue teams.

Precautions To Be Observed by Rescuers

Allow me, here, to give a word or two of advice, in line with my own experience in the wearing of apparatus in the mines of southern Illinois. First, let me urge all mine rescuers to consult with the state mine inspector or the mine management, before entering upon the tasks or duties to which they are called. It will generally be found that these men will not dictate what the rescuers should do, but will confer with them in an attempt to ascertain the best method to adopt in the interest of all concerned.

Again, where men have traveled some distance to a fresh air base, or have exerted themselves in any manner, let them rest for 10 or 15 min., until their breathing becomes normal, before attempting further efforts

with breathing apparatus. A man in charge of a crew should have them under his continual observation and never permit them to overexert themselves.

This constant watchcare of the leader will enable him to detect any signs of distress or weakness on the part of one of his men. It will, also, give the men greater confidence in themselves when they know that their movements are closely watched, and they will be less liable to become nervous, which always causes weakness. Where a man becomes nervous when wearing apparatus, his fearfulness and dread lead to weakness, and he is sure to collapse before long. Then, where one man in a crew collapses the entire crew is apt to be disorganized, because the same fear and dread takes possession of the others.

In conclusion, my advice is let mine rescuers pay little or no attention to what inexperienced men say, even though they are the mine officials in charge of the mine. If they are not acquainted with the use of breathing apparatus, they are not capable of giving advice to rescuers who wear such apparatus. Every man of a rescue team must depend wholly on his own nerve and the advice of his leader who is in charge of the team and whose duty it is to see that every precaution is taken to safeguard his men.

JAMES WEIR, Supt.
Mine-Rescue Station.
Benton, Ill.

Perplexities of Mine Foremen

Letter No. 3—Reading the short editorial entitled "Seeing the Boss Wastes Time and Temper," *Coal Age*, Oct. 24, p. 791, brings to my mind more forcibly than ever some of the many perplexities of mine foremen, which subject I am glad to see has been recently brought to the attention of writers in the Discussion department of the paper.

Permit me to say that the writer of the editorial to which I have referred, either from lack of experience in bossing in coal mines, or for a lack of space to discuss the situation more fully, has viewed the matter from one side only. There is a class of miners who put in more time looking for the boss than they do in working their places. There are miners who are continually looking for the boss and running to him with every little frivolous thing that the better and more efficient miners would settle for themselves.

Common sense and judgment should lead a miner to adjust those little matters and difficulties with which he knows he must contend in the mine, and not bother the boss who has business of far greater importance that requires his constant attention. As I said, there is a certain element in miners that makes too many of them ready and willing to leave their working places on the slightest pretext and wander about the mine looking for the boss. They are often only too glad to have an excuse for leaving their places.

A long experience as a miner and acting in different capacities in charge of mining work has made it clear to my mind that the average mine foreman is always ready and willing to listen to the complaints of miners when they are sincerely and honestly made. A good foreman is quick to learn the character of those miners who continually worry him with little matters that they should adjust themselves. It is well known that the impracticable methods employed by many inexperienced miners serve to keep their working places in an unfit condition.

A good boss is familiar with the local conditions in every miner's working place and knows that it is not necessary for him to go to many of these places every time he is asked. For this reason, he frequently pays little attention to a miner's request for him to look at his place. He knows the conditions he would find there and knows that the miner has not taken proper precautions to avoid his troubles. The whole time of the foreman could be taken up visiting such places and, in the end, little or nothing would be accomplished.

Much Is Expected of Mine Foremen

Referring again to the editorial mentioned, I cannot agree with the impression it conveys that bosses are "anxious to avoid an interview" with miners who need their advice and assistance, except under conditions such as I have described, when the mine foreman knows too well that it would be a waste of precious time. In my experience, not many foremen will delay answering a call to go to a place they know needs attention.

In speaking of the perplexities of mine foremen, the fact has been demonstrated that these officials have troubles of their own. Many things go wrong about the mine and conditions arise that make it almost impossible to get rails and props to working places as quickly as the miner thinks they should come. On this account, a miner may often be obliged to cease work until the needed material can be sent to him.

Today, when large results are expected, the foreman's attention must be given first to the more important matters required to keep the mine safe and the coal moving. A motor has broken down, a haulage rope needs to be repaired, a broken rail replaced in the track, or a fall of slate cleaned from the roadway.

Any of these things if not given immediate attention will seriously affect the output of the mine. On the other hand, a little water in a miner's place means only the loss of a few tons of coal if the miner cannot work that day because he is drowned out of his place. Of many evils hindering the production of coal, the foreman must choose the least and give his attention where it is most needed.

Needless Complaints of Troublesome Miners

There are some miners who appear to think that the boss must look after their little troubles at once, even if he has to neglect the general and more important things of the mine. Many miners are impatient and unreasonable and quickly manifest a spirit of discontent, giving some trivial excuse for leaving their places or quitting their work in the mine. They are prone to recite their grievances to outsiders, particularly to men who are unfamiliar with mining conditions and requirements and who are easily led to believe that the miner is not treated fairly by the boss. But, in the great majority of cases, it can be said that the miner has proved trifling and troublesome and the boss is only too glad to get rid of him. As a general rule, the outsider is more ready to listen to such complaining miners than to the more conservative class.

In summing up, let me say that the average mine foreman, today, is a very busy man and can ill afford to give his time to needless complaints from miners who

are no more satisfied after the boss has done everything possible for them. The foreman has every class of inexperienced and irresponsible labor to deal with in the mine. Why then refer to him as "that dignitary," or insinuate that his time is much taken up in keeping out of the way of his men.

I am convinced that the majority of mine bosses are neither autocratic nor cowardly in dealing with their men. The best foremen are themselves experienced miners and know the difficulties the miner must meet every day. Notwithstanding his many perplexities and responsibilities, however, the foreman must keep cool and pleasant.

Rather than regarding it a great waste of time and temper on the part of the miner who must wait for the boss to come to his place or hunt him up in some part of the mine, it should be considered a greater waste of time and, possibly, temper when the boss is required to go to any remote place in the workings whenever and wherever he may be called to adjust a little matter that is in the miner's own control. JOHN ROSE,

Dayton, Tenn. Former District Mine Inspector.

Hindrances to Coal Production

Letter No. 6—I have just read the interesting letter of Joseph R. Thomas, *Coal Age*, Oct. 10, p. 710, which impressed me with the thought that if the mine officials of a company did not show favoritism of a certain kind they would be the losers. Many of their best men would be seeking work where their efforts would be recognized and rewarded. I am speaking now of the deserving ones, and do not refer to the shiftless class who are often found hanging around a mine and depend largely on the "pull" they have with the foreman.

In every well managed mine there are those who are the favorites of a good foreman. These favorites are the men who have come into the community to stay. They are men of families. In most cases, they rent company houses and trade at the company store; but they are the men who work six days in the week and produce their share of coal.

THE TRUE FAVORITES OF A GOOD FOREMAN

Is it any wonder that a mine foreman takes good care of this class of workers, gives them good places and treats them with consideration? Such treatment is only their due reward for good work and for acting in the interests of the company, which so large a class of miners fail to do but, instead, regard their own interest and convenience first.

Let me ask, again, is it strange that a foreman makes a favorite of a married man, when he knows he can depend upon him more than on a single man who is free to come and go as he may choose? Does not good management require that a foreman do this, in order to insure a steady production of coal and maintain a large output for the mine? The best workers and most reliable men should be a mine foreman's favorites.

It would, of course, be foolish for a mine foreman to decide that he would have no favorites in the mine, but would treat every man alike. For instance, suppose he should let a good place stand idle, waiting for the next man who might come along, who would probably be a tramp miner. Should such a man be given the place after it was refused to one of the old miners when vacated a few days since, would not such treatment cause dissatisfaction? No one would blame an old miner who was refused the place, if he decided to pick up his tools and go elsewhere. As soon as the tramp miner had made his stake, he would be "Johnny on the road" to some other place.

While the favoritism described by Mr. Thomas is truly a hindrance to the production of coal, there is another hindrance that he does not mention. The wages paid, today, for company labor in and around the mines, is excessive as compared with the earnings of a man who digs coal and has his family to support. For instance, a mule driver is often a single man. He is paid $5.25 per day, and his board costs him $1.30 per day. He generally works four days out of the week, and the foreman must look for someone to fill his place the remaining two days. The high wages paid this man is actually a hindrance to the steady production of coal.

Numberless schemes have been devised and tried for keeping a man at work in his place. It has been found a practical impossibility, however, to compel a man to work when he wants to lay off. If a miner wants to lay idle Saturday he simply does not prepare his coal, and that lets him out. All plans to overcome this difficulty have seemingly failed.

INDIFFERENCE OF MINERS HINDERS PRODUCTION

In one instance, a miner was threatened with discharge if he did not load more coal. It made no difference to him, however, as he continued to load his six tons by noon and then lay idle or asleep in the gob until quitting time. Another miner was out three days and claimed he was sick. The foreman told him to get a doctor's certificate and he did so; but the real trouble was the whiskey bottle. Being discharged, he went to work in another mine where he did the same thing again. If it were not for these hindrances, the production of coal, today, would far exceed the demand. It reminds me of a book that I once read, in which the writer likened the laboring man to a mule, claiming that he would only work when he was hungry.

Let me sum up by saying that, in my opinion, the average man working under pressure will perform work with the least possible resistance; but, as the load is increased, the circuit breaker flies out and he ceases his activity. In face of these conditions, let me suggest that every mine should be operated on an ample margin. For example, if an output of 1000 tons a day is needed, the management should estimate on 1200 tons and, perhaps, they will realize the tonnage first named. If a miner loads 12 tons of coal a day, estimate his average as 10 tons a day, and this will require that the mine work 100 men to produce 1000 tons daily.

As a fact, the coal miners of America, today, have realized that we were at war, and they were ready to do a day's work. Notwithstanding all the hindrances that we can mention, the demand for coal has been met at the mines. The President has gotten what he asked and 2,000,000 soldiers are in France today, while the people at home have subscribed $6,000,000,000 for the support of the war, which gives the assurance that our boys will go into Berlin and land the Kaiser and all his murderous tribes on St. Helena.

Farr, Colo. ROBERT A. MARSHALL.

INQUIRIES OF GENERAL INTEREST

Freezing of Shaft in Winter

During the past four or five years it has been necessary to shut down our mine from three to five days each winter, owing to the air shaft freezing solid with ice. At the present time, it does not seem possible to attempt to shut off the water, which enters the shaft at a point approximately 70 ft. below the surface.

Seemingly the only alternative is to heat the intake air to a temperature above the freezing point, at times when that is necessary. In order to do this we are contemplating installing a series of steam coils, arranged in such a manner that the intake air will be drawn through the coils before reaching the fan, which is now forcing 50,000 cu.ft. of air per minute down the air shaft. We expect to heat this air from 20 deg. below zero to 40 deg. above.

As this proposition is an important one to us and will, no doubt, interest others in a like situation, will you kindly state if it is possible to accomplish our purpose in the manner proposed. It would please us to see the matter discussed in *Coal Age*, which we are sure will bring out many helpful suggestions.

———, Ill. GENERAL SUPERINTENDENT

The heating of a large volume of intake air, by passing it over steam coils, would require a considerable distribution of the air at that point in order to enable it to absorb sufficient heat to produce the given rise of temperature (60 deg. F.). The practicability of the scheme must be determined by a calculation based on the amount of heat that must be absorbed by the volume of air to produce the desired rise in temperature, and the possibility of the air extracting this heat from the steam in the coils. Also, it will be interesting to estimate the weight of fuel burned under the boiler.

The weight of 50,000 cu.ft. of air, at a temperature of 20 deg. below zero, would be 50,000 $\times$ 0.0903 = 4515 lb.; or, measured at a temperature of 40 deg. F., the weight of this volume of air is practically 4000 lb. The specific heat of air, at constant pressure, is 0.2374, which is the amount of heat (B.t.u.) required to raise the temperature of 1 lb. of air 1 deg. F. Therefore, the heat required to raise 4000 lb. of air 60 deg. is 4000 $\times$ 60 $\times$ 0.2374 = 56,976 B.t.u., which is the heat that the air must absorb from the steam coils each minute.

Assuming the steam pressure in the coils as, say 10 lb. gage, the heat in the steam, above 32 deg. F., at sea level, is practically 1155 B.t.u. per lb. Then, if the arrangement is such that the air passing over the coils condenses the steam and extracts enough heat to reduce the temperature of the condensed mater to, say 87 deg. F., which is hardly probable, the heat given up by a pound of steam would be 1155 + 32 — 87 = 1100 B.t.u. On that basis the weight of water evaporated or steam condensed—in other words, the *capacity* of the steam plant employed for this purpose—would be 56,976 $\div$ 1100 = 51.8 lb. per min., or practically 12½ bbl. per hour. The conditions assumed in this calculation are probably more favorable than would be realized in practice, and double or triple this evaporation may be found necessary.

Taking the efficiency of coal burned under a boiler as, say, 7 per cent., each pound of coal having a heating value of 14,000 B.t.u. per lb. would yield 14,000 $\times$ 0.07 = 980 B.t.u., which is the heat available in each pound of coal burned. The weight of coal that must be burned per hour, in this steam plant, to meet the requirements is then 60 (56,976 $\div$ 980) = 3488 lb., or say 1¾ tons.

The foregoing calculations show that the proposed scheme is, at the best, not practicable. The necessary distribution of the intake air over the coils, in order to permit such a large volume of air to absorb sufficient heat to raise its temperature 60 deg., would necessitate either a very large area in the fan drift, so as to reduce the velocity of the passing air and give it time to absorb the necessary heat, or baffle plates would have to be inserted to give the air current a devious course among the coils. The first of these plans presents practical difficulties that cannot be surmounted in most instances, while the second would greatly increase the drag on the air, or the resistance against which the fan must operate, and would reduce the air volume in the mine for the same power of the ventilator.

The simplest and most practicable scheme for preventing the freezing up of a wet air shaft, in winter time, is to reverse the circulation in the mine. This must be done at alternate intervals, wherever and whenever that is practicable, so as to prevent the freezing up of the hoisting shaft while thawing out the air shaft, and *vice versa*.

The difficulty presented in this inquiry is not an uncommon one. On the contrary, it is one of frequent occurrence with which the coal-mining industry has long contended. *Coal Age* will be glad to have its practical readers discuss the question broadly, giving their experiences and suggestions.

Has anyone ever tried a method of impregnating the water draining into the shaft with salt? Or what might prove more practical, spraying a brine solution over the ice formed in the shaft? A 25 per cent. brine freezes at zero (Fahr.). The application of any such scheme would involve the shipment to the mine of a carload of rock salt from the salt mines.

In the use of salt for the purpose mentioned, a more effective scheme to adopt, wherever practicable, would be to cut through the curbing at a point just below the inflow, and establish a water-ring surrounding the shaft. A steam coil introduced into this space would effectually prevent the freezing of the water, which should be drained from that point to the bottom of the shaft. Or, a pump installed at this point would effect the double purpose of preventing freezing and elevating the water to the surface. Let us have opinions, or better still, the results of experience of readers.

EXAMINATION QUESTIONS

Miscellaneous Questions

(Answered by Request)

Ques.—A horsepower of 8 produces 60,000 cu.ft. of air per min., in a certain mine. What will a horsepower of 27 produce in the same mine, under the same conditions?

Ans.—In mine ventilation, the quantity of air in circulation varies as the cube root of the power on the air. In other words, the quantity ratio is equal to the cube root of the power ratio. Therefore, calling the required volume of air x, we have, in this case,

$$\frac{x}{60{,}000} = \sqrt[3]{\frac{27}{8}} = \frac{3}{2} = 1.5$$

$$x = 60{,}000 \times 1.5 = 90{,}000 \text{ } cu.ft. \text{ } per \text{ } min.$$

Ques.—Explain the nature and cause of priming, in a steam boiler.

Ans.—The term "priming" in relation to a steam boiler means the carrying over of water into the steam pipe and cylinder of the engine. Priming may occur from any one of several causes, among which may be mentioned too high a water level in the boiler or too small a steam space, due to the improper design of the boiler. Priming may result from forcing a boiler, because of insufficient boiler power; it may also be caused by irregular firing, or the sudden opening of stop-valves. Priming may result from violent foaming in the boiler, caused by impure feedwater or the accumulation of grease and sediment in the boiler.

Ques.—Explain the reasons why a boiler feed pump will force water into a boiler when the steam pressure in the boiler is the same per square inch as that actuating the pump.

Ans.—The reason is that the steam end of the pump has a greater sectional area than the water end or plunger, which gives a greater total pressure acting on the steam piston than the total pressure exerted at the water end, against which the plunger operates. For example, assuming a 2-in. plunger operated by a 6-in. steam cylinder, since the areas of the plunger and piston vary as the squares of their diameters, the steam pressure in the cylinder will overcome nine times that in the boiler.

Ques.—How many 3-in. pipes will be required to run off as much water as one 12-in. pipe, all the pipes being of equal length?

Ans.—For the same head of water producing the flow in these pipes, all of which have the same length, the quantity of water that will flow in each pipe will vary as the square root of the fifth power of its diameter. In other words, the quantity ratio is equal to the square root of the fifth power of the diameter ratio. The diameter ratio, in this case, is $12 \div 3 = 4$. Then, calling the flow in one 3-in. pipe 1, or unity, the flow in a 12-in. pipe, under the same head, will be $\sqrt{4^5} = 32$. Therefore, one 12-in. pipe will carry 32 times the quantity of water flowing in a 3-in. pipe, under the same head; and it will require thirty-two 3-in. pipes to run off the same quantity of water as a single 12-in. pipe, all the pipes having the same length and the same head.

Ques.—The elevation at the head of a slope is +900 ft.; the elevation at the foot of the slope is +300 ft.; the length of the slope is 1200 ft.; what is the degree of pitch of the slope?

Ans.—The vertical rise of the slope, in this case, is $900 - 300 = 600$ ft. Since the length of the slope is 1200 ft., the angle that the slope makes with the horizontal, or the slope angle, is one whose sine is $600 \div 1200 = 0.5$. From a table of sines and cosines, this angle is found to be 30 deg. The slope has, therefore, a 30-deg. pitch.

Ques.—What are the principal things to be looked after on haulage roads in mines?

Ans.—A haulage road in a mine should be as straight as possible. The track should be well ballasted, the roadway drained and timbered so as to prevent falls and give sufficient headroom for the passage of cars. The grade of the main road should favor the movement of the loaded cars, the most economical grade being from 1 to 1.5 per cent. There should be a good clearance space on the same side of the track, for the entire length of every haulage road. Where mechanical haulage is employed, there should be refuge holes cut in the rib on the same side of the track. These holes should be whitewashed and kept free from all obstruction, so that they can be quickly found when needed.

No doors should be permitted on a main haulage road in a mine. As far as practicable, doors should also be avoided on cross-entries. A door should never be erected at the foot of a sharp grade. There should be no sharp curves that would cause the derailment of a car. Where turnouts are made on haulage roads, they should be timbered without necessitating center posts between the tracks. A block or other device should be employed to prevent cars from running out onto the haulage road either from turnouts or from rooms. All switches must be well laid by good tracklayers and guard rails used to prevent cars from jumping the track when crossing a frog.

Ques.—What gases are produced by mine fires and the explosion of firedamp?

Ans.—The principal gases produced by mine fires are: Carbon dioxide (CO_2) and carbon monoxide (CO), depending on the quantity of air supplied by the fire. The explosion of a firedamp mixture, at its maximum explosive point, produces carbon dioxide (CO_2) and water vapor (H_2O). A firedamp mixture when exploded below or above this point will produce more or less carbon monoxide, and there may be some unburned marsh gas (CH_4) remaining after the explosion. In any combustion, there is always some free nitrogen remaining in the burnt air; more properly speaking, there is an excess of nitrogen in the air, following an explosion.

COAL AND COKE NEWS

Harrisburg, Penn.

The claimant is entitled to be judged dependent upon the contributions of a deceased child, if these contributions have been necessary to support, interpreted in accordance with the station of life and manner of living of those who assert such dependency, says Chairman H. A. Mackey, of the State Compensation Board, in a new decision regarding what constitutes a parent's dependency rendered in Mickano vs. Rochester and Pittsburgh Coal and Iron Co., "It might be shown that the child's contributions to the family purse had been necessary to maintain other members of the family in school or to furnish musical instruction to other members, or to maintain an automobile or to obtain other very proper luxuries which cannot be included in the category of actual support. We do not think that the Legislature intended that the employer should pay compensation in order to secure these items for the home."

A meeting of the State fuel administration and anthracite coal operators was held in Philadelphia, on Nov. 18, with the purpose of bringing about a larger distribution of hard coal in certain states. Dissatisfaction was expressed with the present amount of distribution. Among the states represented were South Dakota, Minnesota, Wisconsin, Indiana, Pennsylvania, Delaware, New Jersey, Connecticut and New Hampshire. Others at the meeting included J. D. A. Morrow, director of distribution of the United States Fuel Administration, and J. H. Dickson, New York; S. D. Warriner, and W. J. Richards, who constitute the anthracite committee of the National Fuel Administration.

It was explained by anthracite operators that the October production was 800,000 tons short of the same month last year, which affected the distribution in all states. This loss in output, it was said, was due to the influenza epidemic and other causes. The operators explained the situation to the state administrators and suggestions were offered looking toward a greater supply of coal to communities before severe weather sets in.

Uniontown, Penn.

Conferences of team-track coal operators with Fuel Administration officials at Washington brought no relief to that industry, threatened with extinction by the railroad order substituting open-tops for box-cars. The committee was told that the box-cars were needed for the shipment of grain, but were not given any assurances when such cars would be returned to the coal trade. The two classes of cars means a difference of 75c. per ton and the operators claim they cannot do business with a profit at the open-top fixed price of coal. In the party which went to Washington were J. D. Madigan, of Connellsville; M. Lee Titus, of Point Marion; J. C. King and J. H. Dunn, of Uniontown, officers of the Team Track Operators' Association, with their attorneys, Lee B. Brownfield and John Duggan.

Flare-up of influenza in malignant form generally throughout the Connellsville coke region reduced production of coal and coke to another low level for the week ended Nov. 16. Reports compiled at the regional fuel administration office give a total output of 573,576 tons of coal, with an aggregate loss of 37,018 tons over the previous week. Coke shipments were 258,224 tons, a drop of 19,625 tons. Coal shipments were 219,837 net tons, showing a decrease of 64,725 tons.

While there was some car shortage for the week the principal difficulty was labor shortage. Influenza has now taken hundreds of workers from mines and yards which were heretofore not affected by the disease. Their withdrawal, together with the large number of convalescents not yet able to work full time, present a grave labor problem, which however, can be but temporary. The analysis of the week's production by the fuel administration places labor shortage as responsible for the loss of 5676 cars. Car shortage itself caused a loss of 1161 cars. Cars shipped during the week were 9817 with a rating of 16,372. Loaded coke cars to the number of 6936 left the regions while 2881 cars of coal were shipped to byproduct plants and other industries.

Charleston, W. Va.

During the week ending Nov. 16 the Fairmont region received a full supply of cars, the allotment running from 1500 to 2000 cars a day. One day's supply reached 2900. There were evidences, however, of delay in placing the cars. Production loss was reduced to a minimum, not running over 1000 tons a day. A few of the mines were shut down during the week. Even team-track mines were able to secure an adequate car supply, and open-top cars at that.

Production is still running below normal in the Pocahontas and Tug River regions, due to a pronounced labor shortage. The total output, according to the last compilation, is only 415,000 tons, or an increase of 3000 tons only over the previous week. The total production loss reached 62,452 tons, 52,531 tons of which was due to labor shortage. Five thousand more tons of coke were manufactured than during the week previous, the total production being 53,251.

Notwithstanding an extremely poor power supply in the New River district during the last two weeks, there was a very material increase in production in that field during the period ending Nov. 16. The total output was 139,811 gross tons, representing a gain of 13,597 gross tons. As an instance of the conditions with which New River mines have had to contend, last Thursday was entirely lost, and during the current week there was insufficient power on Monday and Tuesday. The supply was off again on Thursday.

The mines in the Kanawha District managed to speed up production to 167,711 tons during the week ending Nov. 16, thus gaining about 5000 tons, over the previous week's production. Power shortage and a scarcity of man power handicapped operators. Only ten hours were lost from car shortage, but from a shortage of labor there was a loss of 1016 hours. A loss of 908 hours from mine disability shows to just what extent inability to get power held down the output.

As all western shipments of fuel from the Kanawha and Guyan districts are required to be rebilled at Russell, Ky., and as there were reports of the blocking of tracks there, the possibilities are that western shipments would be halted and that a number of mines might have to shut down.

Birmingham, Ala.

Coal and ore production of this section has almost returned to normal. The production of coal for the week just closed is expected to show at least 10,000 to 20,000 tons increase over what it was for the week ending Nov. 9, when 348,306 tons were recorded by the Federal Fuel Administration offices here.

The hope is expressed that the output of Alabama mines can be increased to more than 400,000 tons weekly early in December, although it is thought unlikely that 433,000 tons mined in July will be surpassed, due to the unfavorable weather conditions which in all likelihood will be experienced throughout the district at the beginning of the winter season.

There is urgent need for every ton of coal that can be mined in the entire district. Domestic orders in large numbers are yet to be filled, while industrial plants, railroad lines and steamships, negotiating the change from a war to a peace basis, will need coal and coke in steadily increasing amounts, as the commerce of the nation recovers from its war footing and begins to assume normal proportions.

There is optimism in the fact that many men, available for work in the mining district of the state, will probably be released from cantonments in this country in the next few weeks, and it seems reasonable to believe that the labor shortage which now is the bugaboo of every operator in the district will be alleviated.

It hardly seems possible that there will be any release of coal cars in the immediate future. Supplies will be shipped for Government use for several months to come, and there is not much chance of the mines in this district being furnished with additional cars, according to railroad officials in Birmingham.

New York, N. Y.

The directors of the Wholesale Coal Trade Association of New York have decided to establish a coal exchange in connection with the Association, following the submission of a report by a committee headed by C. C. Harris, of George D. Harris & Co. The report was discussed by a meeting of coalmen, including members of the Association and invited guests, held at the Whitehall Club, following the luncheon of the Association, and was adopted by the Board of Directors a few days later.

It is the purpose of the Exchange to promote better trade relations between members of the wholesale trade, to facilitate dealings between buyers and sellers, to provide a medium through which producers of coal can come in direct contact with reliable distributors of coal and to stabilize business generally. It is intended to publish a bulletin of offerings and requirements daily for distribution to members. The Bureau will not act as selling agent or purchasing agent for any member, but will attempt only to bring together parties to selling and purchasing transactions who have either in writing or verbally listed their offerings or requirements with the secretary of the Bureau.

Members desiring to purchase coal must state the quality and delivery desired, while a member offering coal for sale shall state the price, quality and to what pool it will be consigned if shipped to tidewater, and the location of the coal at the time of offering en route or at tidewater.

All offerings and requirements must be in the hands of the Secretary, in writing, by 4 p. m. for publication that afternoon, and delivery to the members the following morning. It is provided that for the present no fee is to be exacted for the service rendered until its value to members has been demonstrated. It is also provided that the Bureau will not recognize requests for listings that do not represent proposed transactions that will comply in all respects with the rules and regulations of the United States Fuel Administration. All disputes arising between parties brought together by the secretary, or arising through compliance with any rules of the Bureau, are to be referred for adjudication to the Exchange Bureau Committee, and appeals from such decision may be made to the Board of Directors whose decision shall be final.

Oklahoma City, Okla.

Coal produced in Oklahoma during the fiscal year ending June 30, 1918, amounted to 4,489,064 tons of all kinds, according to a report covering that time submitted by Edward Boyle, chief mine inspector. This is an increase of 627,367 tons over the output of a year previous. To produce this required the services of 7607 miners working an average of 189 days a man for the year. According to the report 35 men were killed in the various mines during the year.

In explaining the report, Chief Mine Inspector Boyle says: "The report shows that 7607 miners worked to produce the 4,489,064 tons of coal averaged 590 tons per man for the year ending June 30, 1918. Placing the tonnage at the average rate of $1.01 per ton would make the earning capacity of each miner $595.90, and adding to that 78c. extra for yardage and other deadwork would make the total earning capacity of each miner $1036.10. From this must be substracted the amount of explosives. The grand total of explosives used, based upon the average cost of $2 per keg for 183,561 kegs, would be $367,122. The average cost per man for explosives is $48.27. Deducting this from his earning capacity would leave a balance of $978.83. However, this does not include expense of fuse, blacksmithing, oil, blasting, paper and other incidentals."

Victoria, B. C.

Fleet Robertson, provincial mineralogist for the Province of British Columbia, has returned from Montreal, Que., Canada, where he went, under instructions, to test the cable used in the Protection shaft of

the Western Fuel Co., of Canada, the breaking of which allowed a descending cage, loaded with miners on their way to work, to fall, carrying its passengers to instant death. It is understood that he will be able to show that the break was the result of internal corrosion brought on by the action of water. That, however, is not official, but it is known definitely that Mr. Robertson carried out some careful experiments in the laboratory of McGill University, and that, as a result, he will have some interesting statements to make, not alone as to the reason for the deterioration of the steel rope of Protection shaft, but with reference to the best means of preserving cables of similar character used in mining operations from like deterioration.

Diamond drilling of coal measures situated near the mouth of the Chemainus River, Vancouver Island, is being resumed as a result of the successful defence in the court by H. W. Treat of his Provincial title to these coal lands. The soundness of the licenses he holds, it will be recalled, was contested by the Esquimalt & Nanaimo Railway Co. Mr. Treat announced that the work would proceed a few days after the court's decision. He is of the opinion that the coal measures in question are the same as were worked by the old Wellington (B. C.) mine, the area being prospected in this instance being about eight square miles, off the foreshore. The operations, it has been disclosed, are being carried on by the International Coal Co. at the head of which is Samuel Hill, of Seattle, Wash., son-in-law of the late railway magnate, James J. Hill. It is pointed out that one great advantage possessed by this property in the event of the existence of coal in commercial quantities being proved, is its accessibility. Its location on the waterfront, it is figured, will permit coal to be placed in the hands of dealers at least 50c. a ton cheaper than can be done in the cases of most of the Island mines.

PENNSYLVANIA

Anthracite

Mahanoy City—An explosion of gas at the No. 11 colliery of the Lehigh Coal and Navigation Co. on Nov. 18 cost the life of one man and injured six others, three seriously.

Scranton—In deeds filed on Nov. 19 in the office of the Recorder of Deeds of Lackawanna County, the John Gibbons Coal Co. gains title to property in the vicinity of Ripple St., near the operations of the concern. One piece of land, improved with a washery, switches and outbuildings, was bought for $18,000. The grantors reserve the right to a silt bank on the lot for a term of five years. Culm and mine refuse is also included in the piece.

Plymouth—A threat to strike on Dec. 1 if the new wage scale granted recently to the miners of the anthracite field is not antedated so as to become effective Oct. 1, has been made by members of local union No. 311, of this town. A delegation from this union is to leave for Washington to try and have the wage award made retroactive. The Plymouth men contend that the workers generally are not satisfied with the terms of the latest wage agreement.

Bituminous

Midland—The Crucible Steel Co. is perfecting arrangements for the immediate construction of a large battery of coke ovens. The Cleveland & Pittsburgh Railroad Co. is making track extensions here to take care of the increased business that will result as soon as the ovens are completed.

Pittsburgh—The Moore coal holdings of approximately 2500 acres on the Youghiogheny River, in Westmoreland County, has changed hands for about $1300 an acre, or $3,250,000, according to an announcement made recently by a party interested in the property. It is said the coal passes to the Pittsburg Coal Co., and at the time the deal was consummated several interests were anxious to buy the coal. It is the Pittsburgh vein, and comprises one of the largest single tracts on the Youghiogheny. Many efforts to purchase it have been made in the past, but heretofore all offers submitted have been declined.

Uniontown—An offer to either buy or sell is the answer of S. A. Carson and G. H. Hochheimer, majority stockholders of the Pennsylvania Fuel Co., on the application of F. E. Markell for a receivership. The terms of the offer are for the book value of the stock on Nov. 1. In case Markell declines to do either, the answer filed here sets forth the directors will discontinue the business and distribute the assets to the stockholders. Rigid regulation of the coal business by the Fuel Administration resulted in the reduction of salaries of officers, in one instance, $1000 per month, the affidavit asserts. During the coal boom Carson receved a salary of $1250 per month, and Hochheimer $1750 per month. On Jan. 1, 1918, the papers set forth, Carson's salary was reduced to $600 per month and that of Hochheimer to $750 per month.

WEST VIRGINIA

Hughey—A total of $75,000 will be expended by the Peach Creek Coal Co. upon the construction of a plant at Hughey, in Logan County, in connection with the operation of a drift mine there, work on the plant having started on Nov. 10. The company plans a capacity at the outset of 40,000 tons yearly and eventually 60,000 tons. N. E. Steele has been elected president of the new concern.

Peytona—Extensive improvements have been made by the Laurel Branch Coal Co. at its plant at Peytona on Coal River, the company having installed a new power plant and having added new mining machines to its equipment.

Williamson—Improvements have been made on an extensive scale by the Winifrede Thacker Coal Co., of which R. G. Stevens is superintendent, at its plant near here, a new 300-kw. power plant having been put in in addition to the construction of a number of miners' houses. The company has also put up a new store building.

Williamson—The capacity of the Blocton plant of the Naugatuck Coal Co. has been materially increased by the opening of a new mine in the top seam. Many new dwellings for miners and a clubhouse have been completed.

Sprigg—In order to keep pace with the increasing capacity of its plant and the large number of employees used, the P. M. C. Coal Co. at its plant here has found it necessary to erect more houses for miners and a new store building. The company is under the management of Earl McConnaughey.

Williamson—Construction work is under way at the plant near here of the Superior Thacker Coal Co. A number of dwellings for miners as well as other new buildings for the plant are being erected.

Himler—Improvements in progress at the plant here of the Himler Coal Co. include the erection of a number of new houses.

Downs—The Rachel mine of the Consumers Fuel Co. of Pittsburgh, has wrought some decided improvements under the managership of E. F. Miller. New storerooms, and an office and machine shop have been built and ninety modern dwelling houses erected. A clubhouse has been fitted up for the use of the company's employees. The mine is a shaft operation and is equipped with modern machinery throughout. Working conditions are excellent and the miners like to locate here.

ILLINOIS

Du Quoin—The Equitable Coal and Coke Co. is erecting a coal rescreener at its mine here. The work is being done by the engineering firm of Allen & Garcia, of Chicago, Ill. Construction is of steel and reinforced concrete.

Auburn—The Auburn & Alton Coal Co. made a record run at its mine on a recent Saturday when 1266 tons of coal were hoisted to the surface, after it was mined. It took 1044 pit cars to haul the coal from the mine to the elevator. This is believed to be a record for mining coal in this vicinity, and shows how hard the miners and attendants have been working to supply the coal needs of the nation. The mine has been in operation for a number of years and has always maintained a high record for efficiency. L. W. Senseney is the operator for the mine and Joseph Menzie is the mine manager.

Springfield—The production of coal in the Springfield district is now nearer normal than at any time since the influenza epidemic began. Several mines which have been shut down are now working again, and those which have had a partial force at work are now operating full time. The Jones and Adams mine, which had been working during the past few days with only 158 men, has practically its whole shift of 500 men back at work. The Woodside mine is also in full operation. Reports coming into the office of the subdistrict indicate that only about 200 miners in the Springfield subdistrict are not at work at present.

Springfield—Two former officials of the United Mine Workers, Duncan McDonald, of Springfield, and George L. Mercer, of Canton, are candidates for president of the Illinois Federation of Labor. The election is to be Tuesday, Dec. 12. Each was formerly secretary-treasurer of the Illinois miners' organization. McDonald has latterly devoted his efforts to furthering the coöperative movement.

Alton—Farmers in this vicinity are mining their own coal. Pits abandoned years ago are being operated to supply the rural demand and a number of new openings have been made where the coal vein is near the surface and a supply sufficient to keep the home fires burning on the farms is being taken out.

KENTUCKY

Stone—In addition to erecting a number of miners' houses at its plant at this place, the Sudduth Coal Co. has also put the finishing touches on a tipple at its No. 2 mine.

Toler—Considerable progress has been made on the new work at the plant of the Bailey Coal Co., the company having completed a number of new houses which constitute a part of the plant.

Pinson Fork—The Marietta Coal Co., which recently increased its capital from $25,000 to $50,000, plans development of coal properties on the Pond Creek branch of the Louisville & Nashville R. R., near Whitesburg, Ky. E. A. Gorman and Louisville interests are said to be behind developments in Perry County. However, new development work as a whole is slow just now, as labor and material are hard to secure, while conditions do not warrant any great amount of development.

ALABAMA

Sayreton—The Roberts & Schaefer Co., of Chicago, Ill., has recently completed a large new coal washer for the Republic Iron & Steel Co. at its mine here to replace the washer destroyed some months ago by fire. The washer is of the Elmore type jig.

OKLAHOMA

McAlester—The sale of the coal and asphalt deposits underlying the surface of 441,107 acres of the segregated mineral land in the Choctaw and Chickasaw Indian nations will take place here on Dec. 12. McAlester has the advantage of shipping facilities on the Missouri, Kansas & Texas and the Rock Island roads, and already is the center of a coal region with a fortnightly payroll of over $500,000.

WASHINGTON

Seattle—Alaska has begun the shipment of its vast stores of anthracite coal, according to information received here from the northern territory. The deposits in Alaska are the only ones on the west coast and for many decades have been locked in the north by legislation. With the information of the shipment of anthracite comes the news of the completion and formal opening of the Alaska Anthracite R. R., 22 miles long, running from Controller Bay to Carbon Mountain. The first trainload of anthracite, consisting of 100 tons, reached tidewater over the new railroad. Since that the mines have been shipping 300 tons a day. It is expected the output for this year will be almost 100,000 tons.

Foreign News

Vienna (via Basel, Switzerland)—M. Zerbik, minister of public works, has asked the Austrian foreign minister to address a telegram to the governments of the United States, Great Britain and France showing the extremely critical situation in Austria concerning coal and food. The public works' minister says there is no coal for the heating of houses and that the supply for cooking will not last more than a week. Mills and bakers will be compelled to close, he adds, within a few days. No further coal supplies are available to keep the railroads running, he says, and the gas and electricity services in Vienna cannot be kept going more than two or three weeks.

Ottawa, Ont.—In a bulletin issued by the Advisory Council for Scientific and Industrial Research A. S. L. Barnes, assistant engineer of the Ontario Hydro-Electric Commission, states that it is scarcely conceivable that electric energy can successfully compete with coal, oil and gas for heating purposes. Its main use will always be for mechanical power. He points out that it would need 960,000 hp. to heat the houses of Toronto alone, while the output of Niagara is only 780,000 hp. The whole possible Ontario development would be about 6,000,000 hp., which would be quite inadequate to supply the existing homes with heating alone, exclusive of all other requirements. In any event, the cost of coal would have to rise to not less than

$15.50 per ton before it would be as dear as electricity at 35c. per kw.-hr. Electric heaters as auxiliaries may prove useful in mild weather for short periods, but Mr. Barnes considers that there are scientific and economic difficulties which render impossible the idea that the water-power of Canada can be utilized on a large scale to solve the fuel problem.

Personals

Henry E. Mulligan, who for some time has been associated with S. D. Brady at Fairmont, W. Va., as engineer, has accepted the superintendency at the mines of the Abram's Creek Coal Co. at Oakmont.

George C. McIntosh, of Huntington, W. Va., has severed his connection with the United States Fuel Administration, where he held the post of publicity agent, to accept a similar position with the Solvay Collieries Co. with headquarters at Huntington.

John J. McNulty, mine foreman of the Thomas shaft of the Hillside Coal and Iron Co., transferred to No. 1 shaft of No. 9 colliery, Pennsylvania Coal Co., to take the place of **David Alexander,** who died recently. The change is a promotion for Mr. McNulty.

Orville Stump, superintendent of the Menden coal mine, owned by the Boonville Mining Co., of Boonville, Ind., was married Nov. 20 to Miss Lucia Hemenway, sister of James A. Hemenway, formerly United States Senator. Mr. and Mrs. Stump will reside in Boonville.

Harris Booker, of Monongahela City, Penn., has resigned as general superintendent of the Diamond Coal and Coke Co., of Pittsburgh, Penn., to accept a like position with the United Coal Corporation of Pittsburgh, effective Dec. 15. Mr. Booker succeeds Edward H. Coxe, whose resignation was noted in the Nov. 21 issue of Coal Age.

Obituary

John Woodmansee, superintendent of the Herminie Coal Co., of Herminie, Penn., died recently following a lingering illness. He was 56 years old and leaves a widow and three children.

Coming Meetings

Kentucky Mining Institute will hold its winter meeting Dec. 6 and 7, at Lexington, Ky. Secretary, Charles W. Strickland, Huntington, W. Va.

American Society of Mechanical Engineers will hold its annual meeting Dec. 3-6 in New York. Secretary, Calvin W. Rice, 29 West 39th Street, New York City.

War Service Committees will meet Dec. 4, 5 and 6 at the Million Dollar Pier, Atlantic City, N. J., under the auspices of the Chamber of Commerce of the United States.

Coal Mining Institute of America will hold its annual meeting Dec. 4 and 5 in Pittsburgh, Penn. Secretary H. D. Mason, 911 Chamber of Commerce Building, Pittsburgh, Penn.

Publications Received

Fusibility of Coal Ash and the Determination of the Softening Temperature. By Arns C. Fieldner, Albert E. Hall and Alexander L. Feild. Bulletin 129. Department of the Interior, Bureau of Mines. Illustrated, 146 pp., 6 x 9 inches.

Power: Its Significance and Needs. By Chester G. Gilbert and Joseph E. Pogue, of the Division of Mineral Technology, United States National Museum. Smithsonian Institution, United States National Museum. Bulletin 102, Part 5, the Mineral Industries of the United States.

Trade Catalogs

Grounding Facts. Paragon Electric Co., Chicago, Ill. Booklet. Pp. 22, 6 x 9 in., illustrated. Embodies the results of years of experience and experimentation in this very interesting field. The booklet will afford valuable information to electrical engineers.

Curtis Pneumatic Appliances. Curtis Pneumatic Machinery Co., St. Louis, Mo. Catalog No. 63. Pp. 84, 6 x 9 in., illustrated. Covers air compressors, air hoists, trolley and trolley systems, sand blasts, pneumatic and hydro-pneumatic elevators, jib and traveling cranes.

Hess-Bright Ball Bearings. Hess-Bright Manufacturing Co., Philadelphia. Pp. 108, 5½ x 9¼ in., illustrated. Bound in stiff board covers and excellently printed, the volume is in reality a treatise on the history and development of ball bearings. Typical ball-bearing applications are described and illustrated. The 26 pages in the rear of the book are devoted to general information and prices.

Industrial News

Bellaire, Ohio—The Pittsburgh-Belmont Coal Co. has increased its capital from $700,000 to $800,000.

Uhrichsville, Ohio—The Gilmore Coal Co. has been incorporated with a capital of $10,000 by Paul A. Romig, B. O'Donnell, W. R. Wilcoxen, P. A. Romig and B. B. Beltz.

Coshocton, Ohio—The Coshocton Valley Coal Co. has been chartered with a capital of $25,000 to mine and sell coal by R. H. Mills, F. M. Marshall, G. M. Marshall, Mary B. Mills and T. H. Wheeler.

St. Louis, Mo.—The Walter A. Zelnicker Supply Co. announces the appointment of Joseph Meyerson as secretary to the president. Mr. Meyerson was associated for ten years with the Southwestern Tariff Bureau. Another addition to the company's forces is A. Kottsieper, who will cover the Southwestern territory.

Columbus, Ohio—Reports show that new members of the Michigan-Ohio-Indiana Coal Association during the month of October numbered more than 20. Much interest is shown in the work of the organization, according to B. F. Nigh, the secretary. During August and September the association collected in excess of $12,000 in railroad claims for its members.

Louisville, Ky.—That conditions in the coal trade are far from satisfactory at the present time is shown in the small volume of development work being undertaken in the state, and the very few new companies being chartered. For a time a dozen or more new companies were chartered weekly, but for the past two or three weeks everyone has felt satisfied with leaving well enough alone.

Louisville, Ky.—R. C. Tway, of Louisville, was elected president; and John W. Williams, vice-president, of the Harlan County Coal Operators' Association at a meeting held in Knoxville, Tenn., on Nov. 19. This organization was formed about three years ago and numbers all of the principal Harlan operators in its membership. E. R. Clayton, district fuel administrator, has been secretary for several years.

Charleston, W. Va.—Conviction at the June term of the United States District Court here of discrimination in the distribution of coal cars, has resulted in I. K. Dye, general manager of the Coal & Coke Railway Co. being sentenced to serve six months in jail and to pay a fine of $1000. At the trial evidence was introduced tending to show that he had furnished cars to mines in which he was interested and refused them to other mines.

Norristown, Penn.—The expenses of the local emergency hospital, organized during the recent influenza epidemic, will be met by the fines of shippers of bituminous coal who charged the State Hospital for Insane here prices in excess of the Government figure. The cost of maintaining the victims of the plague was $6000, which amount has already been sent the local authorities by William Potter, Fuel Administrator for Pennsylvania, to whom the fines were paid.

Bluefield, W. Va.—The territory over which R. D. Patterson, production manager of the Tug River and Pocahontas fields, will exercise supervision, has been considerably enlarged, and in the future will embrace the Kenova, Thacker and other fields, which have heretofore been in the territory of J. W. Dawson, production manager. Action was taken on the change by the members of the Williamson Operators' Association at a meeting held at Williamson on Nov. 12.

Boston, Mass.—A demand for reduction of freight rates on coal coming into New England has been sent to Director General McAdoo of the Federal railroad administration by the Massachusetts public service commission. The commission says in its message that the present rates are clearly unjust and a grievous burden and that New England people have been trying for five months without success to obtain relief notwithstanding the promise of the director that a readjustment of rates would be made.

Charleston, W. Va.—The casualty list in the mines of the state during the month of October shows a total of 32 deaths. All but twelve of such deaths were caused by falling coal, slate or roof. Five men were killed by mine cars, three by motors and one by a mining machine. All but three of the total number of deaths occurred inside the mines. The remaining three met their deaths under or between mine cars. The greatest number of deaths were in Fayette and McDowell Counties, there being six in each.

Toledo, Ohio—There was a slight falling off in the tonnage loaded by the Hocking Valley docks during the week ending Nov. 16 as compared with previous weeks, but on the other hand there was a large increase in the tonnage loaded by the Toledo & Ohio Central railroad docks. The lake season is now practically over as only a few cargoes will leave the lower lake ports after Nov. 23. The Hocking Valley docks loaded 125,798 tons as compared with 160,491 tons the previous week, making a total of 4,920,858 for the season. The Toledo & Ohio Central docks during the same week loaded 135,000 tons, making a total of 2,224,000 tons for the season.

St. Louis, Mo.—The abstract and brief of the East St. Louis interests, intervenors in the bridge arbitrary case, in which the St. Louis Chamber of Commerce asks the abrogation of the 20c. a ton charged by the railroads for hauling coal from East St. Louis to St. Louis, was filed a few days ago with the Interstate Comerce Commission at Washington. The document was prepared by R. W. Ropiequet, attorney for the east side interests. The brief emphasizes that the differential is a long-existing relative rate adjustment based upon the natural advantage of location enjoyed by the east side because of its proximity to the coal fields.

Columbus, Ohio—Production figures for the Southern Ohio field for the month ending Nov. 2 showed a heavy decrease, due largely to the prevalence of the influenza epidemic. The figures were given out by W. D. McKinney, Federal representative for the producing district. For the week ending Oct. 12 the output was 314,000 tons as compared with a capacity of 472,000 tons. For the week ending Oct. 19 the output was 355,000 tons as compared with a capacity of 487,000 tons. For the week ending Oct. 26 the output was 318,000 tons as compared with a capacity of 474,000 tons, and for the week ending Nov. 2 the output was 315,000 tons as compared with a capacity of 471,000 tons.

Charleston, W. Va.—Urging a change in the standing zone regulations governing the shipment of coal, Kanawha district operators visited Washington this week to interview officials of the United States Fuel Administration and presented their arguments for a change. Members of the party are of the opinion that the coal from the Kanawha region should be shipped into Ohio and Indiana if there is a market for it there, as is contended by shippers here, it being pointed out that the quality of the coal is such that Ohio and Indiana consumers would like to use it if it can be obtained. It is now claimed that there is no longer any necessity for shutting West Virginia coal out of certain western markets.

St. Louis, Mo.—The St. Louis Fuel Committee has taken under advisement the application of the Beckemeyer Coal Co., of Beckemeyer, Ill., for a reclassification which would take it out of the Standard group and place it in the Mt. Olive group and enable it to sell its output in St. Louis for 25c. a ton more than at present. The application is based upon the claim that the Beckemeyer coal is of Mt. Olive quality. When arguments were made recently representatives of other companies announced that if the reclassification were allowed they would ask reclassification for their product on the ground that it is as good as the Beckemeyer output. Dealers present at the conference asked that if any reclassifying was to be done that it be deferred until spring so as not to affect the value of stocks on hand.

Columbus, Ohio—Ohio operators have been busy recently making out an entirely new set of reports to be filed with the United States Railroad Administration. The new reports show the daily capacity and also the daily output of every mine during the month of October. The daily capacity of the mines is determined by taking the total tonnage produced, dividing by the number of hours worked in producing it and multiplying the quotient by the number of hours in the recognized work day. The result is to be termed the "daily rating" of each mine and shall be the basis on which cars shall be distributed to the mine during the periods of car shortage.

Mine superintendents believe that it will be a difficult matter to increase the car supply of a mine where the production was cut to a low point during the month of October.

MARKET DEPARTMENT

Weekly Review

Fuel Administration Concentrating on Larger Anthracite Output — Changes in Distribution Program Necessary—Bituminous Production Falls Off Considerably — Market Not Affected—Restriction in Use of Soft Coal Removed

A NUMBER of plans looking toward an increased production of anthracite have been set afoot by the Federal Fuel Administration. Influenza and peace celebrations have interfered with the output of hard coal to such an extent as to make necessary the rearrangement of the program of distribution. Points farthest away from the mines will be cared for first, and shipments of hard coal will be withheld from sections that have already received their assigned quota.

War industries that had been granted preferential allotments of anthracite will receive this coal no longer, arrangement having been made to divert this tonnage to domestic purposes. Every possible endeavor is being made by the production division of the Fuel Administration to increase the output of hard coal while weather conditions are favorable, and to this end anthracite miners who had enlisted or been called to the colors are being mustered out of service as quickly as they signify their intention of returning to work.

During the week ended Nov. 16 the output of hard coal amounted to 1,403,000 net tons, a daily average of 234,000 net tons compared to the same period in 1917, when the production totaled 2,041,000 net tons, a daily average of 340,000 net tons. In other words, output is now being maintained at a daily rate 100,000 tons lower than in 1917. From Apr. 1 to date the total output of anthracite is 63,381,000 net tons, as against last year's production of 64,921,000 net tons for the same period.

Bituminous also registered another drop during the week ended Nov. 16 with the output of only 9,707,000 net tons. Last year's total for the same period was 1,572,000 net tons greater. Just at present this drastic slump in production has no particular significance, as the output of soft coal for the coal year to date is 40,213,000 net tons greater than the output for the same period in 1917.

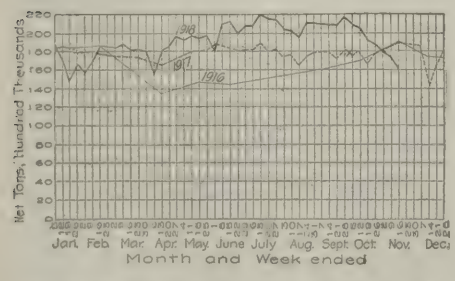
If manufacturing industries adjust themselves rapidly to peace-time conditions demand will again become eager, and the present weakness in the bituminous market will disappear. All restrictions regarding the stocking and use of soft coal have been removed, the need for keeping close watch on the distribution of soft coal having passed. Low quality coals are being sold below the Government maximum here and there, though no cut in price has been reported for the fancy grades.

To sum up, the domestic sizes of anthracite are exceedingly scarce, while bituminous is plentiful, many mines having been forced to close down because of lack of orders.

WEEKLY COAL PRODUCTION

Improvement in the influenza situation in most producing fields was expected to bring about an increase in production during the week of Nov. 16, but the celebration attending the signing of the armistice offset whatever increase might have been so derived. The output during this week is estimated at 9,707,000 net tons, a decrease of 661,000 net tons, or 6.4 per cent. compared with the week of Nov. 9, and a decrease of 1,572,000 net tons, or 14 per cent. compared with the week of Nov. 16, 1917.

Whether the situation has any serious aspects depends upon the length of time required for general industrial conditions to become readjusted, the extend to which manufacturing activity will be resumed, and the rate of production that can be



maintained during the winter months. In the past two weeks, market conditions west of Pittsburgh have been increasingly important in affecting production. The decrease in seven weeks, or from the high mark of Sept. 28, has been 25 per cent., until new production is below current consumption. The low point for the present has been reached.

The average production per working day during the current week is estimated at 1,618,000 net tons, as compared with 1,965,000 net tons for the coal year to date, and 1,762,000 net tons for the same period of 1917. The total production from Apr. 1 to Nov. 16 is estimated at 389,024,000 net tons, an increase over the corresponding period of last year of 40,213,000 net tons, or 11.5 per cent.

The improvement in the anthracite production during the week of November 9 was but temporary, the output during the week ended November 16 decreasing 182,000 net tons, or 11.5 per cent. This output also fell below the corresponding week of 1917 by 636,000 net tons, or 31.2 per cent. The daily average during the week of November 16 is estimated at 234,000 net tons as compared with 333,000 net tons during the coal year of 1917, which practically represents the average daily requirements during this year. The total production from April 1 to date, for this year, is estimated at 63,581,000 net tons, a decrease of 1,340,000 net tons, or approximately 3 per cent. compared with the same period of 1917.

Reports from the carriers, for the week ended Nov. 16, show a decrease, in comparison with the week preceding, in cars loaded, from all districts, with the exception of the northeast Kentucky and southern West Virginia fields, southwest Virginia, and Tennessee and Kentucky. Considerable improvement occurred in these fields, while material decreases were noted in the central Pennsylvania field, where shipment declined approximately 4000 cars, or 14 per cent., in Ohio, where shipments declined approximately 3000 cars, or 15 per cent., and in Illinois, Indiana and western Kentucky, where shipments declined approximately 4000 cars, or 10 per cent. The current week's shipments fell far behind that of the corresponding week of last year, with the exception of southwest Virginia. For the coal year to date, however, the shipments in all districts still exceed the performance during the same period of 1917.

The lake dumpings of bituminous coal (including vessel fuel) fell considerably during the week of Nov. 16, and are estimated at 639,494 net tons. This tonnage is 21 per cent. behind the dumpings during the week of Nov. 9. For the coal year to date the lake tonnage is estimated at 28,477,112 net tons. The fuel requirements of the Northwest for bituminous coal by lake will be furnished.

Shipments of bituminous coal to New England during the week ended Saturday morning Nov. 16 estimated at 413,546 net tons, fell behind the shipments during the preceding week by 31,696 net tons, or approximately 31 per cent. Of the total stated, rail receipts through the gateways amounted to 143,470 net tons, an increase over the last week of 2.5 per cent., while tidewater shipments, amounting to 270,074 net tons, decreased 11.5 per cent. Shipments from Baltimore and Hampton Roads decreased considerably during the week, while shipments from New York and Philadelphia increased 25.8 per cent. The Fuel Administration, on Nov. 16, revised the New England budget, and the shipments for the coal year to date of 18,950,455 net tons are in excess by 2 per cent. The New England receipts by rail exceed the budget for the same period by 7.1 per cent., while tidewater shipments, as a whole are 1 per cent. behind budget.

The production of beehive coke in the United States during the week ended Nov. 16 is estimated at 553,000 net tons, or approximately 1 per cent. behind the production of the week of Nov. 9 and 70,000 net tons or 11.2 per cent. behind the production during the corresponding week of 1917. The daily average during the current week is estimated at 92,000 net tons as compared with 93,000 net tons during the week preceding and 104,000 net tons during the week of Nov. 16 of last year. Operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania report production of beehive coke at 275,490 net tons and the operation of their plants at 66.4 per cent. of their full time as against 69.9 per cent. during the week of Nov. 9. The same operators produced 159,250 net tons of coal.

Repairs to plants during the week ended Nov. 16 caused production of beehive coke to decrease slightly below the production of Nov. 9. The production during the current week is estimated at 571,113 net tons, and exceeds the production of the corresponding week of 1917 by 127,895 net tons, or 28.8 per cent. The plants of the country, during the week ended Nov. 16, were operated at 88.7 per cent. of their full time, as compared with 90.2 per cent. during the week of Nov. 9. The limiting factor during the week, as above stated, was repairs to plants, loss of time attributed thereto, by the operators for the country as a whole, rising from 5.7 per cent. during the

week of Nov. 9 to 7.4 per cent. A slight improvement was noted during the week in the labor situation. The states reporting a decrease in production during the week all attribute the falling off to repairs to plants, while those reporting improvement, with the exception of Indiana, give better labor conditions as the cause. In Indiana a better supply of coal brought about the improvement.

BUSINESS OPINIONS

The Iron Age—The decision of those in control of the steel industry at Washington to sweep away the whole scheme of priorities apart from those on merchant ship, railroad and navy material brings back at a stroke a substantially free market. Cancellations have come in plenty. Shell steel, wire, rails and car material represent the largest cancellations. A small but noteworthy inquiry for billets has come from Belgium, and 3500 tons of Bessemer bars are asked for the French Government. Ship plates are being sought for both China and Japan. The effects of the stoppage of Government work are not pronounced as yet, but some men are appearing every day at steel works gates seeking employment.

Bradstreet's—As the country shifts from a war to a peace basis, irregularity in movements, uncertainty about prices, and cancellations, the latter mostly of war-wanted products, are strongly outlined, these manifestations being accompanied by conservative optimism as to the future and readiness to believe that the country will respond to readjustment with a minimum of shock. Meantime, however, new buying in volume is in abeyance; the general disposition is to mark time pending the opening of clearly defined routes, and, in a word, there is considerable looking about to see what the dispensations of peace will bring forth to fill the gaps caused by the elimination of war work—an aspect that prominently stands out in the iron and steel trades.

Dry Goods Economist—In the cotton piece goods market speculators continue to sell cloths in the gray at prices 1 cent to 1½ cents per yard less than the Government price-fixing committee's quotations for the same counts. In some cases goods are being sold by speculators at prices at which they bought them some time ago. In some cases the War Industries Board has given notice to mills that when possible the relinquishing of certain contracts, or parts of contracts, for goods is desirable whenever possible, for the reason that the demobilization of troops will necessarily lessen the requirements of the Government. With mills, however, the total price recession does not amount to over 1½ cents a yard less than the prices made by the War Industries Board price-fixing committee.

Marshall Field & Co.—Current wholesale distribution of dry goods is running a little in excess of the heavy shipments of the corresponding week a year ago. Total orders from salesmen on the road were about the same, orders for immediate delivery were larger, while sales for future delivery were a little less. More customers were in the house than last week, but not so many as during the corresponding week of 1917. More or less inactivity in the retail business during the month of October due to the influenza epidemic and the unseasonable weather has been followed by improved conditions and merchants look to the future with optimism. The signing of the armistice points to an excellent holiday business. Collections continue good.

American Wool and Cotton Reporter—The ability or inability of foreign sellers to supply wool to the domestic market, and the price at which it can be supplied, taken in connection with the possible or probable conditions on cloth, is causing much speculation. There are those who feel that the raw material situation should be controlled by the Government until suitable arrangements can be made for placing the market on what might be considered a firmer basis. Buyers object to this plan, because they feel that prices will be lower, and they do not want any artificial market established.

Atlantic Seaboard

BOSTON

Manufacturing further curtailed. Trade settles down into grooves, with little inquiry. Practically no regulation locally. New England Fuel Administration ceases to order coal to loading piers. All-rail receipts materially reduced. Agitation for lower freight rates. Railroad fuel supply also falls off. Water receipts light. Problem to move accumulation at Baltimore. Less request for steamers. Future of shipping a cause for anxiety. Glaring differential between rail delivery and shipment by water. Agencies begin to wonder what steps will be taken for their relief. Possibility of through shipments from B. & O. another factor. Continual trouble with hot storage piles. Anthracite receipts show decided loss. "Free coal" increased to 100 cars daily. Complications over local allotments, prices, and two-thirds rule. Water deliveries disappointing, but improvement expected now that lake shipments have ceased. Market still absorbs broken and pea.

Bituminous—Several of the largest textile mills, as well as shoe factories and other plants for the past year engaged largely in war work, have now been notified to stop deliveries on Government contracts. One mill using 4000 tons per week and employing 5000 hands has already changed from war conditions to something like normal activity. Night work ceased a week ago, and this is typical of a large number of similar industrial units. One result is a heavy decrease of coal consumption and therefore a long extension of the time which must elapse before such interests appear in the open market.

The coal trade is marking time. Aside from a very light volume being sold in the current market, there is practically no new business that can be reported. A new contract for future delivery is a thing unheard of. Present movement is confined to those shippers who are so fortunate as to have outlets where the fuel authorities were unable to stock for months ahead during August and September when bituminous of all kinds was being poured into New England.

All embargoes and restrictions are off, so far as this territory is concerned. In effect, this was all discounted months ago, because storage and other limits had to be disregarded in order to absorb the heavy tonnage that was thrown in this direction. The bituminous department of the New England Fuel Administration is now practically disbanded, except for the adjustment of various complications that arose during the active season. All "Storrow bituminous" has now ceased moving to any of the tidewater loading piers, and it is understood that no further requisitions will be filed for "emergency" coal. Some coal of this description remains at Baltimore and at the New York piers, but doubtless all these miscellaneous tonnages will be worked off during the next few weeks.

Receipts all-rail at the five New England gateways show a greater falling off since Nov. 12 than for any similar period since last winter. From the 13th to the 18th inclusive the average daily movement of commercial bituminous was only 287 cars, a considerable reduction from the 600 cars that was the daily average only 60 days or so ago. Railroad fuel averages were only 80 cars daily, for the same period, and this also is a big reduction in movement.

Receipts by water have decreased about in the same proportion as those by rail. The different shippers have distribution in their own hands now and for that reason the ultimate disposition of cargoes seems to proceed more smoothly. Boston houses are more and more inclined to advise their principals to take what foreign business can be had, the outlook for coastwise business is so dubious for months ahead. This is reflected in current receipts which are very light at practically every forwarding point.

The only loading port where there is any considerable accumulation is Baltimore. It is only natural that in a market such as we now have there is decidedly little request for the lower grade coals from the Fairmont district. The New England Fuel Administration has several cargoes on hand awaiting disposition, but as yet no outlet has appeared. Steamers also are not in good request for coastwise coal service. At a recent meeting of Mr. Storrow's advisory committee of shippers but eight steamers were placed out of a possible twenty. This means that movement to this territory has slackened to an extent almost unexampled at this season.

One of the real problems for coal shippers appears in the very pronounced differential in favor of the all-rail routes. At points within easy access of tidewater there is now a difference in delivered cost of practically $2 per net ton, even when there is no demurrage on the water coal. This discrepancy is so glaring that the various Hampton Roads agencies are wondering what is to become of their customary business, and what measures are to be taken for their relief. The obvious first move is a reduction in coastwise rates, but not everybody is clear how this can best be managed. The recent publication of new through tariffs from B. & O. territory to eastern points has given new point to the discussion.

There is continuous difficulty on the part of large steam-users over the heating of coal in storage. Much of this arises from the great anxiety to take on as much coal as possible, but doubtless the chief cause of trouble is in the number of different grades piled together. This condition has an important bearing on the present attitude of buyers toward steam coal now seeking a market.

Anthracite—Domestic sizes received all-rail have shown a decided slump the past week. From the 13th to the 18th, inclusive, the average daily movement was but 316 cars. "Free coal," running to Mr. Storrow's order at the gateways, has been increased from 50 cars daily to 100 cars. Before the order was increased the yield through this channel was about 50 per cent., but the proportion the past week showed an improvement with respect to this emergency coal. It is understood that doubling the original order is to last until the arrears on the first order are made up.

Water deliveries continue to be very disappointing, but now that shipments to the lakes have practically ceased there is hope for improvement in the near future. Stove and chestnut are still in very short supply, and the market continues to absorb large tonnages of broken and pea.

NEW YORK

Anthracite production continues to lag and scarcity of domestic sizes becomes serious. Return of miners from war is only hope, operators believe. Police survey shows that this city lacks over three million tons. Bituminous situation in fairly good shape. Operators slow because of labor shortage and operators have many Government orders. Fairmont coals easy.

Anthracite—The return to the mines of several thousand men who are either now in the country's service or afflicted with influenza and an increase in production would be welcome news to consumers who are short of this winter's coal supply. The demand which eased up considerably because of the continued warm weather has again taken a brace, and householders are becoming urgent. That the situation is not more serious is altogether due to the urgent request of the Fuel Administration and dealers early in the year that every consumer buy his coal early.

Reports from the mining regions received here are not encouraging. They show a steady falling off, due to the inroads of the influenza epidemic, but now the authorities believe they have the situation well in hand. Despite this handicap the operators report the tonnage produced is ahead 128,942 tons for the coal year to date, as compared with the same period of last year. Efforts are to be made by the Federal authorities to increase production, and toward that end it is proposed to release about 7500 mine workers who are now in the service. The new wage scale is now in full working order.

The order of Dr. Garfield fixing maximum prices for the steam coals has not so far resulted in changes in any of the price schedules, nor has it caused any falling off in stocks. Buckwheat No. 1 is plentiful, but the supply does not cause so much trouble to shippers as it did a few weeks ago. The starting of fires in the office buildings has required more of this size. Rice and barley are nearly a drug on the market. Everybody seems to be filled up with these two sizes with no apparent demand.

The domestic sizes continue to be in heavy demand, with stove and chestnut leading. Dealers are now offering consumers egg instead of stove.

While receipts at the local docks for the week show a decrease from what they should be, the dumpings for the seven-day period ended Nov. 22 show an increase of 1344 cars over the previous week, the reports showing 5599 cars dumped as against 4255 cars.

The result of the survey of the coal situation in Greater New York made under the direction of Mayor Hylan shows a deficit of 3,577,261 tons. Much of this shortage may be accounted for by the refusal of dealers and householders to give the police the information sought on the ground that it could be obtained at the office of the local Fuel Administrator.

Current quotations, per gross ton, f.o.b., tidewater, at the lower ports are as follows:

	Circular	Individual		Circular	Individual
Broken	$7.80	$8.55	Buck	$5.10	$5.90
Egg	7.70	8.45	Rice	4.65	5.10
Stove	7.95	8.70	Barley	4.15	4.30
Chestnut	8.05	8.80	Boiler	4.60	
Pea	6.55	7.30			

Quotations for domestic coals at the upper ports are generally 5c. higher on ac-

count of the difference in freight rates. Prices on buckwheat No. 1 and the smaller sizes of anthracite coal are not fixed by the Government.

Bituminous — The rescinding of the storage regulations is not expected to have any material effect on local market conditions inasmuch as most large consumers—both essential and non-essential industries—are well supplied with coal. With these stocks on hand most consumers are not inclined to do any more buying for the present, but are looking for a change in conditions with a possible change in prices. With this prospect before them they are not going to be found with a lot of high-priced coal in their bins if the market does break.

Commercial coals are in good shape. There is no great amount of free coals here, but this is entirely attributed to the decrease in production as a result of the epidemic and the lack of labor, together with the let-up in demand. Tradesmen returning from the mining fields report that conditions last week in the Clearfield regions showed signs of improvement. Production was in fairly good shape, and although labor was short, the epidemic was said to be improving. Car supply was good and operators had plenty of orders from the Fuel Administration and railroads to take the entire output.

Fairmont district coals were in better shape and plentiful. That district has not been hurt so severely as others, and the labor situation is in better shape than in almost any other mining field. Shippers had no difficulty in taking care of their orders and the demand continues to be good.

Consumption here will not be as heavy as during the past few months. Manufacturers engaged in making war necessities are dismissing their help and eliminating overtime in their factories, reducing operations to an eight-hour basis.

Receipts at this harbor are far below normal conditions but sufficient to take care of immediate requirements. Shipments of Storrow coal to New England water points are low and as in previous weeks, there are many idle bottoms in the harbor. The local dumpings for the seven-day period ended Nov. 22 were 6121 cars, as compared with 5033 cars the previous week, an increase of 1088 cars.

Just now coalmen are considering the outcome of the threatened strike of marine workers set for Dec. 1. Should the strike be called, it will affect about 60,000 men employed in and about the New York harbor and will result in all shipping being tied up.

Bunker coal is in fairly good shape here. More could be handled because of the heavy shipping, but there is no delay in coaling vessels. There is a heavy demand for the high grades from individuals, but as these mostly go into the bunkering pools there is little for outside consumption.

Current quotations, based on Government prices at the mines, net ton f.o.b., tidewater at the lower ports, are as follows:

	Mine Gross	F.o.b. N. Y. Gross
Central Pennsylvania:		
Mine-Run, prepared or slack	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of Mine	3.08	5.23
Prepared	3.36	5.51
Slack	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite shortage of family sizes unrelieved. Production reduced by several causes. Producers and officials consider subject in closed session. Closing of training camps will release family sizes. Water tonnage to be diverted locally. Stove and nut in greatest demand. Pea grows scarcer. Steam coals unchanged. Bituminous situation still quite easy. Demand well met.

Anthracite—Conditions in the city are rapidly reaching a point where some drastic action to increase coal supplies is imperative. In times of stress we are inclined to believe that most dealers exaggerate their wants, but a recent canvass of the representative dealers shows a majority of them in desperate need of the family sizes. The stocks are lower than at any time since April, the beginning of the coal year. Shipments have not increased during the past week, and it is only due to the mild weather that there has not been serious discontent. The loss of tonnage due to the influenza epidemic was a severe blow to all the plans of the distributors. That the production is still below the anticipated figures is claimed by all operators. The peace celebration in the region, followed by several days of half-hearted work, is also responsible for a great loss of coal. There are some who claim that the recent increase in miners' wages, together with the knowledge that the war is over, has had a tendency to encourage idleness among the men. The one bright feature of the situation is that the government has arranged to release men from the army as soon as possible in order that such as are skilled in work about the mines may at once aid in increasing production.

At the office of one of the large companies it was learned that its shipments by water would be greatly reduced by the 25th inst. and that it was expected to divert a heavy tonnage into eastern Pennsylvania. This company's trade in Philadelphia has been neglected for a month, and it is believed every effort will now be made to care for it. Another company expects to be in the same position by Dec. 1, when its customers confidently expect coal. While Philadelphia dealers are "sore" and feel that this territory has been unduly neglected, they are daily growing more inclined to place the blame on the inexperience of the numerous fuel administrators rather than upon their shippers.

The increase in the retail prices due to the advance in the mines' price is causing a storm of protest, and strange to say the greatest objectors seem to be the consumers with established credit with their dealers. One of the largest suburban dealers this week expressed the determination to deliver his limited receipts to his cash customers only. He claims to be having little trouble with his C. O. D. business, but states that when coal is charged the bill is invariably returned for correction and then a lengthy and unpleasant correspondence follows. The fact that everyone signed coal cards agreeing to pay the prices in effect at time of delivery seems to have been overlooked by most of the consumers. The complaints to the fuel administration became so numerous that they were unable to handle them and this week they inserted an extensive notice in the city dailies calling the attention of the public to the facts underlying the increase in retail prices. In this it was plainly stated that the retail coal dealers' profits are not a fraction of a cent greater than they were last April, despite the increased cost of delivery.

As to the different sizes, egg remains easier than stove and chestnut, but only because there is less of it burned here and a larger proportion of it has been delivered to the consumers. Stove and chestnut are equally scarce now, with many yards without a ton of either. Pea is not in the same active demand, due to the continuance of mild weather. This is the size for which the first cold snap will bring hurry calls to every dealer from the smaller homes. Even now the stocks of it are low, with every dealer anxious for a supply before real cold weather arrives. There is not the slightest increased retail demand for buckwheat coal and the dealers do not anticipate much demand for it unless conditions become critical in the next six or eight weeks.

In the steam coals No. 1 buckwheat is somewhat easy, but the tonnage is all taken without much trouble. Rice is doing fairly well, principally due to the heavy tonnage of this size being delivered on contracts. The spot market for it has very little activity. About as much can be said for barley, while culm is out of the market.

The prices per gross ton c.o.d. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.25	Buckwheat	$3.40	$4.45
Egg	4.80	6.15	Rice	2.90	3.80
Stove	5.05	6.40	Boiler	2.70	3.70
Nut	5.15	6.50	Barley	2.40	3.30
Pea	3.75	5.00	Culm	1.25	2.15

Bituminous—The soft coal situation still continues easy, there being more than sufficient coal to meet every demand. While this is causing some uneasiness to shippers, yet it is generally agreed by all that it is better this way than the reverse. The bituminous producers started out to supply the industries of the country with fuel and present conditions are evidence that they have accomplished their purpose.

So far as we can learn, the government price is being maintained, although with the continuance of open weather for many more weeks there is no telling what might happen. There are plenty of rumors already that occasional shipments have been sold at a price as low as $3, but certainly no one is quoting such a price and it must have been made to move coal for special reasons. There is beginning to be quite a little solicitation for orders by some houses, both directly and by letter. This is usually on coals that in ordinary times have trouble to make the market at the full price.

BALTIMORE

An easy soft coal supply and a line of inquiries starting from the mines under new conditions. Bituminous will be available for domestic use if hard-coal scarcity continues.

Bituminous—The entire soft coal market here is easy, although for a brief time last week there was a shortage in the very best grades held for Government account, due to the fact that the Pennsylvania R. R. took over large quantities of coal that had arrived at some pools for other purposes. With a release of the industrial world by the fuel administration from all storage restrictions, a number of smaller industries are now putting away coal that is coming freely into the market. Reports with the local fuel administration show most of the large industries pretty well stocked, and some have two to four months of coal ahead. Many old connections between mines and middlemen and customers are being reëstablished or preparations made for resumption as additional Government contracts are cancelled, thus releasing preferentially held production.

The district representative during the week, on order of the national fuel administration, notified all box-car loaders that no more such coal would be applied to the accounts of state fuel administrators. This sent a flood of notices from such producers to the general trade, the offerings being at the Government price, plus 75c. Middlemen here report that they are now getting all the coal they need at the moment from regular old connections, and that inquiries they have made to mines still tied up on Government coal or Government-directed coal are answered by letters promising fuel a little later. The result is that purchasing agents here are no longer asking the fuel administration for any diversions. It may be said for the first time in months that the soft coal situation here is without snap.

Anthracite—A decided scarcity of hard coal exists here despite the rosy statements of the fuel administration nationally. The receipts in October of 45,406 tons proved a tremendous disappointment, as about twice that amount had been hoped for. Stove size is almost out of the market, many dealers offering only No. 2 (egg) or pea coal, which is unfitted for many homes. In connection with the fact that many homes here are entirely without fuel, Jere H. Wheelwright, as head of the National Coal Association, comes out with a statement that there will be no need for anyone freezing. With the war demand cut off, he points out that high-grade soft coal can be diverted to domestic use when anthracite is not to be obtained.

Lake Markets

PITTSBURGH

Greatly decreased production brings about order shutting off supplies from many consumers. Stocks will tide over. Market firm.

The Pittsburgh coal market began to show a slight softening tendency upon the signing of the armistice. Good grades of coal remained very firm, but as had been the case with certain Ohio districts for several months, the poorer grades began to show a weakening. This tendency has not proceeded, as something like a shortage appears actually to have developed, due to the sharp and continued curtailment in output caused by the influenza epidemic. Conditions became such, at any rate, that last Thursday night the Federal Fuel Administration instructed R. W. Gardiner, distributor for the Pittsburgh district, to shut off supplies of coal, with certain exceptions, from all consumers in the immediate territory bounded on the west by the Ohio River, on the south by the Pennsylvania state line, on the east, roughly, by the eastern edge of the Pittsburgh seam and on the north by the Allegheny county line. The exceptions are railroads, gas-producing plants, byproduct coking plants and retail dealers. Mr. Gardiner is given discretion as to other consumers who may be in great need of coal, such as public utility companies. In essence, this is an order requiring consumers who have stocks of coal to draw upon them until the emergency is past. The decrease in production indicated by this measure is clear when it is considered that lake shipments have ceased, although they had been running at 350,000 tons a week from the district for a long time, and at fully 300,000 tons a week late in the shipping season. It is estimated, roughly, that the influenza epidemic, reinforced by the disposition of

workmen to celebrate the cessation of hostilities, has brought the district's output down.

Prospects are that as soon as normal production conditions are restored most of the wagon-loading mines will go out of operation, as well as some others that do not produce really good coal. For standard grades of Pittsburgh coal it is expected there will be a market at the full government limits for some time, and the market is now quotable on that basis: Slack, $2.10; mine-run, $2.35; screened, $2.60 per net ton at mine, Pittsburgh district.

Many of the foreign-born workmen have determined to go to their native lands, although fewer will go than now express the intention. One coke operator reports a census taken of his workmen as follows: Twenty-five per cent. stated they would remain at work; 25 per cent. intended to make brief journeys abroad; 50 per cent. stated they were going back to stay.

The market remains quotable firm at the set limits: Furnace, $6; foundry, 72-hour selected, $7; crushed, over ¾-in., $7.30; clean screenings, over ½-in., $5.50, per net ton at ovens.

The "Courier" reports coke production in the Connellsville and Lower Connellsville region in the week ended Nov. 16 at 259,930 tons, a decrease of 19,720 tons, and raw coal shipped at 185,240 tons, a decrease of 8597 tons. The heaviest coke production since the first of the year was 353,470 tons, in the week ended July 13, the average in September being a trifle over 340,000 tons a week.

TORONTO

Little anthracite coming forward. Dealers refusing new orders. Prices advanced. Market overstocked with bituminous and dealers trying to unload.

Very little anthracite is being received, owing to the large shipments which are being forwarded to the upper lakes before the close of navigation. Most of the dealers are again refusing new orders and endeavoring to overtake delayed deliveries. Consumers who were reported as being entirely destitute of fuel have all been supplied with small quantities, and owing to the unusual mildness of the weather, the shortage has not been so severely felt. The market is at present overstocked with bituminous, which is not much in demand, and some dealers are shading the government prices in order to effect sales. The price of anthracite has advanced following the increased cost at the mines. Quotations for best grades per short ton are as follows: Retail anthracite egg, stove, nut and grate, $12; pea, $11; buckwheat, $9; bituminous steam, $9.25; slack, $8.25; domestic lump, $11; cannel, $13; wholesale f. o. b. cars at destination, three-quarter lump, $6.50 to $7; slack, $5.50 to $5.82.

BUFFALO

Bituminous in good supply. Jobbers becoming more active. Some unsold coal on track. Miners getting back to work. Anthracite demanded.

Bituminous—The supply increases and the demand does not, so a surplus is in sight that may become large before long. The producer and jobber fear it and are trying to avoid it. Producers are again saying that they will shut down before they will allow prices to go below the profit line. Jobbers, of course, are anxious for enough surplus to give them business, but to maintain merely a working surplus of that sort is by no means an easy matter.

This condition of the trade means that the jobbers are going back into something of their old activity. They do not get any great amount to do yet because the consumers are holding off. The idea is that prices will decline, and as the consumers have more coal on hand than they have had in a long time it is not to be expected that the demand will run very high right away. The actual consumption is going to be large, but with the weekly production of late running well above 2,000,000 tons a week over last year a surplus can hardly be avoided.

There is talk of prices running below the regulation figures, but it is not yet reported that any really good coal has been offered at a cut, and the situation is hardly such as to warrant it right away. But for the big slowing up of mining on the outbreak of the influenza the surplus would have been large now. Then there comes a further surplus from the shutting off of the shipments to the lakes, which alone is enough to create an over supply. So the future supply is seen to be heavy in spite of all influences to the contrary.

Anthracite—The supply does not increase much, but on the whole the feeling is easier, for many people are saying that the supply will increase soon, much in the way bituminous has done. The fuel authorities still say that the allotment will be filled according to plan, and that when the people stop demanding more coal than they need it will be easy to keep ahead of the actual needs.

There is much disposition to complain of the advance in price, which brings the retail cost of chestnut to $10.50 per net ton to the curb, with 50c. more for putting in, a price that would be granted without much of a murmur if it could be made to appear warranted by any new conditions arising.

The shipments by lake continue large and will go on for a week or so longer, after which they will soon drop off. The amount for the week was 156,200 net tons, of which 79,700 tons cleared for Duluth and Superior, 17,400 tons for Fort William, 17,000 tons for Sheboygan, 16,000 tons for Milwaukee, 15,500 tons for Chicago, 6000 tons for Green Bay, 2800 tons for Hancock, 1000 tons for Depere and 800 tons for St. Ignace. This is the heaviest weekly amount this season.

CLEVELAND

Standard No. 8 coal is just able to hold its own in this market, with the result that No. 6 and stripping coal have sagged as much as $1. The tendency is all toward weakness, many operators believing the bottom will be touched between now and Jan. 1. Contract cancellation, especially by retail dealers, has assumed proportions. Production has receded, due to recurrence of influenza.

Bituminous—Decided weakness among the lower grades, which is reported to be making breaches in the better grades, is apparent on every side. Demand has narrowed until it now is just about flush with the production of Standard No. 8 coal. Consequently, concessions for other grades are sought and obtained. Coshocton slack—a No. 6 coal—has been offered at $2.40, or 25c. below the Government maximum. Top prices on bituminous from stripping operations in eastern and southern Ohio have been shaded as much as $1 in tonnage. Several big operators foresee the weakness spreading to the standard grades and are prepared to make cuts. Federal Fuel Administration officials here and many big operators declare flatly that so far no shading has been required for standard No. 8 coal, but they will not go on record as to how long this condition can continue. Operators assert there is no cause for pessimism now, with coal selling at the highest prices on record, but there is no escaping the facts that every indication discernible is one of weakness.

Readjustment of industries in the lower lake regions is well under way. Labor already has suffered a deep cut in wages through elimination of Sunday and overtime work. The much-talked-of reconstruction business so far has not developed, primarily because work will not be undertaken so long as prices, on the average, are twice as high as normal. Cessation of munitions making has thrown as high as 6000 workmen out of 7000 in one lower lake plant out of employment. Efforts of Washington to maintain commodity prices or wages by artificial means are doomed to failure, it is believed.

Industrials, operators point out, on the whole have large stocks which they will seek to work off. Thus, they will be out of the market for the present. But by the time peace requirements do come out in volume the industrials again will become coal buyers. This is the logic behind the claims of some operators that the low point in the coal market should be reached between now and Jan. 1, with a gradual pick-up coming with the new year.

Were it not for decreased production at the mines, bituminous plainly would be a glut on the market. Stocking restrictions have been entirely wiped out. The lightless-night ban has been modified and is effective now only two, instead of four, nights a week here. Three carloads of mine-run, offered at public sale by the clerk of the municipal court to satisfy a judgment, brought only $1.20 a ton. The lake trade has slowed up to the point where it is a small factor. Cancellations of contracts by retail dealers on account of no market have become numerous. Retail dealers stand together, apparently, in the belief that reduction of prices will not stimulate business, for retail prices have not been cut in the face of a dropping off of fully 50 per cent. of retail business. Influenza has returned, in spots, to the No. 8 district, and coupled with the opening of the hunting season and the general letting down caused by the signing of the armistice, production has suffered greatly. Operators, however, welcome this state of affairs just now. Car supply, too, has fallen, but this occasions no concern.

Shipments in the week ended Nov. 7 by operators who are members of the Pittsburgh Vein Operators' Association of Ohio totaled 4475 cars, compared with 8069 cars in the week ended Oct. 31 and 4882 cars in the week ended Oct. 21. Car supply reported by these same operators in the week ended Nov. 9 averaged 21.54 per cent. short, as against an average shortage of 26.27 per cent. the first week preceding and 30.47 the second.

Anthracite—Belief that more anthracite and Pocahontas would come in, with the demand at tidewater lessened, has been dispelled, and retail dealers believe receipts will become no heavier until after Jan. 1. The 1918 schedule will be continued, they understand, which means that the movement into Cleveland will hover around the 25 to 30-car a week point.

Lake Trade—The movement of bituminous to Lake Erie docks for the Northwest has fallen to the lowest point of the season to date, but the 2,388,875 tons required to round out the 28,000,000-ton allotment for the Northwest will be floated by the end of the month beyond doubt. Requests for use of equipment at both lower and upper lake docks after Nov. 23, the official closing of the lake coal season, have been few. Anthracite, undoubtedly, will be floated so long as the carriers are operated. The loading of bituminous at lower lake docks in the first half of November is estimated at 1,650,000 tons by the Coal and Ore Exchange, of Cleveland.

DETROIT

Diminished activity in the domestic and steam plant trade in bituminous is ascribed to an over-supply in the hands of buyers. Anthracite stocks are low.

Bituminous—Reserves in the hands of consumers of steam coal and in the yards of retail dealers have produced an inactive market for bituminous in Detroit. Jobbers say they meet with little success in the attempt to arouse interest in new commitments, even when the coal offered is of a quality superior to that of the stock which has recently been available.

In following the advice of the fuel administration to stock up early and take any coal obtainable, the users of steam coal and the retailers have been induced to load up rather heavily with the coal sent into the local market from Indiana and Illinois. This stock is described by jobbers as of inferior quality and is said to be causing annoyance to the industrial plants attempting to use it, as well as to the retailers, who are endeavoring to distribute it among reluctant household consumers.

The domestic demand is blunted by the weather conditions, which have not yet taken on sufficient suggestion of winter frost to stimulate buying by householders. Quite a number of the domestic consumers are also reported to be holding back in the hope of being able later to stock up with anthracite. Asserting stocks now on hand would be exhausted in a week of real winter temperature, W. K. Prudden, Michigan fuel administrator, is preparing to open two coal yards in Detroit, with the intention of storing there shipments of bituminous, which local consignees refuse to accept.

Anthracite—Demand for anthracite from domestic consumers continues strong. Applications from consumers unable to obtain supplies from dealers are being received at the rate of about 40 daily in the offices of the fuel administration, though more than 65,000 such orders were booked early in September. Of the latter, it is said practically all have been provided with a maximum of two tons, while a further distribution is planned, in case the coal is forthcoming. Receipts during the present month are falling short of the shipments in October.

Lake Trade—Practically all coal for the head of the lakes had been loaded before midnight, Nov. 23, though a few shippers who had fallen behind are sending forward additional cargoes this week, where boats are available. The demands of the grain trade for ship storage capacity have left few freighters to be had for moving coal.

COLUMBUS

Weakness in mine-run and screenings still continues. There is a good demand for domestic sizes although domestic trade is quiet because of continued warm weather. The lake trade is practically over. The tone of the market is not as good as formerly.

The principal feature of the coal trade in Ohio is the continued weakness in steam sizes. An over-production of mine-run in every field is reported and markets are flooded. This is especially true of many small mines in the Hocking Valley field, which have been opened under the stimulus of war business. Screens were not obtainable and mine-run was the only grade marketed. Another reason for the larger amount on the market is the fact that

steam users have heavier stocks of fuel in reserve than ever before. It is believed that reserve stocks average about two months and possibly more. Steam consumers have stopped buying as they are desirous of using their surplus stocks. Railroads are not taking as large a tonnage as formerly as freight movement has decreased. Michigan has been supplied by Indiana and Illinois and that section will not be in the market for some time.

Domestic trade still shows strength despite the unfavorable weather conditions. Dealers' stocks are pretty large, but there is still a good demand for prepared sizes. West Virginia grades are especially sought after. Dealers will not buy any more mine-run as they have their bins clogged. It is believed that the rural sections are the best prospects for business as farmers have been too busy to haul their fuel. City consumers have about 75 per cent. of their supply, while rural people have but 35 to 40 per cent. Dealers in the smaller towns are as a result the best customers. Retail prices are still firm at former levels.

Lake trade is now about over as only a few cargoes will move after Nov. 23. The lake season as a whole was successful and all Northwest requisitions were filled. There will be no shortage of fuel in that section. Vessel movement was much more efficient than ever and less time was lost in loading and unloading. Ohio and West Virginia furnished a large part of the coal shipped to the upper lake regions.

Production has fallen to about 50 per cent. of normal, mostly because of the influenza and peace celebration. Then the opening of the hunting season was another cause for loss of tonnage. Some few mines have been closed because of lack of orders. It is believed that eastern Ohio is producing a larger amount than any other section.

CINCINNATI

Mild weather and lack of industrial buying have produced a dull market, so that small shipments are ample to meet demand.

The effect on manufacturing of the sudden, if not unexpected, coming of peace, has been marked, in this section, especially, where so many large industrial units have been extensively engaged in the production of commodities for the use of the Government and the Allied powers for war purposes. In a good many cases these factories have already been notified that a greatly diminished activity for Government purposes will be immediately put in effect, and in other instances instructions to cease operations on contracts have been received.

A striking local instance of the manner in which industrial war work is affected is the cessation of work on the enormous air nitrates plant near Cincinnati, which was to use electric current from the local station of the Union Gas and Electric Co. This plant will not be completed, at least for Government use, and the current, and hence the coal to produce the current, will not be required.

With little need as yet for coal for heating purposes, and with the industrial market for steam fuel in the condition indicated, the entire market is extremely quiet; and as far as the steam market is concerned, it is somewhat difficult to say just when conditions will return to normal.

In many lines, particularly in machinery, it is not expected that there will be any period of actual dullness, the present caution being purely for the purpose of awaiting developments. In the mining sections some trouble from influenza is still reported, tending to reduce production, and transportation conditions are also suffering from the same handicap; but shipments are adequate, in view of the reduced demand.

LOUISVILLE

General market draggy on all lines, both domestic and steam being quiet. Lake region shipments over, and Southeastern coal now moving to retailers of Kentucky and South.

Mild weather is not helping things much in Kentucky just now, and the retailer, jobber and producer are all in the same boat—short of business, and doing everything possible to secure a market for coal. It is claimed that about 80 per cent. of the big domestic demand has been supplied for the winter, and that only cold weather will make the remaining percentage buy.

Industrial consumers are using up coal stocks on hand, feeling that the market may go lower, and that they will have no difficulty in securing coal whenever they require it, with the result that they are playing safe on uncertain business.

Receivers are becoming finicky concerning grades at the present time, and are turning down shipments on the claim that the grades are not as represented, this resulting in some coal paying demurrage on track.

For the first time in months a good supply of eastern and southeastern lump coal is coming on the market. However, many retailers are well stocked on Hazard and western Kentucky lump and are accepting little additional coal, having all they want for the present. However, retailers out in the state that were not able to secure western Kentucky, Hazard or eastern Kentucky, which latter was moving to the lakes for months, are now just beginning to get some stocks laid up in advance of cold weather.

A shipment of nine barges of Pittsburgh coal which came down the Ohio River a few days ago represented the first received in eight months. Eight barges went to New Albany, Ind., one barge of lump being delivered at Louisville. The E. T. Slider Co. and the River Coal Supply Co. had the entire shipment, which consisted of six barges of lump, two of slack and one of mine-run.

At the present time there isn't much demand for eastern Kentucky coal, West Virginia or Pittsburgh on the local market, as there is not a ready demand, and the price is so strong that it takes too much money to stock a yard on such grades. Retailers in many instances have a month to six weeks supply on hand and are not unloading any additional coal until they reduce stocks.

Continual reports are being heard concerning producers and jobbers cutting prices 15c. a ton and more in order to get business. Some mines with no more than a day or two of business ahead of them are willing to accept almost any price to get business, and the value of a good sales manager is again demonstrating itself.

BIRMINGHAM

Railroads short of coal. Domestic demand strong. Operating conditions show a little improvement.

While the local coal market is not specially strong for the steam grades, the requirements of the trade are now greater than the supply coming from the mines, due to the fact that the railroads have been taking the maximum obtainable under their contracts, during the past few weeks, thus interfering with regular shipments to other classes of consumers, who are now beginning to run low on stocks. Railroads securing fuel in this zone are reported to be very short and are exerting efforts to expedite heavier movements of coal from the mines. An increase in the tonnage of bunker coal required from this district is expected about the first of the year or sooner, as more shipping is expected to be diverted to the Gulf ports in the near future.

The domestic trade is without change, there still existing a strong demand, which is much in excess of the supply available, and some steam coal is being prepared and diverted to domestic channels.

Coal production appears to be picking up a little this week with the return of more miners to their tasks. Operating conditions were very unsatisfactory during the past week, the peace celebration completely disconcerting the regular routine, and mine workers were slow to return to their labors, and the output, which had been so seriously crippled by the influenza epidemic for several weeks, showed little improvement. The production for the week ending Nov. 9 was 348,306 net tons.

Coke

CONNELLSVILLE

Further decrease in coke production and raw coal shipments. Market quite firm. Labor migration in prospect.

Nothing could have done more to support the market from the shock of the cessation of hostilities than the continuance of declining production of coke. Week by week the influenza epidemic has reduced output, while week before last the celebration of the termination of hostilities made further inroads on production, and a payday at the close of the week paved the way for a continuance of the celebration last week. Consumption of coke is at the former rate, there being no disposition on the part of blast furnaces to slow down or blow out, even for repairs that in several cases will have to be made within no great length of time.

Generally speaking the hope of coke producers is that the market will stay up to the government limit of $6, while the expressed expectation of consumers is that there will soon be a drop, and one of no small proportions. The Fuel Administration's maximum price does not seem to have a definite time limit, and as the administration's control is permitted to the declaration of peace, the control will only be taken off by definite action of the Fuel Administration, and this is not likely to occur. The blast furnace and steel interests have shown such coöperative spirit in the past that they have some expectations of adhering to government maximum price for pig iron and steel as long as they are maintained, but the coke producers are hardly in the same category; and it is possible that if shading of government limits began it would soon run to important proportions.

Until production is restored to something like normal there can be no question as to prices. Consumers have always felt that the $6 coke price was rather high, even as compared with $2.35 for Pittsburgh district coal, which they do not consider a low price by any means. The coke trade is short of labor, or the influenza epidemic would not have had such a remarkable effect in decreasing production, and the present outlook is for decreased supply in some respects.

Buffalo—The demand is good, but the supply is now sufficient to meet it, all the furnaces here getting what they want, most of it coming from their own byproduct ovens. Fuel coke still sells pretty well, though it partakes something of the weakness of bituminous coal. It is now quite out of the question to find sale for the coke culm piles which were opened a few weeks ago and thrown on the market. Iron ore receipts are now dropping off materially, as the season is practically at an end. The amount reported by lake during the week was 197,100 gross tons, scarcely more than half the former movement.

Middle Western

GENERAL REVIEW

Middle West market continues weak. Poor grade coal selling below Government maximum. Guiding hand needed to keep market from falling to pieces.

The coal market in the Middle West continues to be very weak. There is one noticeable fact, however, and that is that the high-grade coals, from both Illinois and Indiana, are selling at the full Government prices, and for the present at least, not showing any signs of weakening. The poorer grade coals, however, have been offered very freely of late at considerable discounts from the Government price, and in a great many cases even this discount has been of slight inducement to the average purchasing agent.

The state of Michigan has all the coal on hand that it can comfortably assimilate, and not only are Illinois and Indiana coals allowed to go to all points in the Southern Peninsula, but coal from Ohio, West Virginia and the two eastern districts of Kentucky can now move to Michigan, and are being readily purchased, with the natural result that the poorer grade coals from Illinois and Indiana are being practically shut out.

The State of Illinois has been unable to take care of the coal produced within its own borders, nor has Iowa or Wisconsin been able to absorb its surplus. Indiana coal today is consumed practically within its own borders. This is because to date eastern coal is not allowed to move to points in Indiana, and Illinois coal cannot compete, in most cases, with Indiana coal, when the low freight rate of the Indiana product is brought into consideration.

There are a great many opposite views relative to the immediate future of the coal industry. It is freely said that unless the Government steps in and controls the basic industries, by establishing a minimum price, as well as a maximum price, that the coal industry will suffer a tremendous loss. This is because the producing mines must be kept running, and in order to keep their labor organizations together, the operators, nine times out of ten, are willing to make very substantial reductions in order to move their product and keep their organization intact.

The optimists of the coal industry believe that conditions will soon change, and that the renewed activity along manufacturing lines will be able to absorb the coal produced by this country. One example quoted was a large factory, which, before the war, was engaged in the manufacture of veneer work, used in building. When this country entered the war, the manufacture of building material was curtailed, but most of the manufacturers received Government contracts to keep them running for the time being. The firm we have in mind at once engaged in the manufacture of propellers for aeroplanes. In the meantime, all the surplus veneer stock they had in their storerooms was sold, and they accumulated a very large number of orders to be filled after the war. A few days after the armistice was signed, these people had their propeller contract canceled, and their plant is now down, but within a very short time will reopen, and all their activities will be concentrated on producing veneer work.

The Middle West has been enjoying a long period of mild weather, and as a result but little coal has been consumed. The market will be helped by the coming of cold weather. Furthermore, a number of larger industries which purchased coal during the season and stored it are now consuming it beneath their boilers as fast as possible, and it is fair to assume that they will be in the market again within six weeks.

What the situation lacks at this time, more than anything else, is a strong guiding hand to keep timorous operators from losing their heads altogether, and cutting each other's prices down to a point where the cost of production will not be covered.

CHICAGO

Little activity is shown in market conditions. Cold weather expected to help dealers. High-grade coal bringing full Government prices.

There is little activity in the coal market of this city. The large consumers are out of the market and will be out of the market for some time to come, as they are doing all possible toward reducing their substantial storage piles. There is practically no demand for coal in Chicago. The only people who are purchasing coal at this time are doing so to take advantage of reduction in price made them by some producer or jobber.

The domestic situation continues to be extremely dull on account of the mild weather. It may be confidently looked forward to that as soon as a cold snap comes there will be a revival of activities in the domestic trade. Practically the only domestic coals that are holding up to the full Government price are the high-grade and specially prepared products from the southern part of Illinois and from the Clinton district of Indiana.

MILWAUKEE

Shortage in anthracite making it unpleasant for dealers. Illinois coal being pressed upon the market. Lake receipts slowing up as the season of navigation nears an end.

The main feature of the coal situation at Milwaukee at present is a shortage of anthracite. Colder weather finds many consumers waiting for supplies ordered months ago, and naturally the disappointed ones are appealing to other sources for relief. State Fuel Administrator Fitzgerald calls attention to the fact that no dealer has been accorded more than 50 per cent. of the amount sold in 1916, and that while there are cases where dealers have not as yet drawn their full allotment, it does not signify that they are in position to take on any new orders. He advises everybody to stick to their regular sources of supply.

There are huge piles of bituminous coal on the docks and consumers of this character of coal have little to fear. In addition, Illinois operators are unusually active in pressing their products on the market. There has been no cutting of prices of Illinois coal as yet, but this may follow. This condition is directly the opposite to that which prevailed a year ago, when anything having the semblance of coal was eagerly absorbed. Illinois coal is being freely advertised at prices ranging from $7 to $7.75 per ton, with an extra charge of 50c. for delivery into bins. Nearly all coal docks are experiencing fires in soft coal piles, but thus far no serious loss has resulted therefrom.

Lake receipts are slowing up to a noticeable extent. Many of the coal-carrying craft are now taking down grain to Buffalo to be held in the vessel until spring. This reduces the tonnage available for coal for the remainder of the season. Receipts during the month of November, thus far, aggregate 87,077 tons of hard coal and 162,568 tons of bituminous. This brings the cargo receipts by lake since the opening of navigation up to 647,046 tons of hard and 3,313,697 tons of soft coal. Anthracite is still coming by rail in fairly liberal quantities.

ST. LOUIS

Slightly colder weather has not improved market, which is continually slipping. Steam and domestic demand light. Prospects poor. Mines idle, with equipment plentiful and transportation good.

The local situation is a depressing one. With slightly colder weather on the 21st, and the first sign of snow of the season on the 22d, the market is in a demoralized condition as regards Standard coal. Standard 2-in. lump went as low as $1.75 and screenings down to $1.40, with 6-in. lump going as low as $2. Even at these prices the mines were obliged to shut down on account of no business. Some mines have only worked one day in the six, and even then had a hard time placing tonnage.

Steam business has dropped off on account of the large plants using up their storage coal, and the munition plants using up what they had in sight, not knowing how much longer they would be allowed to continue. Offsetting this there should be some business from the brick, tile and cement plants and other industries that have been running on short time as nonessentials, but if there is anything like this in sight it has not materialized to any extent as yet.

Car supply in the Standard field is more than any mine can begin to take care of and transportation is good. Labor is plentiful, and the only thing that worries the operator at this time is finding a market for his coal.

In the Mt. Olive district an effort has been made on the part of the operators to keep out of the sea of despondency, and they have pretty well succeeded on account of their railroad business. There has, however, been a good tonnage of domestic coal moving to the north from this district and the prices are holding up remarkably well.

Referring to railroad coal brings out the fact that many mines in the Standard field that had railroad contracts are idle, and while there is no evidence on hand to prove that the railroads are buying on the open market at lower prices, yet their failure to take the contract coal has greatly depressed the market. The mines that are getting railroad business are the only ones in the field that are working anywhere near regular time.

In the Carterville and Duquoin field a large tonnage is moving on railroad orders, but there is a surplus at the present time in all of these fields of lump, egg and nut coal, and some mines are finding it hard to move their product, having unbilled coal at the mines daily. This is in both Williamson and Franklin County. The car supply here is plentiful and there seems to be nothing to worry the operator here, other than a place to put his product.

The Government maximum price here, with the exceptions above noted, is:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.55@2.75	$2.55@2.75	$2.40@2.70
3x6-in. egg	2.55@2.75	2.55@2.75	2.40@2.70
2x3-in. nut	2.55@2.75	2.55@2.75	2.40@2.70
Washed:			
No. 1	3.05@3.20	3.05@3.20	.....
No. 2	3.05@3.20	3.05@3.20	.....
No. 3	3.05@3.20	3.05@3.20	.....
Mine Run	2.35@2.50	2.35@2.50	2.20@2.30
Screenings	2.17@2.32	2.17@1.32	1.50@1.60

Special preparation on Carterville is 10 cents extra.
Williamson & Franklin Co. rate is $1.10.
Other fields 95 cents.

The prices in the Carterville and Duquoin fields have not been cut to any extent. In a few isolated cases the operators have given certain jobbing interests 15c. off of the $2.55 Government price, so that the top of the market in this district is $2.55.

There are some operators with special permits of 10c. a ton for extra preparation, but there is an effort being made to have this done away with very shortly.

There is still a heavy percentage of the men missing from the mines on account of the influenza, but it is growing smaller gradually.

The cut mine prices have not, however, affected the retail prices in St. Louis as yet. The Standard price of $5.45 has been cut by one or two dealers to $5 and the Carterville price of $6.20 delivered has been cut to $6, but this is not general nor is it likely to be.

Assistant Fuel Administrator John C. Hall has conducted several hearings the past week or two in connection with dirty coal shipped by southern Illinois coal companies to points in the State of Missouri. Mr. Hall is also director of enforcements, and an active campaign is going to be made from now on against all violations of dirty coal, etc.

General Statistics

NORFOLK & WESTERN

Below is given a statement of the coal tonnage from mines on the Norfolk & Western R. R. and from other railroads, for the month of September, 1918:

From	Net Tons
Pocahontas field	1,373,366
Tug River district	283,232
Thacker district	244,785
Kenova district	101,536
Clinch Valley district	160,423
Other N. & W. fields	13,214
Total N. & W. fields	2,176,556
Williamson & Pond Creek R. R.	196,433
Tug River & Kentucky R. R.	63,665
All other railroads	72,505
Grand total	2,509,159

OCTOBER ANTHRACITE SHIPMENTS

Shipments of anthracite for the month of October, as furnished to the Anthracite Bureau of Information, amounted to 6,286,366 tons as compared with 7,110,950 tons for October last year, and 6,234,395 tons for the month of September this year, showing a decrease as compared with October of last year of 824,584 tons, and an increase as compared with September of this year of 51,971 tons.

The average daily shipments in October of this year were 232,828 tons against 263,368 tons for the corresponding month last year, a decrease of 30,540 tons in the daily production for the month. This decrease can be attributed to the recent epidemic of influenza which passed over the region and resulted not only in the loss of a great deal of time, but a loss of life in a great many instances. When everything is considered the output for the month of October is commendable and a credit to the anthracite industry.

The shipments by companies were as follows:

	October 1918	October 1917	Coal Year, 1918	Coal Year, 1917
P. & W. R. R.	1,115,340	1,425,265	9,111,369	8,988,139
L. V. R. R.	1,216,391	1,314,896	8,910,548	8,685,842
C. R. R. of N. J.	601,180	604,295	4,175,925	4,141,140
D. L. & W. R. R.	982,966	1,153,661	7,054,540	7,368,299
D. & H. Co.	739,495	813,429	5,514,544	5,284,571
Penna. R. R.	393,885	430,662	3,260,441	3,300,307
Erie R. R.	731,694	793,226	5,319,347	5,349,365
N. Y. O. & W. R. R.	165,205	179,403	1,210,231	1,197,413
L. & N. E. R. R.	340,210	396,113	2,352,812	2,465,739
Total	6,286,366	7,110,950	46,909,757	46,780,815

CHESAPEAKE & OHIO

Following is a comparative statement of the coal and coke traffic from the New River and Kentucky districts for the month of July, 1918, and the seven months ending July 31, 1918:

COAL

To	July 1918	July 1917	Seven Months 1918	Seven Months 1917
Tidewater (bituminous)	554,591	430,710	3,491,488	3,444,117
East (bituminous)	309,537	197,141	1,932,455	1,667,393
West (bituminous)	1,479,602	1,484,529	9,131,358	8,684,988
Company's fuel (bituminous)	152,263	192,772	1,289,316	1,337,297
From connections (bituminous)	154,112	147,735	955,778	1,064,947
Total	2,650,105	2,452,887	16,830,395	16,198,742
Anthracite	282	538	9,021	4,030
Total coal movement	2,650,387	2,453,425	16,809,416	16,202,772

COKE

To	July 1918	July 1917	Seven Months 1918	Seven Months 1917
Tidewater	.....	.....	.....	69
East	14,434	8,422	139,640	82,234
West	20,897	20,398	116,272	163,938
	35,331	28,820	255,912	246,241
From connections	6,259	5,367	42,375	46,338
Total coke movement	41,590	34,187	298,287	292,579

COAL AGE

Volume 14 New York, December 5, 1918 Number 23

The Invincibles

Written expressly for *Coal Age*

By RUFUS T. STROHM

NOT all the brave are the men who died
On the hallowed soil of France
To stem the flood and to turn the tide
Of the gray-clad Hun's advance;
For here at home there are hosts of men
Of a loyal, sturdy mold,
Whose splendid deeds neither tongue nor pen
In a fitting way has told.

THEY are the men who remained to fight
By the working face and rib,
And cleaved through the solid anthracite
With the aid of fuse and squib;
For when the war in its lengthened course
Brought an increase of demands,
They bent their backs and they put new force
In the labor of their hands.

THEY heard no sound and they had no sight
Of the battle's raging hell,
And yet they shared in the grilling fight,
And they did their duty well;
But though the race of the boche is run
And the nations talk of peace,
The task of the miner is not done,
For the country's needs increase.

THE winter comes in the waning year
With an icy, numbing breath,
And millions quake with a growing fear
Of disease and cold and death;
But while the threat of impending woes
Makes their bravest spirits quail,
They lift their hands and their eyes to those
Who have not been known to fail.

□

YE men of brawn and of sympathy,
Who have heard their urgent cries—

YE miners, what will your answer be
To the pleading in their eyes?

Underground Mining with Electric Shovels

By E. J. WITTHOFF
Cleveland, Ohio.

SYNOPSIS — *The ordinary well known steam shovel, reduced in size and driven by electrical energy, is growing in favor with mining men. This type of machine has been used for several years, particularly in iron mining. Cost records show a decided saving by their use.*

ELECTRIC shovels are becoming increasingly desirable and essential in underground mining. For years many of them have been used in underground iron, coal, zinc, limestone and salt mines. Their performance has definitely established them as highly productive, economical factors in this class of excavation.

The chart, Fig. 1, shows the power demand of one of these shovels in a New York iron mine. It is equipped with a 20-hp. motor and the record is of loading five consecutive cars of ore. For car No. 1 the average demand was 16.04 hp.; for car No. 2, 20.75 hp.; for car No. 3, 16.25 hp.; for car No. 4, 17 hp.; for car No. 5, 14.25 hp. This shows an average of 16.86 hp. for the total five cars.

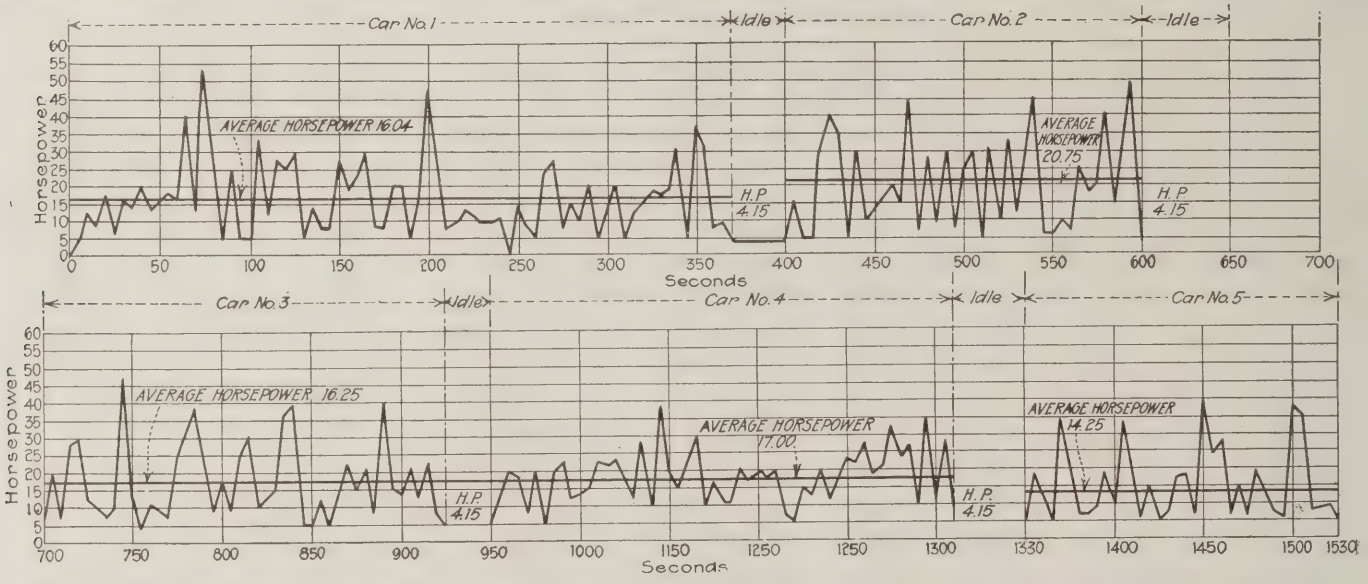


FIG. 1. DIAGRAM SHOWING POWER CONSUMPTION OF MINING SHOVEL LOADING FIVE CONSECUTIVE CARS OF IRON ORE

Below is a detailed statement of the complete operating costs of this shovel for the last four months of 1917 and the first five months of 1918:

Month, 1917	Cars	Tons	Labor	Supp.	Power	Total Cost	Cost per Ton
Sept.	1,084	3,794	$384	$224.65	$9.98	$618.63	$0.163
Oct.	1,713	5,995	432	21.30	15.70	469.00	.079
Nov.	378	1,042	204	122.86	3.24	330.10	.317
Dec.	1,148	2,296	384	11.54	10.10	405.64	.177
1918							
Jan.	1,064	2,128	400	56.05	9.70	465.75	.219
Feb.	1,396	3,290	524	131.27	13.20	668.47	.203
Mar.	1,756	5,268	800	241.80	17.00	1,058.80	.201
Apr.	2,095	6,285	832	177.41	18.90	1,028.31	.164
May	2,390	7,170	864	238.29	24.50	1,126.79	.157
Total	13,024	37,268	$4,824	$1,225.17	$122.32	$6,171.49	
Avg.	1,447	4,141	536	136.13	13.59	685.72	$0.166

These costs cover all the expense involved in actually loading the ore and tramming it about 300 ft. to the main haulageway. They include, also, the expense of moving the shovel to different levels and locations. The ore was loaded into 3-ton gable bottom cars.

Under identical conditions and per-ton loading cost by hand-labor was 30c. and by shovel 16.6c. The saving per ton effected by the shovel was 13.4c. or $5000 in nine months, which is equivalent to a 7 per cent. return on a $100,000 investment.

A northwestern iron company has used a similar electric shovel for about 4½ years. The ore was 25 per cent. fine, 75 per cent. lumps, the largest pieces being 2 x 2 ft. x 18 in. This shovel loads 150 to 220 tons daily.

The following table gives the tonnage and the average cost per ton, for each fiscal year, ending June 30, from 1914 to May 1, 1918:

Year	Electric Shovel Tonnage	Electric Shovel Cost	Hand Operation Tonnage	Hand Operation Cost	Saving
1914	20,820	$0.268	102,438	$0.466	$0.20
1915	24,497	.253	34,222	.324	.07
1916	32,261	.304	84,485	.318	.01
1917	31,530	.344	77,653	.391	.05
To May 1, 1918	26,439	.408	59,646	.510	.10

Fig. 2 shows a Thew electric shovel, built by the Thew Automatic Shovel Co., of Lorain, Ohio, mining iron ore underground.

In a western zinc mine a mining shovel loaded 125 cars in 5¾ hours at a cost of less than 9c. per ton, including tramming. This represented a reduction in cost of handling material and hauling it to the shaft for hoisting from 16c. and 18c. per ton by hand to 9c. by the shovel, a direct saving of 45 to 50 per cent. Today five of these shovels are working in this mine.

The construction of an underground mining shovel is novel, not in the sense of being new and untried, but in being a somewhat radical variation from the standard full-circle swing type of steam shovel. This mining shovel is really an abridgement, a "pocket edition" of larger shovels, but with a pronounced difference in construction and working features to adapt it to advantageous and profitable use under the conditions pe-

culiar to underground operation. It possesses all the rugged strength and dependable digging ability of the bigger shovels in concentrated form. Its compactness does not, however, complicate its control, for it is easily operated by one man. A mine laborer of average intelligence can soon learn to handle it and produce good results.

Compacting the construction of the shovel—minimizing its over-all dimensions—was the basic step in its adaptation to underground mining. Besides the restricted operating rooms, narrow entries and passageways had to be considered, as well as the shaft through which the shovel is taken into the mine. The shovel is so built that it can be quickly dismantled for passing through these restricted areas and speedily erected for succeeding operations. A remarkable instance of the "knocking-down" ability of these mining shovels is that a recent installation could be disassembled for taking through a 3 ft. 6 in. by 3 ft. 8 in. shaft.



FIG. 2. SHOVEL USED IN UNDERGROUND MINING

Loading cars with facility and speed means keeping them moving. An excavator that requires the exact spotting of cars for receiving their load handicaps production seriously. Conditions often make it inadvisable, impossible, or too expensive to place track for locating cars in a certain, definite position. An underground mining shovel, rotating through a complete circle, has the advantage of being able to work in any direction; to load cars easily and quickly, either at the side of or behind the machine. The result is increased production and reduced overhead expense.

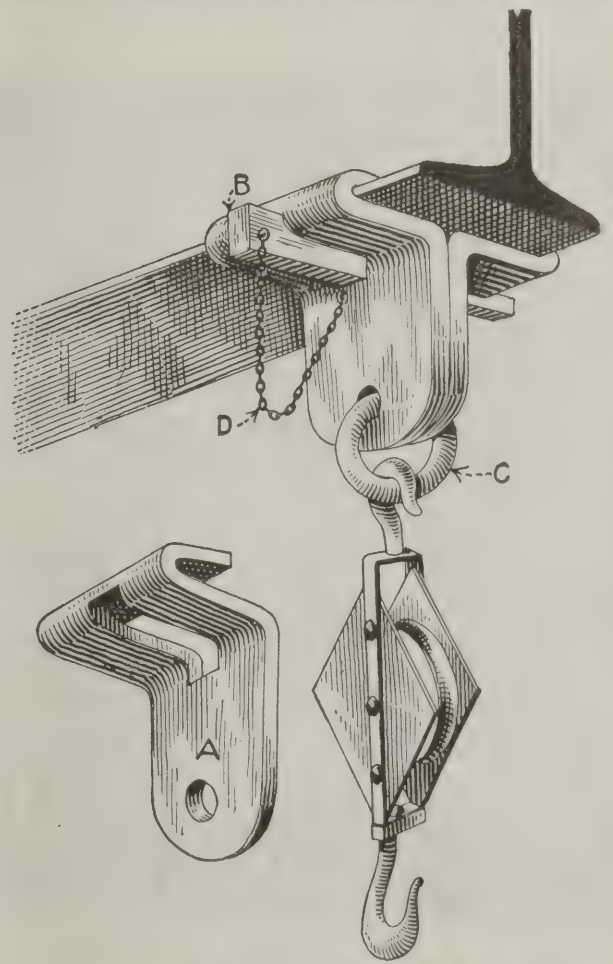
Experience has proved that electricity is the ideal power for these underground mining shovels. It is economical, safe and easily handled. Electricity need be used only while actually digging. Current can be switched on or off instantly. Electric power eliminates the dangers of explosions in coal mines caused by gases coming into contact with an open fire.

The motor is of the single, constant-speed type, with friction controls. All electrical equipment and connections are simple and may be readily understood by the operator. Hoisting, crowding, swinging and propelling movements are all controlled direct from this motor, in this manner minimizing physical effort on the part of the operator and enabling him to easily speed up tonnage delivery.

Every underground mining operation involving considerable output and affording sufficient working clearances can advantageously use one of these shovels. Their real worth is well summarized in the words of a mine superintendent: "The principal advantage is more production with fewer men, at less expense."

Quickly Detachable Clamp

A quickly removable clamp which can be used anywhere about the mine where I-beams are used is shown in the accompanying illustration. The clamp is made of two sections of machine steel, *A*, each being slotted to receive the taper key *B*. In operation the sections *A* are clamped tight against the lower part of the beam by means of the wedge. The hanging ring is welded after passing through the lower holes of the sections. The holes should be large enough to allow free motion of the ring in order to permit setting and removing the hangers from the beam. For the sake of keeping all parts together, the key may be fastened to one of the sections by means of a small metal chain, such as is shown at *D* in the illustration.



DETAILS OF EASILY DETACHABLE CLAMP

Loading Out Coal with Electric Shovels

By W. B. BRENNAN
Cheyenne, Wyo.

SYNOPSIS — *Electric shovels have been used for several months in a coal bed 30 ft. thick that pitches 18 deg. Their use has proved financially profitable; and since the shovel is full revolving, delivery to pit car may be made at any of at least three points. Much of the transportation difficulty often encountered with so-called mechanical loaders is thus obviated.*

IN ORDER that a clear idea may be gained of the conditions under which shovel operation underground is conducted, it will be necessary to describe briefly the mining property and the coal bed. In mine No. 4 at Hanna, Wyo., where electric shovels are used in loading, the coal bed pitches 18 deg. and is nearly 30 ft. thick. This mine is reached by a slope driven down the pitch, off which entries are turned on the strike. At 1000-ft. intervals along these entries panel planes or slopes are driven parallel with the main slope. From these panel planes rooms are driven, and it is in these that the shovels are employed. These rooms are approximately 28 ft. wide and 18 to 20 ft. high.

It will readily be perceived that a room of rectangular cross-section driven on the strike in such a coal bed will have the upper corner on one side near the roof and the lower corner on the other near the floor. The bottoms are kept practically level and the entire room lies within the confines of the coal measure. Some coal is left in the roof as the shale above the coal bed will not stand.

When it was first attempted to operate with these shovels, it was the endeavor to cut, shoot down and load out daily. This did not prove satisfactory, however, as enough coal could not be secured from one undercut to keep the shovel operating throughout an entire shift. To overcome this, rooms were driven along the bottom with a height of 6 ft. into the face for a distance of 300, 400 and even up to 600 ft. When a room of this kind was made, the shovel moved in and 12 to 14 ft. of top was shot down. This gave the necessary coal to keep the shovel working.

This has proved fairly satisfactory, and at the present time two shovels are working continuously; a third is about ready to be installed, and plans are on foot for a fourth one to be put in operation within the next six or seven months. These shovels are of the electrically driven full-revolving type. One is a 16-ton Type 00 Thew machine, while the other is a 32-ton Type 1 of the same make. In either case three men are required with a shovel, one man operating the machine, the other two part of the time working on the coal pile and part of the time trimming the mine cars or wagons as they



SHOWING ELECTRIC SHOVEL IN SUCCESSFUL USE UNDERGROUND

are loaded, so as to get the maximum capacity on each without delay. The larger shovel loads from 175 to 225 tons daily and the smaller one from 140 to 180 tons.

It has always been my opinion that mechanical loading underground was quite as much a haulage problem as a loading one, if not even more so. Of the various types of mechanical loaders heretofore developed, practically all employ a conveyor which either discharges at a fixed point where it is necessary to place the pit cars or requires complicated machinery to handle the coal to various destinations. With a shovel which revolves it has been found that three different points exist where cars may be loaded without difficulty. This makes it possible to keep the shovel in operation continuously, there being no delay caused by waiting for cars to be spotted.

If a machine as expensive and complicated as a coal loader is to be made a commercial success, it is necessary to keep it in operation continuously during the entire working period of the mine. This is what it has been endeavored to accomplish with these shovels. This goal has been attained with considerable uniformity, there being not many more delays with these machines than occur with any machinery underground.

The first shovel has now been in operation since January, 1916, and the second since July, 1917. They are working daily and load about the average tonnage mentioned above. The most serious delay thus far encountered arises when it is necessary to move a machine from one loading place to another. This of course takes considerable time with a machine the weight of one of these shovels. Working places are, however, being so arranged that the various moves occur only four or five times per year per shovel.

The rate for loaders working after mining machines in the southern Wyoming field is 49c. per ton. These men lay their own tracks and timber rooms where necessary. Coal is undercut and shot by the company. It has been found in the use of these shovels that the actual cost of loading coal into the mine cars is only about 15c. per ton, but other expenses are involved, such as changing tracks, setting timber where necessary and a certain amount of switching which has to be done by the company men in connection with the shovels, such as is normally done by the loaders where they work under contract. Thus the cost of shovel loading averages 28 to 32c. per ton, which includes all labor, repairs on shovels, power and any other charges that can possibly be chargeable against mechanical loading. The effort has always been to make the charges against this method of loading as complete as possible.

In hauling to and from the shovel to the panel slope, mule haulage has in some cases been employed; but, where the rooms are long enough to justify it, locomotive haulage has been installed. This has proved quite satisfactory. The shovels are equipped with wide tractor wheels which travel on the bottom, and as the shovel moves forward the tracks are laid behind it.

As to the future of coal-loading machinery, it is my opinion that some type of loader built along the general lines of a shovel that will pick up the coal and be able to dispose of it in various places will be the successful mechanical loader of the future in mines giving 7 ft. or more of headroom. A loader of this type could be made to travel on mine tracks and should not weigh much more than an arcwall or straight-face mining machine. A machine of this type with a properly designed boom and bucket could work in 7 ft. coal beds and load cars of a fair size to a reasonable capacity.

My experience with machinery in general underground is that it must be as simple and rugged as possible, since the class of labor obtainable is such that delicate and complicated machinery will not be found serviceable. Experience in this mine would indicate that the electric shovel meets the conditions admirably.

Testing a New Breathing Apparatus

By John Lyons
Carterville, Ill.

In order to test the new Gibbs standard two-hour breathing apparatus a number of employees of the Madison Coal Corporation on Oct. 4 last journeyed by automobile to the Illinois state mine rescue station at Benton, Ill. The party was composed of William Turton, district superintendent; John Lyons, rescue foreman; Herschel Harriss, assistant mine foreman; John Lauder, face boss, and Fred Schoonover, safety inspector.

These men were well received by James Weir, superintendent in charge, who clearly described the different



METHOD OF ADJUSTING BREATHING APPARATUS

types of safety lamps and rescue apparatus kept at the station. The new Gibbs apparatus was explained and the machine thoroughly tested for leakages, careful note being made of the amount of oxygen contained in the cylinder at the start of the test and the amount used in a given time.

John Lyons was the first to wear the machine, the gage at this time showing 135 atmospheres. He performed work in the smoke gallery, such as pulling the 50-lb. weight, sawing props, crawling through the 17 x 19-in. tunnel, carrying a 130-lb. dummy single-handed round the gallery and then carrying the body end of a stretcher bearing a 160-lb. man with another man carrying the foot end. Lyons worked as fast as possible, not stopping at any time to rest. Unfortunately no record was kept of the actual work done. At the end of 30 min. the apparatus was taken off. The gage

now read 75 atmospheres, showing that during the work-period of 30 min. 60 atmospheres of oxygen had been used, or almost one-half the capacity of the cylinder when fully charged. This amount equals 116 liters, or an average of 3.86 liters per minute for the 30 minutes.

Without recharging, Mr. Harriss at this point put on the apparatus, with the gage showing 75 atmospheres. A correct record was kept of the work performed by him, which was as follows: Trips around gallery (100 ft. per trip), 29; pulled 50-lb. weight 3 ft. high 90 times; pushed pit car a distance of 60 ft. 16 times; carried 130-lb. dummy single-handed 360 ft.; sawed props 4 in. in diameter with dull saw once; went through 17 x 19-in. tunnel once. The total time occupied during this work was 30 min., and the total amount of oxygen used was 40 atmospheres, or 77 liters, being an average of 2.56 liters per minute.

Mr. Schoonover then put on the apparatus without recharging, the gage reading 35 atmospheres. He walked round the gallery for 10 min. and was then forced out because he had no oxygen in the cylinder. The gage readings showed that he had used 35 atmospheres in 10 min., equal to 67 liters, or at the rate of 6.7 liters per minute. Undoubtedly there must have been something wrong with the gage, causing it to register more than the cylinders actually contained. No person under any condition, no matter how hard the work, is capable of using up so much oxygen. Experts consider that 3 liters per minute would be the maximum quantity used in hard work.

Special attention was given to the behavior of the automatic feed valve on the apparatus, which is said by the makers to allow sufficient oxygen to the wearer no matter at what speed he may be working and to reduce the quantity passing when the wearer ceases work or rests; also the temperature of the inhaled air from the breathing bag. The three wearers all agreed on the following opinions:

That at no time did they have to slacken their speed because the automatic valve was not delivering sufficient oxygen, enough being supplied at all times.

While the purifier got so hot that it could not be touched with bare hands, the temperature of the inspired air did not seem to rise perceptibly throughout the trials.

At no time did the breathing bag get so full as to make it uncomfortable to breathe against. This is brought about by the automatic release valve, which releases the air in the breathing bag when it reaches a certain pressure. However, it was thought that owing to this valve releasing easily it might have been the cause of using up such an excessive amount of oxygen during the period of 70 min. in which the apparatus was worn.

The center of weight of the apparatus is too high on the back, causing the person wearing it to have to lean forward in order to maintain his balance. A glance at the side view photograph accompanying this article illustrates this clearly.

It was also thought that the casing that covers the main part of the apparatus could be made a little lower. The present type comes too much in contact with the wearer's head when he bends down for such work as pulling the weight.

There should be some different arrangement for holding the gage when this is not being read. The wire clips now in use allow the gage to jump out when the wearer of the apparatus is using a saw or pulling the weight machine.

The foregoing trials were made with men well trained in the use and care of mine-rescue breathing apparatus. They are members of the rescue brigades which are maintained by the Madison Coal Corporation at its Carterville mines. These brigades have helped the state teams at explosions occurring in the southern Illinois coal field during the last four years, including the recent disaster at Royalton.

Coal Mine Proves a Sand Pit

Wheeler & Mason, coal operators of Columbus, Ohio, while opening a stripping operation on a tract of approximately 275 acres near New Lexington, Ohio, discovered a valuable deposit of molding sand. This is now being developed by the Perry Coal and Sand Co., chartered to produce and market the sand. Since Jan. 1 of this year the concern has marketed over 700 cars of the sand, which has proved highly successful in use.

Late in 1917 Mr. Wheeler started to clear the ground



REMOVING MOLDING SAND BY STEAM SHOVEL

by steam shovel preparatory to mining the 5-ft. bed of No. 6 coal which is on the property. After throwing a considerable amount of the sand aside, it was discovered that the overburden was probably more valuable than the coal deposit. Accordingly, an $80,000 sand plant was erected and operations started as rapidly as possible. The deposit is 18 ft. thick and covers approximately 100 acres of the tract.

Under the sand is a 5-ft. stratum of shale which will be left for the present. Later on it is expected to remove the shale and market the coal beneath it.

Some of the most important equipment units requiring immediate attention following an explosion at a mine are as follows: Ventilating appliances, hoisting appliances, signaling appliances, brattice boards and canvas, props and ties, tools, nails and spikes, and miners' safety and portable electric lamps. An experienced man who has some qualifications as a leader should be detailed to look after each of the units mentioned and should be furnished such volunteer assistance as will constitute an efficient working force. Each of these foremen should then immediately proceed to perform the duties assigned him and organize his force into shifts of six or eight hours.—*Rescue and Recovery Operations in Mines.*

Elimination of Power Losses*

By GRAHAM BRIGHT
East Pittsburgh, Penn.

SYNOPSIS—*A shortage of power for industrial purposes has developed within the past few months. Various measures may be taken to alleviate this condition, some of which, such as changing the starting hour of the work day, might be considered as drastic. Electric operation of mines offers many possibilities of saving over either steam or compressed-air operation.*

THE shortage of power supply in most of the central stations of the country, and the greater value of fuel, makes the economical use of power not only increasingly important but an actual necessity. The real economic use of power means not only the elimination of power losses, but the proper distribution of power in order to improve the load factor and permit of more customers being served or more apparatus being used with a limited amount of power-producing equipment. The large increase in industrial power consumption due to war conditions has loaded most power plants beyond their capacity, and a number of schemes have been devised to assist the central stations to take care of the abnormal conditions.

The first natural solution is to install additional capacity in the isolated plant or central station. There are, however, several objections to this. In the first place the financial condition of most mining companies and central stations is such that even if they could obtain the consent of the Government, and could raise sufficient money to purchase additional equipment to make the necessary changes in power plant and transmission lines, the high cost of equipment, material and labor at the present time would scarcely justify the investment, especially when the conditions after the war are considered, at which time the industrial loads will probably decrease and the fixed charges on the new equipment will be much higher than under normal conditions.

A study of the load curve of a large central station will indicate to a considerable degree how the system can be relieved and how additional loads can be taken care of. The average central station load curve shows that the load from midnight until 6 a. m. is from 25 to 50 per cent. of the full load during the day. At 6 a. m the load rises rapidly, reaching a maximum between 8 and 9 a. m. At noon the load suddenly drops off about half but rises rapidly again at 1 p. m. to about the same value as before noon. Between 3 and 4 o'clock in the afternoon the load starts to drop off, especially if there is much running load. If there is considerable railway and lighting load, there will be a rise again from 5 to 7 o'clock in the evening, after which the load will gradually decrease until midnight.

When a fair percentage of the load is mining, considerable assistance can be given the power station by shifting as much load as possible from the day to the night turn. Many mines are doing most of their pumping and cutting at night, which assists the load factor by decreasing the day load and increasing the night load.

*Paper for presentation before the Coal Mining Institute of America, Pittsburgh, Penn., Dec. 5, 1918.

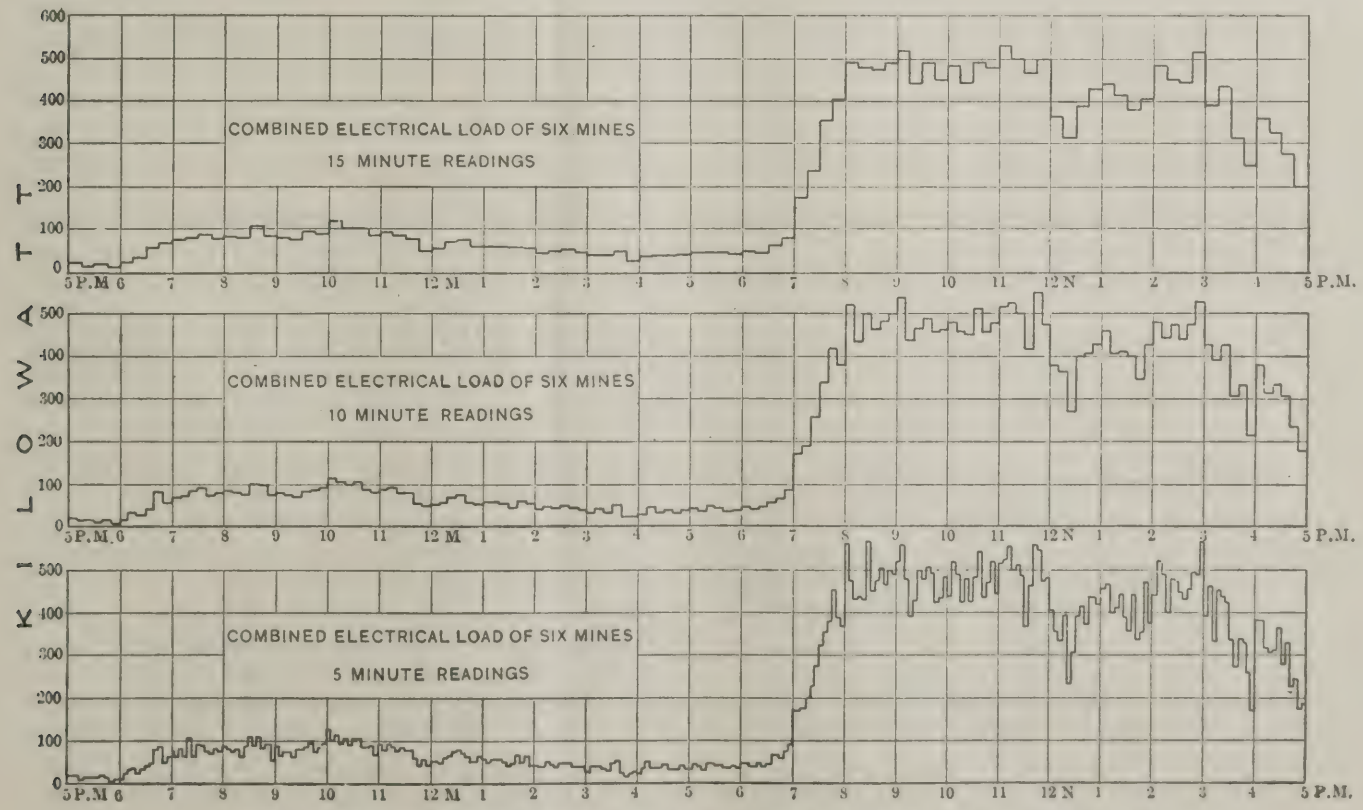


FIG. 1. READINGS SHOW LARGE VARIATION BETWEEN DAY AND NIGHT LOAD

This incidentally permits of more customers being served with a given amount of power station equipment. Some additional help can be given by changing the starting time and lunch hour of the day shift at some of the mines. In a few cases the rather drastic method of shutting off each customer in rotation for a short period two or three times a day has been necessary where the capacity is insufficient to take care of all the customers at the same time.

The curves shown in Fig. 1 were plotted from tests made simultaneously at six mines located in the same vicinity, the tests being made to determine the general shape of the load curve, the diversity of six mines compared to one, and the relative values of the 5-, 10- and 15-minute integrated peak loads, for a full day's run of 24 hours. These curves indicate the large variation between the day and night load and show that the load factor and capacity required could be considerably improved if some of the day load could be shifted to the time between 5 o'clock p. m. and 7 o'clock a. m. Incidentally the sum of the maximum peak loads of the individual mines shown in Fig. 1 was 50 per cent. greater than the combined peak.

There are two ways of helping out the power station irrespective of whether it is a central station or isolated plant. The first is to eliminate power losses wherever possible, and the second is to so schedule the use of power as to improve the load factor so as to require less capacity of power equipment.

Power Losses in Isolated Plants

In regard to the elimination of power losses, the mine with an isolated plant will be first considered. It is not always fair to compare the practice at a mine plant with the average central station because of the fact that the mine plant is generally located in an undesirable section far away from industrial centers, where living conditions are such that it is difficult to obtain and keep high-class labor. The average single mine cannot afford to employ experts continuously to keep the various parts of its power system in the best of condition. This places it at a disadvantage when compared to a mine using central station power.

Beginning with the boiler plant, considerable saving can be effected by employing an expert from time to time to go over the entire equipment carefully, and not only make recommendations regarding improvements and repairs, but carefully instruct the firemen regarding best methods of firing, cleaning fires, adjusting drafts, taking care of the ashes, etc. It is considered the best practice in a modern boiler plant to work the boilers at not less than 100 per cent. overload to give the best all-round efficiency. It is doubtful if there are many mine boiler plants where it is possible to work the boilers above rated load. This means that more boilers are in use than necessary and the individual boilers cannot be taken out of service long enough to give them the thorough cleaning and inspection they should have.

The water question is a most serious one in many mine boiler plants, and the proper treatment of boiler water requires an expert.

Some of the defects which should be watched for closely and where considerable saving can be effected if corrected, are as follows: Improper firing; defective settings; irregular inspection and cleaning; insufficient draft; no lagging on steam pipes and insufficient lagging on boilers (this is especially true in the South, where boilers are often mounted in the open without any sort of building protection whatever); leaky blow-off; leaky traps.

The engine room or other location using steam engines is a fertile field for the efficiency engineer. The fan engine is about the only engine around a mine on which the load is steady enough to permit of economical operation. Indicator cards often show that the engines are much underloaded and it is impossible to obtain high economy. The advantage of such an installation is that it will operate over long periods with little or no trouble. Considerable saving could be effected, however, by installing the proper size of engine or adopting motor drive.

In the engine room proper, where engines are used to drive generators, considerable saving in power can frequently be effected. The valve settings should be regularly checked by taking indicator cards, and no engine should be operated unless absolutely necessary. The load on a small or medium sized mine generator is extremely variable, so that high economy cannot be obtained. Fig. 2 illustrates a portion of a typical day

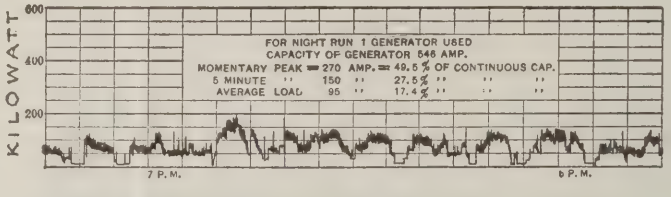


FIG. 2. DAY LOAD ON 1902-AMP. MINE PLANT

load on a plant having a capacity of about 1000 tons per day, and shows the wide variations in load that take place in a short period of time. The capacity of the generating equipment to meet a load of the character shown in Fig. 2 is based on the maximum peak instead of the average, and if the engine driving the generator is based on the average load it will be found that it will not have sufficient power to drive the generator at the maximum load.

The situation is often aggravated by the steam pressure being somewhat lower than the pressure for which the engine was designed. The result is as shown in Fig. 2, where it was found necessary to operate two generators during the day, having a combined capacity of 1092 amp., when, if sufficient driving power were available, one generator of less than half the total capacity would have been ample. Considerable saving in power could therefore be effected with the proper installation of engines and generators, but where possible a much greater saving could be effected by the installation of motor generator sets or rotary converters, using central station power.

Fig. 3 shows a typical section of the night load on the same plant. This curve shows that the generator and engine are operated over long periods at far below their normal capacity. This curve shows the advantage that would be obtained if a portion of the day load could be shifted to the night turn, permitting the generator to operate at nearer its full load capacity, thereby causing more efficient operation.

The real saving in power about the ordinary mine plant is shown by the adoption of central station current and the elimination entirely of all steam operation. If we compare the operation of the plant, portions of whose load curve are shown in Figs. 2 and 3, with one using central station power, we will find that the latter plant would require but a single 100-kw. rotary converter and, besides a considerable saving in power, the cost of operation would be much less.

In haulage a great amount of power is frequently wasted. A few mines use compressed-air locomotives, and this type of machine is inherently inefficient. One has simply to visit the compressor plant of a mine using compressed-air locomotives to realize that considerably more power is required than would be the case where an electric haulage system is installed.

I have in mind a particular installation near Pittsburgh where compressed-air locomotives were formerly used for the main haulage. The distance was about 10,000 ft., and in bringing a loaded trip from the inside it was necessary to stop six times to charge the air tanks. Since a large portion of the power required under such conditions is due to acceleration, one can readily imagine the extremely low efficiency of such a performance. The compressed-air locomotives on the main haulage have recently been replaced by electric machines, and a great saving both in power and labor has been effected.

Large Transmission Losses Costly

With an electric system of haulage, pumping, cutting and ventilation, there are often many opportunities to effect power saving. This can be accomplished by scheduling to an extent the use of power to improve the load factor and to improve the line and return circuit conditions so as to eliminate a large part of the transmission losses. Large transmission losses not only needlessly waste power but greatly shorten the life of the equipment, cause numerous delays and increase the cost of repairs.

These losses, when excessive, have a deleterious effect on the entire output of the mine. Much time is lost due to slow-speed operation, and the men will be idle a considerable portion of the time waiting for cars and because of delays arising from breakdowns and burnouts.

The electrical equipment is frequently blamed for troubles and delays where the real cause is in the transmission system. The remedy for low voltage does not always consist of the installation of additional copper. Frequently it will be found that the low voltage condition is due to poor splices in the overhead system or poor bonding in the return circuit. It is needless to say that all connections and splices in the overhead system should be carefully soldered and the bonding system frequently tested. Cross bonds should be installed about every 200 ft. and all switches, frogs and cross-overs should be carefully bonded around. Every mine should either have a bond-testing instrument or be able to borrow one periodically.

Where different trolley and feed wires run to adjacent localities in the mine, they should be frequently connected together in such a manner that the various circuits will help each other out. This will often be of great assistance, since the maximum load seldom occurs in more than one circuit at the same time. The returns in power saving, decrease in delays, burnouts and repairs, together with the actual increase in output, will more than pay for the extra time and expense involved in improving the voltage conditions in the transmission system.

It is frequently found that considerable saving in power and capacity can be obtained by changing some of the maximum grades in a mine so as to take less power and permit the locomotive to handle greater trips.

Comparing the haulage system of mines to a street railway system, one seldom sees a broken-down car on the latter or hears of long delays due to defective equipment. This is largely due to two things—regular and systematic inspection and the use of spare equipment. The street railway companies and the large steel mills have found that rigid and regular inspection pays for itself many times over in the elimination of costly delays and breakdowns in service.

The actual cost of repairing a breakdown is frequently but a small proportion of the total cost, which arises chiefly from vexatious delays and loss of revenue and output. The proper inspection and upkeep of the equipment will therefore tend to keep the entire operation

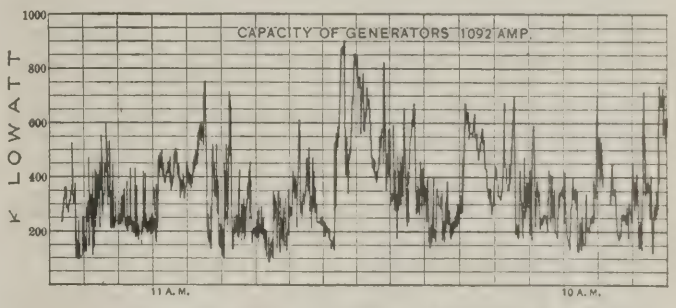


FIG. 3. EVENING LOAD ON 600-AMP. MINE PLANT

in logical working order and will eliminate a loss which is inevitable when part of a system breaks down and the remainder must operate, requiring normal power at a time when the output is greatly reduced.

Compressed air is sometimes used to operate steam pumps, in which case the efficiency is extremely low. The installation of a motor-driven pump would show a large saving in power. Considerable loss takes place in long air lines installed in mines. Air leaks do not have the property of "taking-up" like steam leaks, and are sometimes difficult to locate and repair. A leak in an electric circuit is soon detected and easily repaired, so that the loss in such a circuit will as a rule be much less than in a compressed-air line. It is not an uncommon sight to see a large steam-driven compressor operating over a long period when the only load on the air system consists of two or three small pumps, each of which could be operated by a 5-hp. electric motor. The load on the compressor in this case would probably be from 100 to 150 hp., largely due to the friction loss of the machine and the air leaks in the system.

The electric pump is without doubt the most efficient method of removing water from a mine. Where it is possible to do so, a further saving can be effected by arranging to do a large part of the pumping at night, in order to improve the load factor.

The ventilating system does not lend itself to changes which will improve the load factor. The fan must ob-

viously operate at full speed during the day when there is the greatest demand for other power. There are many cases, however, where the speed of the fan at night can be reduced, thereby causing a large saving in power. Where a speed reduction of 2:1 is required, this can be readily obtained with the electric motor and the efficiency at one-half speed will not be far below the full load efficiency. This of course is not the case where a steam engine is used to drive the fan. The addition of booster fans will often accomplish certain results with much less expenditure of power than if the same results are obtained by speeding up the main fan.

As long as a piece of apparatus about a mine operates and causes no delay, its performance in regard to efficiency is seldom inquired into. A steam hoist is notoriously inefficient, due to the peculiar cycle of operation. Each cylinder must be capable of starting the heaviest load, which means that the combined engine is considerably larger than necessary. This permits of rapid acceleration and a short quick cycle is therefore possible.

Indicator cards show that during the accelerating period the cards are practically square, after which drifting takes place until the braking period. The efficiency is naturally low and considerable power is saved by the use of electric hoists. With an electric motor uniform torque is obtained and an excess of capacity is not required. The efficiency depends somewhat on the electric system used, but in any case the efficiency is much higher and cost of operation is much lower than with the steam hoist.

This is clearly shown by some actual tests extending over a period of two years at one of the mines of the Lehigh Coal and Navigation Co. The results of the tests were published in a paper entitled "Economy of Electricity Over Steam for Power Purposes in and About Mines," by R. E. Hobart, mechanical superintendent of the Lehigh Coal and Navigation Co., at the February, 1918, meeting of the American Institute of Mining Engineers.

Cutting and punching machines may be of the compressed-air type, but a large proportion of these machines are electrically driven. Operating compressed-air cutting or punching machines at night is as a rule not economical, as it entails running large compressor units which may not be used for any other purpose at the time, resulting in inefficient operation. With the electric cutting machines, however, the power-producing apparatus can be operated economically at light loads and, as before stated, the principal saving effected by night operation is in the improvement of the load factor.

The methods to be employed for the elimination of power losses may be divided into two classes, one which will produce immediate results while the other, by reason of the equipment and changes involved, may require several months.

Under the first class may be mentioned: Regularity of inspection and repairs to power plant equipment; instructions to firemen, engineers and electricians; scheduling the use of power to improve the load factor; improving the transmission and return circuit conditions; changing time of starting day shift. Under the second class may be mentioned: Installation of new equipment; changing over to electric operation; changing over to central station power; providing spare equipment; providing spare parts for use when necessary.



PERSONNEL OF THE FEDERAL FUEL ADMINISTRATION, WHICH IS SHORTLY TO WIND UP ITS AFFAIRS

Preservative Treatment of Mine Timbers as a Conservation Measure*

By KURT C. BARTH
Chicago, Ill.

SYNOPSIS — *Wood preservative may be profitably applied to a large proportion of the lumber and timber used by mining companies. Three distinct methods of application are available—the pressure, immersion and brush processes—the choice depending upon circumstances. Timbers treated with preservative and then coated with gunite should be nearly fireproof and of almost indefinite life.*

WOOD preservation applied to a large portion of mine construction is an important economy and a conservation measure of considerable magnitude. Preservative treatment of mine timber, for underground as well as surface structures, must be practiced systematically and consistently in accordance with established principles and in a manner which will assure the most practical results.

The object of preservative treatment is to increase the natural life of structural wood to equal the mechanical life, or to render it fit to serve the purpose intended for the full period of its mechanical usefulness. Thus, in every instance where decay may be expected to weaken and render the timber or structure unfit to perform the required service, necessitating repairs or replacement before its usefulness has ceased, the logical thing is to employ available means of counteracting such destructive influences—namely, to employ proved methods of retarding the development of fungous growths.

The fundamentals of wood preservation are definitely established. It only requires their application to the case in hand to ascertain whether the advantages to be derived from such practices warrant the expense of employing methods of preservative treatment, and exactly which methods or processes are most practical in the circumstances.

Consequently, the first step must be a careful analysis of the conditions directly or indirectly related to the matter, and their relative influence upon the determining factors. Practically, each mining property presents an individual problem, and particularly does this apply to coal mines. The suggestions contained herein must, therefore, be quite general, but their specific application requires merely suitable modifications to meet the conditions encountered.

Preservative treatment of timber is a conservation measure for several reasons: It permits the utilization of less durable species of wood for purposes where, if untreated, it would not be worth the labor of placing. (2) It prolongs the life of such timber until it equals and usually exceeds that of the most durable commercial species when used untreated. (3) It conserves labor and releases for productive employment men engaged in the nonproductive capacity of replacing decayed timber. (4) It conserves the timber supply by reducing considerably the demand for repairs and replacements because of decay. (5) It increases the available supply of timber for other uses now possibly restricted because of the huge demands for mining purposes. (6) By permitting the employment of timber obtainable in the immediate vicinity it lessens the demand upon transportation facilities for moving timber from distant sources of supply. (7) It conserves iron and steel products by the judicious substitution of wood for structural purposes, without sacrificing reasonable permanency.

These facts may not all apply in every case. As previously stated, they are general yet nevertheless of sufficient importance under present conditions, and in their relation to the period of reconstruction which is before us, to alone make imperative the adoption of wood preservation as a policy.

Economic Phases of Timber Treatment

The economic phases of the matter are more pertinent, in that they permit visualization of the dollars and cents that may be saved. These may be enumerated as follows: (1) A saving of material, equal to the increased service obtainable from treated timber, and accessories used in construction. (2) Saving of the labor required for repairs, the handling of material, its manufacture, transportation, etc. (3) Saving of equipment and tools required for repairs or replacement of timber and structures. (4) Saving of time and the loss due to interrupted production necessitated by repairs which must be made where operations are continuous. (5) Saving in overhead and the expense of supervision and engineering often required for underground repairs or replacements. (6) A lower annual cost of treated underground timbering and wooden surface structures as compared with untreated wood, and a proportionate reduction of the cost of production per ton.

In any case where preservative treatments are at all advisable there will always be found a considerable net saving. It would be possible to present an interesting hypothetical case, but such figures would only be relative at best, and perhaps of little use for our present purpose, without a direct application to the particular conditions.

The practicability of preservative treatment is dependent upon a number of factors of varying values which must be carefully defined and translated into a simple mathematical problem of cost versus profit. These are primarily the following: (1) Species of wood to be employed, its physical fitness for the purpose and its cost. (2) Where local timber is to be employed, facilities for manufacturing, including peeling and seasoning. (3) Durability under prospective conditions of service. (4) Character of service in which timber and

*Paper for presentation before meeting of the Coal Mining Institute of America at Pittsburgh, Penn., Dec. 5, 1918.

lumber are to be employed, or the type of structure. (5) Average period of mechanical usefulness under existing and probable future conditions. (6) Average number of years additional service practically obtainable by the elimination of decay. (7) Cost of treatment required to obtain desired increase in life. (8) Annual cost of untreated timber or structure. (9) Annual cost of treated timber or structure. Such an analysis would answer the important question of whether treatment would pay.

The next step then would be to determine the most suitable method or process of treatment. Herein, as in most subjects, exist differences of opinion; but fundamentally there can be none, in that any treatment to be worth while must attain the desired object, which is to assure a sufficient saving to warrant its employment.

Under the stress of operating conditions methods must be devised and employed which often are far from the ideal, and when the most efficient is not available or too costly for the purpose, one less efficient but still *sufficiently efficient* to be worthy of consideration must be made to answer. To discard preservative treatment simply because, for instance, timber impregnated by the pressure process is not obtainable, or too costly, is illogical, since for just such conditions the non-pressure processes have been developed, and with proper safeguards are entitled to equal recognition.

Processes of Preservative Treatment

The standard processes of treatment are divided into two groups. Group A—Pressure Processes—includes: (1) Full cell treatments; that is, impregnation of timber to a predetermined extent, leaving the wood cells full of preservative, applied in retorts or cylinders under artificial pressure, with (a) creosote oil, (b) zinc chloride, (c) solution of zinc chloride and creosote. (2) Empty cell treatments; that is, impregnation of timber to a predeterminated extent, in retorts or cylinders under high artificial pressure, and removal of the surplus preservative, leaving the wood cell walls coated and the cells more or less empty.

Group B—Non-pressure Processes—Includes: (1) The open tank process; that is, the impregnation of timber in open tanks, or vats, under atmospheric pressure only, by complete submersion for varying periods in alternate hot and cold (or cooling) baths of refined coal-tar creosote oil. (2) Surface treatments; that is, several successive applications of refined coal-tar creosote oil to timber at points of contact, or over the entire surfaces by (a) brush treatments—two or more paint coats; (b) properly designed spraying machines; (c) dipping, or short immersions in the heated creosote.

A further grouping will divide all treatments into two classes: (1) Impregnation processes, including both pressure and non-pressure methods by which an adequate penetration of the preservative is obtained. (2) Surface treatments, the purpose of which is to retard decay at certain points exposed to a greater degree than are other portions.

Each method of treatment enumerated has definite limitations and advantages, and the selection of one must depend strictly upon meeting the requirements of the case in hand as may be dictated by an analysis of the governing conditions.

Sawed timbers which when in service are exposed to severe mechanical wear must be impregnated with the preservative to an adequate depth in order to present an unbroken barrier to attack by fungous growths should abrasions and ordinary checks occur.

Round timbers, having an ordinary sap ring, when properly seasoned, can usually be satisfactorily treated by the open tank process, as the sap wood of practically all commercial species is readily impregnated.

Impregnation processes are always advisable when the maximum increase in the natural life of structural wood is desired, and in every instance where non-durable species of wood are employed. Timber surface structures in which durable grades are employed should be given at least a surface treatment at points of contact, either during construction or previously.

Structural wood should be seasoned air-dry before treatment, particularly when non-pressure processes are to be used. If green, artificial seasoning may be done in connection with pressure treatment, but seasoned timber is always preferable. For mining purposes, especially for underground uses, the timber must be peeled immediately after cutting, and then seasoned for at least 30 to 90 days, depending upon weather conditions and the season of the year.

The analysis previously outlined includes the selection of the preservative. This is, undoubtedly, by far the most important factor in determining the efficiency of any method of preservative treatment. Herein also there exists a great variety of opinions, in which numerous theories play a more or less important part. However, practical experience gained in the commercial practice of wood preservation during nearly four score years has clarified the situation to such an extent that we can today deal in definite values and the knowledge of actual performance. Primarily, we are concerned with two products—coal-tar creosote oil and zinc chloride.

Both of these preservatives have been in use sufficiently long to establish their relative merits beyond the possibility of detraction. Recently experiments with sodium fluoride for the treatment of underground timbers has given promising results, but the latter product has not yet established the reputation or record of other salts such as zinc chloride. For surface structures especially, and for by far the majority of all purposes, coal-tar creosote oil is eminently the most efficient preservative. There is no record of failure of properly creosoted timber.

Such minor points as appearance and odor have been much discussed, and until recently the wide-spread impression that the employment of creosoted timbers increases the fire hazard has been an obstacle to the general introduction of creosoting. But these objections have been overcome and removed by proper education and changes in methods. Those who have thoroughly investigated the matter realize that creosoted timber properly handled is not a fire hazard—on the contrary, dry creosoted wood is less inflammable than untreated wood.

Howard F. Weiss, in his book, "The Preservation of Structural Timber" (page 192), cites an experience where after a fire in a mine the untreated props were destroyed while the creosoted timber was merely slightly charred on the surface but still serviceable. Wood freshly impregnated is more inflammable than

before, but no matter for what purpose it may be intended, treated wood should always be thoroughly dry before placing.

Numerous mines have used creosoted timber for shaft lagging, shaft timbers, head frames, gangway and main entry sets, and so far I know of no record of fire or casualty directly or indirectly charged to the presence of creosote in the timber. It would seem therefore that much of the prejudice against creosoted wood for mine uses is really without foundation in fact, particularly where modern methods of fire prevention prevail.

Extensive experiments in fireproofing underground timbers in both coal and metal mines by mechanical application of concrete coatings has given considerable impetus to this method. It has occurred to me that a combination of creosoted timber and this "cementation process" would be an admirable type of permanent construction. It is practically impossible to absolutely exclude air and moisture by such a coating, consequently decay can be expected to progress unhindered, and possibly more rapidly, causing the weakening and collapse of the timber without the opportunity of detection in time to perhaps avoid accident.

Untreated Timbers Fail Rapidly

Numerous instances have been observed where untreated electric power transmission poles set in concrete, nailing strips for floors partially embedded in concrete, as well as columns entirely encased in cement or plaster, have failed more rapidly than would otherwise have been the case. In consequence, when such type of construction is necessary the best practice requires preservative treatment, mostly surface applications of refined creosote of all parts partially or entirely inclosed. For instance, if the timber for shafts and permanent workings, or where the period of mechanical usefulness would warrant, were creosoted by the open tank process, which could be done at comparatively small expense at the mine, and when placed coated with ¼ to ½ in. of cement and sand, decay would be practically eliminated; and the fire hazard, if existent, greatly reduced if not entirely removed.

This is merely a suggestion which I would be pleased to carry out in an experiment in coöperation with any mine operator interested. The theory is that by utilizing native round timber properly treated the necessary mechanical support is obtained, and that with an application of "gunite" merely sufficient to act as a fire retardant coating, the highest factors of safety and economy are combined.

Wood is still extensively employed for surface structures, and undoubtedly will be for some time to come, particularly now and during the immediate future, when steel and iron will be in such great demand as to necessitate its conservation wherever possible. In this field the employment of non-pressure processes is especially applicable. Repairs due to decay of timbers in exterior structures largely result from the development of fungi in inclosed parts or at points of contact. Therefore, application of surface treatment to timbers previous to assembling will retard decay at the most vulnerable points and increase the life of the entire structure.

Many wooden tipples and shafthouses have been so treated, and after erection refined creosote found further employment as a substitute for paint because of its lower cost and greater preservative value. Such practice is not confined to mining operations, but is extensively used by other industries. Trestles of various types, which are of a semi-temporary nature, that is, the mechanical period of usefulness is set at 15 years or so—have been brush-treated or sprayed at points of contact in order to increase the natural life of the timber to equal the mechanical life desired. Telephone and electric poles are brush-treated with excellent results. Mills in which manufacturing processes create conditions favorable to the development of decay have installed tanks for treatment of lumber and timber for miscellaneous uses.

The development and promotion of non-pressure processes of treatment, which are entirely dependent upon the use of refined coal-tar creosote oil, have made it possible for the average consumers who cannot equip themselves with apparatus necessary to impregnate timber by the pressure processes, to enjoy the full benefits of wood preservation to the degree in which they conform to the simple but necessary requirements. It is now possible for every user of wood, large or small, to avoid the waste of permitting it to decay. Those who are not informed on the subject can readily become so through various sources. The United States Forest Service maintains a research department at the Forest Products Laboratory in Madison, Wis., which deals entirely with wood preservation problems and whose bulletins and reports are available to the public gratis. Manufacturers of preservatives employ experts to promote their proper use and to aid consumers in solving problems.

The coal industry has a very particular interest in the development and popularization of wood preservation because of the normally increasing consumption of coal-tar creosote oil, largely a byproduct of coke making. Therefore, adoption of wood preservation is of twofold benefit in that it reduces considerably the high expense of timber replacement due to decay and furthers the expansion of an industry which consumes a large volume of one of the chief byproducts of coal.

Will Increase Coal-Loading Facilities a Hampton Roads

Eleven DeMayo bunkering machines are to be installed at Hampton Roads by the Port and Harbor Facilities Commission of the Shipping Board. Six additional coal barges with an aggregate capacity of 6500 tons are to be put in service. During the war, Hampton Roads has been the most important turn-around point on the Atlantic coast, with the exception of New York.

Five of the DeMayo machines have been constructed by the American Car and Foundry Co., of Berwick, Penn., and have been ordered to be shipped immediately. Three used machines were purchased in New York and are about to be shipped. Three more new machines have been ordered from a firm in New York.

These machines are capable of handling 75 tons of coal an hour, and it is intended to install two of them on each barge. The maximum capacity of the machines is rarely utilized, however, because it is impossible to trim the coal in the ship as rapidly as it can be turned into the bunkers. This trimming usually restricts the work of bunkering to between 25 and 50 tons an hour for each machine.

An Unusual "Bounce" Condition

By A. C. WATTS
Salt Lake City, Utah

SYNOPSIS—*"Bounces" occurred with annoying frequency in a heading driven in virgin territory and under comparatively light cover. This condition was somewhat mystifying until a fault was driven through and an analysis of conditions made. Beyond this fault, which is the second pierced by the development of this entry, no bounces have occurred.*

DURING the driving of a slope in one of the Utah mines of the Utah Fuel Co., considerable trouble was experienced from "bounces," the occurrence of which could not be explained by the commonly accepted theories which have heretofore satisfactorily accounted for such phenomena as had occurred in other parts of the same mine and in other mines of the same district. Heretofore bounces had taken place in pillar workings under heavy cover, but in this instance the workings were in virgin territory, several hundred feet away from room workings and 1500 ft. distant from the nearest pillar operations.

The first indication of trouble was the sloughing of the coal from the ribs of the entry, particularly the right rib facing down pitch. As the entry progressed the forces became greater and the coal from the ribs was broken up and thrown out with considerable force. As the entry was driven still further down the pitch, the roof coal would be broken down also and finally coal would be thrown from the face as far as 10 ft., extending the face as much as 5 ft. This face coal would be broken to pea size and smaller.

The width of the entry was widened in places to 16 ft. from an original width of 8 to 10 ft. To protect the entry and workmen, a concrete wall from 9 to 12 in. thick, reinforced with old rail, was built along the rib from which the coal sloughed most freely. This wall extended down the slope for 200 ft., and the rest of the entry was heavily timbered and lagged on ribs and roof. Finally work was abandoned temporarily in the main slope and an effort was made to advance the back slope ahead of it, in the hope that the pressure on the main slope would be relieved as the back slope had theretofore been comparatively quiet.

In driving the back slope the width was kept at 8 ft. and the height 6 ft., both sides and roof being heavily timbered and lagged. Although several bounces took place while driving the back slope, it was successfully driven down 150 ft. without accident until a fault was encountered. This fault, in connection with other conditions that will be described later, satisfactorily explained the cause of the bounces. The unexplainable feature is the entire absence of bounces in the level entries driven to right and left off the slope at the seat of trouble.

At the beginning of the explanation it must be stated that three conditions, which have proved conducive to bounces in this district, were present in this instance. They are (1) heavy cover, (2) the nature of the cover and (3) a hard, brittle coal. The cover here, as shown by the profile (Fig. 1), was 1500 ft. thick and was rapidly increasing as the slope came under the crest of a divide. This cover is made up to a large extent of massive sandstone, aggregating in some places 500 ft. thick. The sandstone is very cohesive and does not break and cave easily. The sloughing and bouncing of the ribs of the slope was aggravated by the butt cleavage of the coal, which ran nearly parallel with the direction of the slope and inclined 30 deg. off the vertical from the top of the seam. Ordinarily the butt cleavages in this district are not very pronounced, but bending action, which will be explained later, had made them at this point quite prominent.

So far conditions were ideal for bounces if the workings had been pillar workings, but other reasons had to

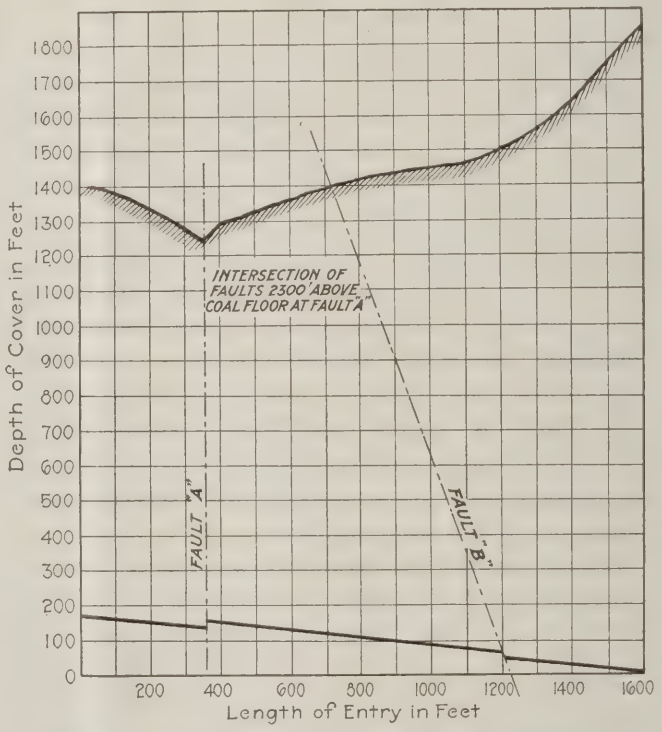


FIG. 1. PROFILE OF COAL BED AND SURFACE

be sought to explain why bounces should occur in an entry entering an apparently solid block of coal and territory never before worked. After the fault (fault *B* in Fig. 2) encountered in the back entry had been proved, it was found to be a downthrow of 17 ft., bringing the floor of a 5 ft. 3 in. upper seam to the same level as the 9 ft. 9 in. bed being worked. Further up the entry 840 ft. an up fault (fault *A*) of 18 ft. had been encountered. This fault (*A*) was practically perpendicular whereas the lower fault (*B*) inclined toward it 20 deg. Fault *A* crossed the slope at approximately 90 deg.; fault *B* at approximately 67 deg. The strata between these faults had been thrown off the normal pitch of the measures so that the normal pitch was increased in the fault block by 1 per cent.

These two faults formed a wedge with the apex above the surface and thus left an unsupported block between them. Fault *B*, if continued to an intersection with the perpendicular fault *A*, would intersect it about 2300 ft. above the coal floor. The surface profile shows a marked depression directly over the extension of fault *A*, which depression undoubtedly marks this fault on the surface. The Government topographical map shows a canyon starting at this point.

As stated above, the frequency and force of the bounces increased as the entry was driven downward. The reason for this became apparent when the lower fault was struck and developed and a study made of the fault block in connection with the overlying strata. A geological section shows the two coal beds at this mine to be between heavy blocks of massive sandstone analogous to a brittle substance between two grindstones. The faulting forces had tilted the fault block out of conformity with the balance of the area, and probably there is still some tension at this particular section.

Furthermore, the inclination of the fault block tends to increase due to the pitch of the lower fault, which forms a slippage plane. This is further aggravated by the weight of the overlying strata, which are sheared by both faults clear to the surface and thus rest directly

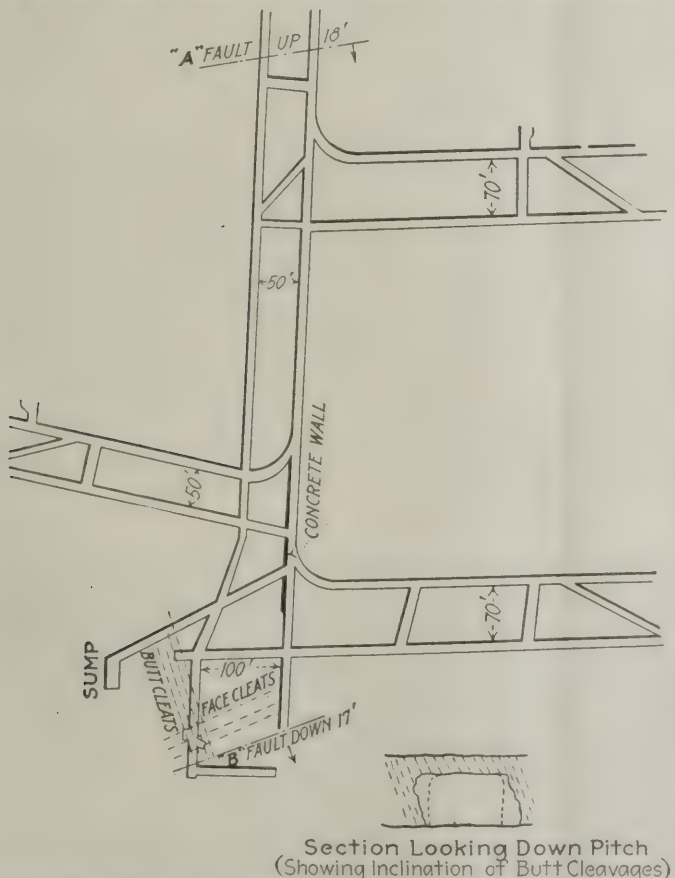


FIG. 2. PLAN OF WORKINGS AND LOCATION OF FAULTS

on the wedge-shaped fault block. Thus two forces are working on the comparatively soft and brittle coal. Naturally this pressure would relieve itself as soon as an opening was made in the coal. No bounces occurred in the back entry when driven below the fault, and it is not expected any will occur because solid ground is being entered; and the strata overlying the coal is better supported and not subject to stresses as found in the fault block.

It is interesting to speculate on the reasons for these faulting and bending actions. G. B. Richardson, in United States Geological Survey Bulletin No. 371, describes the structure of the Book Cliffs coalfield in which this mine is located as follows:

The strata of the Book Cliffs coalfield, forming as they do part of the southern margin of the Uinta synclinal basin, dip gently northward. The dip is not uniform, how-

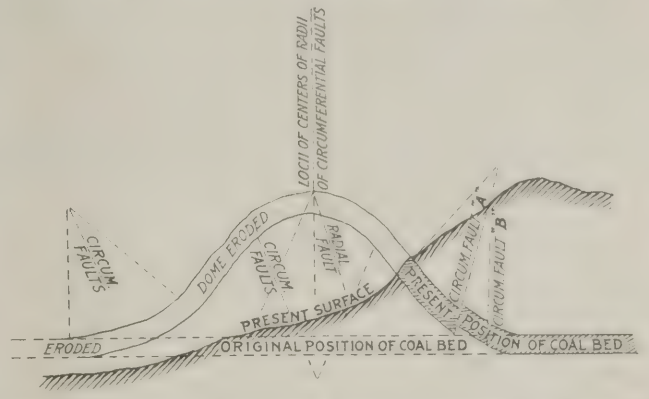


FIG. 3. ILLUSTRATING THE DOME THEORY OF FAULTS

ever, for this area, besides being included in the zone of folding of the Uinta Mountains and the Uinta Basin, is affected by the uplifts which produced the San Rafael Swell and the Uncompahgre Plateau. That part of the Book Cliffs coalfield which is included in the present report is gently warped, the eastern part constituting the end of a low, northward-plunging anticline, and the western part the end of a northward-plunging syncline. Conforming with this structure, the irregular S-shaped outline of the cliffs coincides with the strike of the rocks. There are, also, local faults of small displacement.

The district has also been described as the remnants of a great dome, the central portion of which has been eroded by the Price and San Rafael rivers by whose waters in ages past, geologists estimate, 160 billion tons of coal have been carried into the Gulf of California. Whichever it was, dome or a great warped syncline, the faulting action would be somewhat similar and each would explain the conditions that are found.

Accepting either the "drift" or "in situ" theory as correct for the formation of the coal, it was laid down in vast flat beds. At one part of these beds, which has since been covered with thousands of feet of sedimentary deposits, a vast dome had been lifted or a great warped fold had been made. This lifting action of the dome would develop two different lines of faulting: one radially from the center of the dome and the other circumferentially around the dome. There would be really two series of circumferential faults: one with the center of the dome for a center, and below the surface, and one centering toward or above the surface. These fault planes would form great, more or less, regular cylinders extending around the dome and with axes common with axis of the dome (see Fig. 3).

Evidences of the first series of circumferential faults are lacking due to erosion which has taken away the crest of the dome, but the latter series of circumferential faults, which mark the bend in the strata where they begin to resume their original flat position, is still in evidence and it was a combination of two of these faults that produced the condition so conducive to the bounces experienced.

Radial faults extending from the top center of the

dome outward would gradually become less in magnitude of throw as the distance from the top of the dome increased. These faults would mark changes in the direction of the strike which are noticed in this district.

If the synclinal theory is accepted, we would find the faults which correspond to the circumferential faults of the dome theory extending in lines parallel with the axis of the syncline. Where there was a bend in this axis, or a warping, the faults would be thrown diagonal to the parallel direction and faults more or less perpendicular to the axis would be possible. Fig. 4 plainly shows this theory to be plausible in the district. The strike of the strata has changed approximately 15 deg. and this was accomplished gradually without the appearance of radial faults sufficiently strong to give abrupt changes in strike and prove the dome theory. However, it must be said the structure of the coal deposits has not been thoroughly studied as a whole, and the various districts in which mining is being prosecuted have not been completely correlated. Also, that the district under discussion comprises only about three miles of a territory that embraces hundreds of square miles. It would thus not be safe to say that conditions which seem to prove one theory in this district prove it for the whole.

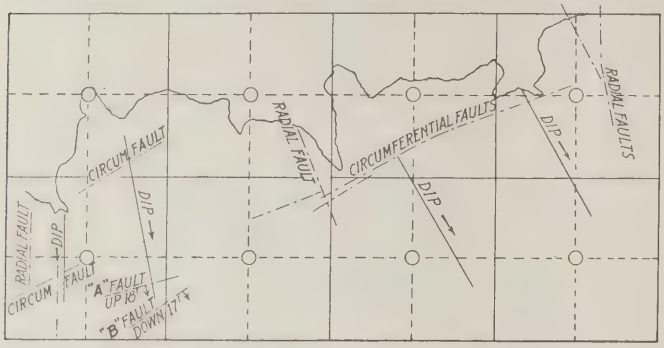


FIG. 4. GENERAL TREND OF FAULTS AND PITCH OF STRATA IN VICINITY

It is apparent that the two faults making an unsupported block so shaped that movements were invited, so to speak, were the main cause of the bounces. The change in the direction of the strike caused a bending stress in the strata which was not relieved by radial faults and only partially relieved by fault *B*. This bending stress is still potential and is manifested by the exaggeration of the butt cleavages and partially in the bounces.

Wireless Telegraphy

"It's all right to tell your wife some things, but one ought not to tell his wife everything."

This bit of philosophy fell from the lips of the president of one of the local unions of the United Mine Workers at a scale convention held in a large mining town recently. After stating this truth, the president of the union explained what was in his mind.

The financial secretary of the union at a certain mine had been given the password of the union, which is very sacred. The financial secretary told it to his wife after swearing her never to reveal it. (Is there any use of continuing?) The secretary's wife told the pit boss' wife and she——. The president reported the election of a new financial secretary.

Legal Department

EMPLOYEE INJURED WHILE RIDING ON CARS—The Alabama statute which forbids mine employees to ride on haulage trips in going to and from their places of work has no application to tramways outside of mines, disconnected with such ways in mines. Hence the statute did not apply to the case of a miner riding on a tram car used on the surface to carry coal from a stock pile to the point of loading on railway cars. (Alabama Supreme Court, Monte-Vallo Mining Co. vs. Underwood, 79 Southern Reporter, 453.)

COAL FREIGHT RATES—The North Dakota Supreme Court has denied the right of a railway company to recover the excess of claimed reasonable rates on intrastate shipments of coal above statutory rates against a shipping operator. This suit—Minneapolis, St. Paul & Sault Ste. Marie Railway Co. vs. Washburn Lignite Coal Co., 168 Northwestern Reporter, 684—was based on compensation for carrying coal while litigation was pending to determine the validity of an act passed by the North Dakota legislature in 1907, fixing maximum rates for the carriage of lignite coal. The rates were ultimately found by the Federal Supreme Court to have been confiscatory, and the railway company sought to recover the excess of what it conceived to be a reasonable transportation charge. The precise point decided by the North Dakota court in this suit is that the mere fact that a statute prescribing freight rates is finally held to be invalid as being confiscatory does not entitle carriers to enforce reparation against shippers.

NEGLIGENT SALE OF DYNAMITE — Defendant coal-mining company kept on hand a supply of dynamite to be used by the miners in its employ whenever necessary to do any blasting, and sold it to the miners as they called for it. Two grades containing 40 and 60 per cent. dynamite respectively were kept for sale. Plaintiff, a miner, called upon defendant's storekeeper for a supply of the less explosive grade, and, supposing that he had obtained it, used the dynamite, tamping it in a drill hole in the manner in which he was used to safely handle the lower grade explosive. An accidental explosion resulted, rendering plaintiff permanently blind. In affirming judgment for $10,000 in favor of the injured man, the Kansas Supreme Court decides that the jury's finding of these facts establishes actionable negligence on the part of the defendant, acting through its storekeeper. (Terleski vs. Carr Coal Mining and Manufacturing Co., 173 Pacific Reporter, 8.)

MEASURING DAMAGES FOR PERSONAL INJURIES—DELEGATING EMPLOYER'S DUTY—In reversing judgment which had been awarded in favor of a miner on account of injuries sustained by him through a fall of roof in the mine of the defendant in which he was working, the Alabama Supreme Court lately laid down the following rules governing the measure of damages to be awarded in Alabama when liability for personal injury is established, and the question whether an operator may delegate performance of certain acts to employees and thereby relieve himself from liability for any negligent performance of the delegated duties: "The measure of compensation to an injured employee is determined by the evidence (which may include mortuary tables, to show the probable duration of life) upon such factors as the age of the person, his business habits, industry, and sobriety, usual earnings, skill, and whatever other relevant facts of the case would aid the jury in arriving at a fair and just compensation for his sustained pecuniary damages. . . . The duty of the master, under the common law, is to exercise reasonable care to furnish the servant a reasonably safe place to work. This duty cannot be delegated. Yet the master may delegate the duty of exercising reasonable care to *maintain* such a place of work in a reasonably safe condition; and if such place becomes unsafe through the negligence of the servant to whom such duty is delegated, the master is not liable." (McCollum vs. South Brilliant Coal Co., 76 Southern Reporter, 901.)

The Hazard Coal Field

By P. M. SHERWIN
Blue Diamond, Ky.

SYNOPSIS—*Hazard coal is known chiefly for its hardness and low ash content. The region where it is produced is rough and mountainous, and presents many contrasts of old pioneer days and modern civilization. Much development work will doubtless take place in this field soon, and its future would appear to be assured.*

AMONG recently developed coal areas in the United States the Hazard field of eastern Kentucky is probably the most important as to present output as well as future prospects. Named after Hazard, the county seat of Perry County, it includes all the mines on the North Fork of the Kentucky River and its tributaries from Jackson to Whitesburg, Ky., a distance of about 80 miles. The territory is served by what was originally the Lexington & Eastern Ry., but is now a branch line of the Louisville & Nashville R.R., extending from Lexington to McRoberts, a distance of about 200 miles. Near McRoberts, 20 miles above Whitesburg, are the mines of the Consolidation Coal Co. and the Elkhorn Coal Corporation. But as these companies operate in the Elkhorn seam they must properly be designated as belonging in the field of the same name.

The railroad had reached Jackson early in the eighties, but there it stopped for nearly three decades until the rapid development and heavy demand for Elkhorn coal induced the Louisville & Nashville to extend its Jackson line in an effort to tap this rich field. At the time of its building little was thought of the coals in the Hazard field. However, great difficulties presented themselves to the penetration of the mountain ranges by the railroad builders, and when the headwaters of the Kentucky River were reached at McRoberts, it was decided to make this the end of the line. Thus it happens that the Hazard field today furnishes the greatest percentage of outgoing tonnage.

Prior to the completion of the railroad in 1912, the mountainous regions comprising Perry and Letcher Counties were known to the rest of the United States only by the stories of Fox and other writers. Hazard in 1912 had a population of 500, mostly housed in small shacks and log cabins. The next census will show 5000 people, living in a town with modern streets, electric lights and water-works.

This shows truly remarkable progress, yet many circumstances tend to remind one still of the olden days. A few miles away we might find ourselves at some lonesome log cabin where even a hint of our modern civilization would seem far-fetched and out of place. The bloody family feuds and the battles between revenue officers and moonshiners have grown scarce, it is true, but every native still "totes" his gun and shootings are even yet fairly common; also many are the secret stills where corn mash is turned into the forbidden "moonshine."

In common with other mountainous and remote sections the country is quite crude. There are no roads worthy of the name. The native is still satisfied to ride to the postoffice, the store or the mill on his trusty mule. He is apt to regard the newcomer with suspicion and universally designates him by the name "furriner."

Slowly, however, a new spirit is penetrating from the mining camps into the distant, narrow hollows. When the native workman leaves the camp in the spring to plant his corn on the steep hillsides, he takes with him little bits of culture which eventually will work as the leaven in the loaf. Nevertheless, the most common habitation is still the log cabin. Even now the weekly supply of corn is taken to the mill strapped behind the saddle and the jug of illicit whiskey is yet found in the hollow tree in exchange for so much legal tender. Slowly modern ways are penetrating from the valley of the Kentucky River to the most far-flung ridges of the Cumberland and Black Mountains. The coal production of this region in five years has risen from zero to nearly 20,000 tons daily. Given the men necessary (and it is not a fanciful prophecy) five years hence the output will be more than doubled.



HAZARD COAL GOING THROUGH THE SCREENS IN THE TIPPLE

Geologically the field belongs to the Appalachian coal-bearing measures. It contains three workable beds above the river valley. No. 3 seam is about 25 ft. above the river at Hazard. It is a little over 2 ft. in thickness, and con-

tains dirty coal of no commercial value. No. 4 seam, showing 48 in. of clean coal, is at tipple height and is probably of greatest importance of any coal-bed in the field on account of its great consistency as to thickness and quality as well as extent in area. Seams No. 5 and 5A are of no value. Two hundred feet above No. 4 seam we find No. 6, with from 65 to 70 in. of coal, but containing a 4-in. band of jack rock 10 in. from the bottom. No. 7 seam is about 60 ft. higher and averages 72 in. of coal, but also carries a band of jack rock. On account of the rough nature of the country, showing heavy erosion and abounding in deep and numerous valleys, the Nos. 6 and 7 mining areas are much cut up. This renders a hard and fast system of development difficult. However, all the coal is universally mined on the room-and-pillar system, no long-wall to the best of my knowledge being employed in any of the mines of this region.

It is principally due to the No. 4 bed that the fame of Hazard coals spread so rapidly and was followed by an influx of capital and consequently a still more rapid development. This coal was first shipped to the Northwestern market and gained fame as a high-grade domestic fuel, as it is an extremely hard coal of low ash content. This quality strongly appealed to users of anthracite.

As a general rule, and on account of the extreme steepness and height of the hills, the companies operating the upper seams use retarding conveyors to bring their product to the railroad cars. A few plants employ monitors. Usually the coal is screened to three sizes. There are in all about thirty companies, with varying capacities in operation, along the North Fork of the Kentucky River. Seven more are located on First Creek, a tributary, 5 miles below Hazard, with a daily output of 100 cars. Ten are being opened on the new Lots Creek branch of the Louisville & Nashville R. R., with a proposed total daily capacity of 200 cars. These mines will ship with the opening of the railroad early next year. Tipples and towns have been built, headings are being driven and 50,000 tons of coal are mined and stored, waiting for the coming of the cars to help alleviate the nation's fuel shortage.

The Columbus Mining Co., the Daniel Boone Coal Co., the Blue Grass and the Hazard Coal companies are all operating in the immediate vicinity of Hazard and work seams Nos. 2 and 3 simultaneously.

One mile above Hazard at Lothair is the plant of the Kentucky River Power Co. It is a modern turbo-electric steam plant developing 6000 kw. It supplies all the larger mines in the district and furnishes light and power for the City of Hazard. Only one power plant is now in operation here. The power house is economically situated at the tipple of the Kentucky Jewell Coal Co., the slack being directly elevated from the screens to the overhead bunkers by bucket conveyors. In order to guard against interruption of the service on account of any failure of this particular mine an auxiliary conveyor can furnish coal from a track hopper.

There are two 1500- and one 3000-kw. turbines installed in this plant. At present the company supplies about twenty mines within a radius of 20 miles, with as many more new operations under contract. There are 60 miles of high-tension transmission line, carried on wooden poles; at the numerous river crossings, steel towers are being used. The current is three-phase, alternating with a voltage of 33,000. At the mines this is stepped down in oil transformers to 2200 volts and delivered at this potential to the coal companies.

Several coal companies with modern plants are located along the river as far as the mouth of Carr's Fork. Here a branch of the Louisville & Nashville R. R. 8 miles long is under construction. This no doubt eventually will extend the full 28 miles of this not inconsiderable water-course. Rockhouse Creek at Blackey and Smoot's Creek at Roxana are the starting points for other branch lines, with mines operating and under construction. Several of the mines carry their coal across the river by means of cableways, but none of these are large producers. Mace's Creek, Leatherwood and Kingdom Come offer a vast undeveloped region and will no doubt see the building of branch lines soon.



INTERIOR OF BOILER HOUSE AND TURBINE ROOM OF KENTUCKY RIVER POWER CORPORATION

Forty-five miles above Hazard lies Whitesburg, the county seat of Letcher County. The coal measures rise considerably faster than the river and at this point the lower seams of the Elkhorn field are exposed, thus taking the place of the Hazard coals which have mostly been eroded away with the tops of the mountains.

The Elkhorn coals, usually considered as belonging to the Big Sandy field, are much higher in volatiles and remarkably low in sulphur, and therefore form an excellent byproduct fuel.

The Lexington & Eastern, now known as the Eastern Kentucky Division of the Louisville & Nashville, is

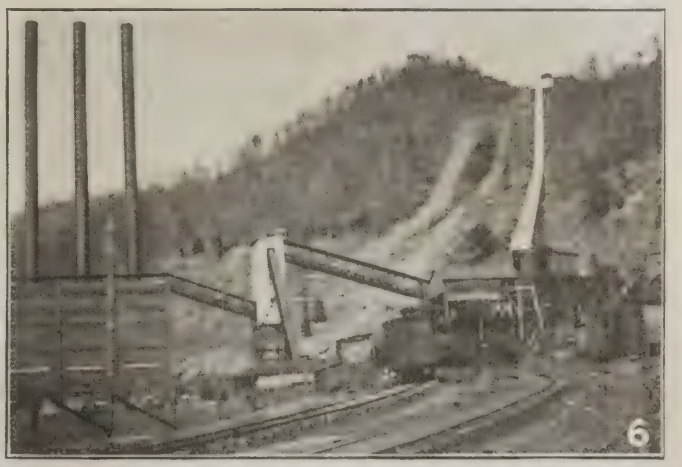
















VIEWS OF SURFACE PLANT AND MINING OPERATIONS IN THE HAZARD COAL FIELD

1—Carrs Fork Valley. 2—Daniel Boone Coal Co., No. 4 Seam Mine. 3—Louisville & Nashville yard at Hazard. 4—Partial view of Hazard. 5—Blue Grass Coal Co. 6—Kentucky Jewell Coal Co. and Kentucky River Power Co. 7—Blue Diamond Coal Co. 8—Hazard Jellico Coal Co.

essentially a coal road, the only other outgoing commodities being hardwood logs and barrel staves. Enormous quantities of white oak and other valuable woods grow along the upper reaches of the river and its tributaries. To give some idea of the curvature of the railroad line, it may be stated that the distance from Ravenna to McRoberts by rail is 156 miles, while the airline distance is only about 75 miles.

The Hazard coal field has enormous possibilities for the future and the next few years should see the building of many more branch lines. This will be followed by the springing up of new towns and mining plants. A conservative estimate would place the daily capacity of this field at 35,000 tons, which should be reached in a few years time.

Chilean Coal-Mining Industry

The coal-mining industry of Chile dates back to 1849, when the first workings were opened. Development has been slow, compared with other comparatively new fields, like New South Wales and Japan. In Chile the development has been solely due to private enterprise, and consequently the progress has been slow and difficult. The first establishments, opening up near the shore, had the advantages of proximity to marine transport; but, on the other hand, the difficulties of mining under the sea with the reduced extent of foreshore for working shafts, etc., had to be surmounted.

The first mines to be exploited were those of Lota and Coronel. Later on the Lebu mines, followed by the establishments of the Arauco Railway and Mining Co., Ltd., and the Compania Carbonifera Nos Rios de Curanilahue. Some smaller companies like the Lirquen, Rosal, etc., at Penco, and the Victoria at Lebu are of more recent origin. In Punta Arenas there are some

Two Tables That Will Prove

In coking coal, it is frequently advantageous to know what will be the ash and sulphur content of the coke produced from a coal of given analysis. In the accompanying tables, Table I shows the per cent. of ash in coke made from coals of various percentage of volatile matter and ash; the number of pounds of coal required to make one ton of coke (Column 1); the per cent. of ash increase from coal to coke (Column 22); and the rules for and calculations relating to the compilation of the

TABLE I. THE PERCENTAGES OF ASH IN COKE MADE FROM COALS OF VARIOUS PERCENTAGES OF ASH AND VOLATILE MATTER

Line	Pounds of Coal Required to Make 2000 Pounds of Coke	Per Cent. of Volatile Matter in the Coal	Per Cent. of Ash in the Coke																	Factor	Per Cent. of Ash Increase from Coal to Coke
Column	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	2,400	17.00	3.00	3.60	4.20	4.80	5.40	6.00	6.60	7.20	7.80	8.40	9.00	9.60	10.20	10.80	11.40	12.00	12.60	13.20	1.20	20.00
2	2,427	18.00	3.05	3.66	4.27	4.88	5.49	6.10	6.71	7.32	7.93	8.54	9.15	9.76	10.37	10.98	11.59	12.20	12.81	13.42	1.22	22.00
3	2,469	19.00	3.08	3.69	4.31	4.92	5.54	6.15	6.77	7.38	8.00	8.61	9.23	9.84	10.46	11.07	11.69	12.30	12.92	13.53	1.23	23.00
4	2,500	20.00	3.13	3.75	4.38	5.00	5.63	6.25	6.88	7.50	8.13	8.75	9.38	10.00	10.63	11.25	11.88	12.50	13.13	13.75	1.25	25.00
5	2,532	21.00	3.15	3.78	4.41	5.04	5.67	6.30	6.93	7.56	8.19	8.82	9.45	10.08	10.71	11.34	11.97	12.60	13.23	13.86	1.26	26.00
6	2,564	22.00	3.20	3.84	4.48	5.12	5.76	6.40	7.04	7.68	8.32	8.96	9.60	10.24	10.88	11.52	12.16	12.80	13.44	14.08	1.28	28.00
7	2,597	23.00	3.25	3.90	4.55	5.20	5.85	6.50	7.15	7.80	8.45	9.10	9.75	10.40	11.05	11.70	12.35	13.00	13.65	14.30	1.30	30.00
8	2,631	24.00	3.28	3.93	4.59	5.24	5.90	6.55	7.21	7.86	8.52	9.17	9.83	10.48	11.14	11.79	12.45	13.10	13.76	14.41	1.31	31.00
9	2,667	25.00	3.33	3.99	4.66	5.32	5.99	6.65	7.32	7.98	8.65	9.31	9.98	10.64	11.31	11.97	12.64	13.30	13.97	14.63	1.33	33.00
10	2,703	26.00	3.38	4.05	4.73	5.40	6.08	6.75	7.43	8.10	8.78	9.45	10.13	10.80	11.48	12.15	12.83	13.50	14.18	14.85	1.35	35.00
11	2,740	27.00	3.43	4.11	4.80	5.48	6.17	6.85	7.54	8.22	8.91	9.59	10.28	10.96	11.65	12.33	13.02	13.70	14.39	15.07	1.37	37.00
12	2,778	28.00	3.48	4.17	4.87	5.56	6.26	6.95	7.65	8.34	9.04	9.73	10.43	11.12	11.82	12.51	13.21	13.90	14.60	15.29	1.39	39.00
13	2,817	29.00	3.53	4.23	4.94	5.64	6.35	7.05	7.76	8.46	9.17	9.87	10.58	11.28	11.99	12.69	13.40	14.10	14.81	15.51	1.41	41.00
14	2,857	30.00	3.58	4.29	5.01	5.72	6.44	7.15	7.87	8.58	9.30	10.01	10.73	11.44	12.16	12.87	13.59	14.30	15.02	15.73	1.43	43.00
15	2,898	31.00	3.63	4.35	5.08	5.80	6.53	7.25	7.98	8.70	9.43	10.15	10.88	11.60	12.33	13.05	13.78	14.50	15.23	15.95	1.45	45.00
16	2,941	32.00	3.68	4.41	5.15	5.88	6.62	7.35	8.09	8.82	9.56	10.29	11.03	11.76	12.50	13.23	13.97	14.70	15.44	16.17	1.47	47.00
17	2,985	33.00	3.73	4.47	5.22	5.96	6.71	7.45	8.20	8.94	9.69	10.43	11.18	11.92	12.67	13.41	14.16	14.90	15.65	16.39	1.49	49.00
18	3,030	34.00	3.78	4.53	5.29	6.04	6.80	7.55	8.31	9.06	9.82	10.57	11.33	12.08	12.84	13.59	14.35	15.10	15.86	16.61	1.51	51.00
19	3,077	35.00	3.85	4.62	5.39	6.16	6.93	7.70	8.47	9.24	10.01	10.78	11.55	12.32	13.09	13.86	14.63	15.40	16.17	16.94	1.54	54.00
20	3,125	36.00	3.90	4.68	5.46	6.24	7.02	7.80	8.58	9.36	10.14	10.92	11.70	12.48	13.26	14.04	14.82	15.60	16.38	17.16	1.56	56.00
21	3,175	37.00	3.98	4.77	5.57	6.36	7.16	7.95	8.75	9.54	10.34	11.13	11.93	12.72	13.52	14.31	15.11	15.90	16.70	17.49	1.59	59.00
22	3,225	38.00	4.03	4.83	5.64	6.44	7.25	8.05	8.86	9.66	10.47	11.27	12.08	12.88	13.69	14.49	15.30	16.10	16.91	17.71	1.61	61.00
23	3,279	39.00	4.10	4.92	5.74	6.56	7.38	8.20	9.02	9.84	10.66	11.48	12.30	13.12	13.94	14.76	15.58	16.40	17.22	18.04	1.64	64.00
24	3,333	40.00	4.18	5.01	5.85	6.68	7.52	8.35	9.19	10.02	10.86	11.69	12.53	13.36	14.20	15.03	15.87	16.70	17.54	18.37	1.67	67.00
Per Cent. of Ash in the Coal Charged:			2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	10.50	11.00		

To find the percentage of ash remaining in the coke made from any given percentage of volatile matter and ash in the coal charged, follow the line corresponding to the given volatile matter to its intersection with the column corresponding to the given ash in the coal charged.

For example: Coal charged contains 30 per cent. volatile matter and 6.50 per cent. ash. At the intersection of line 14 with column 11 it shows 9.30 per cent. as the ash remaining in the coke.

Rule: To find the percentage of ash in coke from any given volatile matter and ash in coal, multiply ash in coal by factor in column 21 corresponding to the given volatile matter. For example: Coal 30 per cent. volatile matter, line 14, and 6.50 per cent. ash, column 11. Factor 1.43, line 14, column 21.

6.50 ash × 1.43 factor = 9.30 per cent. ash in the coke (nearly).

Rule: To find per cent. of increase from coal to coke, subtract 1 from factor. Example: Line 14, volatile matter, 30 per cent., factor 1.43, column 21.

1.43 — 1 = 43 per cent. ash increase.

Rule: To find per cent. of ash in coal from any given ash in coke and volatile matter in coal, divide ash in coke by factor.

Example: Line 14, column 17, ash in coke 9.30 per cent., line 14, column 21, factor 1.43: $\frac{9.30}{1.43}$ = 6.50 per cent. ash in coal.

Calculation to determine factor:

	Per Cent.	
Volatile matter.....	30.00	
Ash.....	6.50	Coke 70 per cent.
Fixed carbon.....	63.50	
	100.00	

100 parts coal contain 6.50 per cent. ash
70 parts coke contain 6.50 per cent. ash
100 parts coke contain $\frac{6.50 \times 100}{70}$ = 9.30 per cent. (nearly) ash in coke

Ash in coke = $\frac{9.30 \text{ per cent.}}{\text{Ash in coal} = 6.50 \text{ per cent.}}$ = 1.43 (nearly) factor.

older workings, which supply fuel to the steamers, and in the province of Valdivia there are some new mining developments at Millahuillin. The coal production up to, and including 1914, amounted to a total of 32 million tons.

This development has not been contributed to by the state, in the provision of a single railway, port works, or efficient geological survey of the carboniferous regions, to give the necessary impetus to the local industry. The high price of coal is in a great measure due to this neglect on the part of the government to encourage the national industries and the general prosperity. Now there is a persistent outcry against the "impoverishing of the country" by spending 30 to 35 millions of gold pesos annually on imported coal, and interested parties are clamoring for the imposition of import duties on foreign coals.

This is only aggravating the evil, by swelling the dividends of a few fortunate shareholders at the expense of the suffering public and increasing the price of an indispensable article, which is rapidly attaining to the rank of a luxury. What is absolutely necessary is good harbors, sufficient feeder railways running to the coast, and adequate rolling stock.

The Chilean coals all belong to the lignites of the tertiary period. The territory exploited up to date, which forms the productive zone of the carboniferous system of the provinces of Concepcion and Arauco, measures some 980 sq.km. This is comprised in a belt 90 km. in length by 10 to 11 km. wide.

The principal mining centers are the Bay of Arauco, where the workings of the Lota and Coronel companies are situated, and the eastern zone of the province of Arauco, at the foot of the Nahuelbuta cordillera. The workings of Lota and Coronel extend under the sea

Valuable in Coking Practice

table. Table II shows the volatilization of various percentages of sulphur during the coking process in coals of different volatile contents, the number of pounds of coal required to make one ton of coke and the rules and calculations relating to the compilation of the table. These tables are practically self-explanatory and require no further comment. They will be found useful not only to those who are already interested in coking but also to those contemplating going into the manufacture of coke.

TABLE II. THE VOLATILIZATION OF VARIOUS PERCENTAGES OF SULPHUR IN COALS OF DIFFERENT VOLATILE MATTER CONTENTS, DURING THE COKING PROCESS BASED ON VOLATILIZING 40 PER CENT. OF THE SULPHUR IN THE COAL

Line	Pounds of Coal Required to Make 2000 Pounds of Coke	Per Cent. of Volatile Matter in the Coal	Per Cent. of Sulphur Remaining in the Coke																		Factor	Per Cent. of Sulphur Decrease from Coal to Coke
Column	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	2,400	17.00	0.576	0.612	0.648	0.684	0.720	0.756	0.792	0.828	0.864	0.900	0.936	0.972	1.008	1.044	1.080	1.116	1.152	1.188	0.720	28.00
2	2,427	18.00	0.586	0.622	0.659	0.695	0.732	0.769	0.805	0.842	0.878	0.915	0.952	0.988	1.025	1.061	1.098	1.135	1.171	1.208	0.732	26.80
3	2,469	19.00	0.590	0.627	0.664	0.701	0.738	0.775	0.812	0.849	0.886	0.923	0.959	0.996	1.033	1.070	1.107	1.144	1.181	1.218	0.738	26.20
4	2,500	20.00	0.600	0.638	0.675	0.713	0.750	0.778	0.825	0.863	0.900	0.938	0.975	1.013	1.050	1.088	1.125	1.163	1.200	1.238	0.750	25.00
5	2,532	21.00	0.605	0.643	0.680	0.718	0.756	0.794	0.832	0.869	0.907	0.945	0.983	1.021	1.058	1.096	1.134	1.172	1.210	1.247	0.756	24.40
6	2,564	22.00	0.614	0.653	0.691	0.730	0.768	0.806	0.845	0.883	0.922	0.960	0.998	1.037	1.075	1.114	1.152	1.190	1.229	1.267	0.768	23.20
7	2,597	23.00	0.624	0.663	0.702	0.741	0.780	0.819	0.858	0.897	0.936	0.975	1.014	1.053	1.092	1.131	1.170	1.209	1.248	1.287	0.780	22.00
8	2,631	24.00	0.629	0.668	0.707	0.747	0.786	0.825	0.865	0.904	0.943	0.983	1.022	1.061	1.100	1.140	1.179	1.218	1.258	1.297	0.786	21.40
9	2,667	25.00	0.638	0.678	0.718	0.758	0.798	0.838	0.878	0.918	0.958	0.998	1.037	1.077	1.117	1.157	1.197	1.237	1.277	1.317	0.798	20.20
10	2,703	26.00	0.648	0.689	0.729	0.770	0.810	0.851	0.891	0.932	0.972	1.013	1.053	1.094	1.134	1.175	1.215	1.256	1.296	1.337	0.810	19.00
11	2,740	27.00	0.658	0.699	0.740	0.781	0.822	0.863	0.904	0.945	0.986	1.028	1.069	1.110	1.151	1.192	1.233	1.274	1.315	1.356	0.822	17.80
12	2,778	28.00	0.667	0.709	0.751	0.792	0.834	0.876	0.917	0.959	1.001	1.043	1.084	1.126	1.168	1.209	1.251	1.293	1.334	1.376	0.834	16.60
13	2,817	29.00	0.677	0.719	0.761	0.804	0.846	0.888	0.931	0.973	1.015	1.058	1.100	1.142	1.184	1.227	1.270	1.311	1.354	1.396	0.846	15.40
14	2,857	30.00	0.686	0.729	0.772	0.815	0.858	0.901	0.944	0.987	1.030	1.073	1.115	1.158	1.201	1.244	1.287	1.330	1.373	1.416	0.858	14.20
15	2,898	31.00	0.696	0.740	0.783	0.827	0.870	0.914	0.957	1.001	1.044	1.088	1.131	1.175	1.218	1.262	1.305	1.349	1.392	1.436	0.870	13.00
16	2,941	32.00	0.706	0.750	0.794	0.838	0.882	0.926	0.970	1.014	1.058	1.103	1.147	1.191	1.235	1.279	1.323	1.367	1.411	1.455	0.882	11.80
17	2,985	33.00	0.715	0.760	0.805	0.849	0.894	0.939	0.983	1.028	1.073	1.118	1.162	1.207	1.252	1.296	1.341	1.386	1.430	1.475	0.894	10.60
18	3,030	34.00	0.725	0.770	0.815	0.861	0.906	0.951	0.997	1.042	1.087	1.133	1.178	1.223	1.268	1.314	1.359	1.404	1.450	1.495	0.906	9.40
19	3,077	35.00	0.739	0.785	0.832	0.878	0.924	0.970	1.016	1.063	1.109	1.155	1.201	1.245	1.293	1.340	1.386	1.432	1.478	1.525	0.924	7.60
20	3,125	36.00	0.749	0.796	0.842	0.889	0.936	0.983	1.030	1.076	1.123	1.170	1.217	1.264	1.310	1.357	1.404	1.451	1.498	1.544	0.936	6.40
21	3,175	37.00	0.763	0.811	0.859	0.906	0.954	1.002	1.049	1.097	1.145	1.193	1.240	1.288	1.336	1.383	1.431	1.479	1.526	1.574	0.954	4.60
22	3,225	38.00	0.773	0.821	0.869	0.918	0.966	1.014	1.063	1.111	1.159	1.208	1.256	1.304	1.352	1.401	1.449	1.497	1.546	1.594	0.966	3.40
23	3,279	39.00	0.787	0.836	0.886	0.935	0.984	1.033	1.082	1.132	1.181	1.230	1.279	1.328	1.378	1.427	1.476	1.525	1.574	1.624	0.984	1.60
24	3,333	40.00	0.802	0.852	0.902	0.952	1.002	1.052	1.102	1.152	1.202	1.253	1.303	1.353	1.403	1.453	1.503	1.553	1.603	1.653	1.002	0.00
Per Cent. of Sulphur in the Coal Charged:			0.80	0.85	0.90	0.95	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65		

To find the percentage of sulphur remaining in the coke made from any given percentage of volatile matter and sulphur in the coal charged, follow the line corresponding to the given volatile matter to its intersection with the column corresponding to the given sulphur in the coal charged. For example, coal charged contains 30 per cent. volatile matter and 1.20 per cent. sulphur. At the intersection of line 14 with column 11 it shows 1.030 per cent., the sulphur remaining in the coke.

Rule: To find the percentage of sulphur in coke from any given volatile matter and sulphur in coal, multiply sulphur in coal by factor in column 21 corresponding to the given volatile matter. For example: Coal 30 per cent. volatile matter, line 14, and 1.20 per cent. sulphur, column 11, factor 0.858, line 14, column 21.

1.20 sulphur × 0.858 factor = 1.03 per cent. in the coke (nearly).

Rule: To find per cent. of sulphur decrease from coal to coke, subtract factor from 100. Example: Line 14, volatile matter, 30 per cent. Factor = 0.858.

100 — 0.858 = 14.20 per cent. sulphur decrease.

Calculation to acquire factor:

100 parts of coal contain:

	Per Cent.	
Volatile matter,	30.00	
Ash,	9.30	= coke 70 per cent.
Fixed carbon,	60.70	
	100.00	To make 2000 lb. of coke.

2000 ÷ 70 per cent. = 2857 lb. of coal required.

1.20 per cent. sulphur in the coal

34.284 total pounds of sulphur in the coal

40 per cent. of the sulphur volatilizing

13.7136 lb. of sulphur volatilizing

Lb. Lb.

34.284 — 13.7136 = 20.5704 lb.

$\frac{20.5704 \text{ lb.}}{2000 \text{ lb.}}$ = remaining in the coke, or 1.03 per cent. (nearly)

Formula for per cent. of volatilization.

Let a = Pounds of sulphur in coal charged;
b = Pounds of sulphur remaining in the coke;
x = Per cent. of volatilization.

$$\frac{a - b}{a} = x$$

$$\frac{a\ 34.284 - b\ 13.7136}{a - 34.284} = 40 \text{ per cent.}$$

Sulphur in the coke = 1.03 per cent.

Sulphur in the coal = 1.20 per cent. = 0.858 factor.

1200 to 1400 m., and it will be difficult to work more than 3000 m. from the coast. Notwithstanding this limitation, there is a capacity of 40 million tons for future production.

In the eastern region of the province of Arauco, which seems to be the same system as that of Arauco Bay, the coal beds are inclosed in 540 ft. of soil of a carboniferous formation, which includes the district from Peumo and Colico to Cullinco, through Carampangue, Curanilhue and Pilpico. This is where the mines of the Arauco Mining Co., Ltd., and the Ruos de Curanilahue Co. are situated. These are the best and most productive developments. The work is carried on under decidedly different conditions from those existing in the submarine workings on the coast. The entire output is transported by the Arauco Co.'s railway.

First Company Organized with British Capital

The Arauco Railway and Mining Co. was the first company organized for the exploitation of the coal beds in this region, and the construction of a railway running through the carboniferous region north to Concepcion. This was done with British capital, the Chilean government giving a guarantee for interest on the amount invested. It was only necessary to fall back on the guarantee during the first few years. After this the undertaking has been self-supporting, and it is understood that the guarantee money has been refunded.

South of these mines lies the new center of Pilpico, with the most magnificent deposits of the whole region. This is followed by a carboniferous district, 18 km. in length, as far as Cullinco, as yet unexplored, and which will produce the largest supplies of the future. The new railway from Curanilahue to Los Alamos will open up this region and connect the entire district to the coast, at the port of Lebu.

The river, in its journey to the sea, passes the oldest colliery district in the province of Arauco—the Errazuriz Establishment (which is now owned by the Curanilahue Co.), the Victoria and the Millaneca companies. The development of the Lebu mines has been sorely hampered, owing to the difficulties of the port, or rather to the lack of a proper port, as the formidable sand bar keeps everything over 200 tons outside in the open roadstead. The new railway from Los Sauces to Lebu via Canette will bring to the port of Lebu the coals of Curanilahue (which at present go by rail to Talcahuano), those of the new region between Curanilahue and Los Alamos, as well as those of the Lebu mines. It will therefore create a coal shipping center.

The Southern Railway Construction Co., which has been unable to complete the railway owing to the lack of sufficient capital and certain unforeseen difficulties, will no doubt eventually be bought out by the Chilean government and the work concluded, together with the necessary harbor works at Lebu. This railway will eventually be the main artery from Argentina to the Pacific, through the pass of Longuimay.

North of the Bay of Arauco there are found small coal deposits at Penco, in the Bays of Coliumo and Talcahuano, where the mines of Cerro Verde, El Rosal and Lirquen, about 2 miles from Penco, are being exploited. The coal from these mines is different in character from the others, being of a soft nature, and producing a coke that crumbles easily.

There are other lignite mines in the extreme south of Patagonia, within easy distance of the Port of Punta Arenas. The bed which is at present being exploited is 6 ft. thick and of an inferior quality. A local railway brings the coal to port.

According to data and statistics published in 1910, and the analysis published in the "Boletin de Geografiay Minas" in 1913, in the mines of Cerro Verdo, Lirquen and Rosal, in the region of Talcahuano, the heat content varies between 5764 and 6351 calories. The coals of Valdivia in the Region of Millahuillan belong to the same class. In the tests made by the State Railway Department these coals prove to be 25 per cent. inferior to the coals of Lota, Coronel and Arauco.

In the regions of Lota, Coronel, Collico, Curanilahue, Pilpico, Los Alamos, Cullinco, Lebu and Loreto, in Magallenes, the heat content varies between 7404 and 5156 calories. All these coals produce a compact coke, but which, owing to its chemical composition, is unsuitable for smelting purposes.

Owing to the war, the gas companies, which were previously dependent upon Australian coal, have been thrown back on Chilean material. The Santiago Gas Co. is modernizing its plant under the direction of a technical expert, who states that from experiments made on an extensive scale the Coronal coal gives the best results—results which compare favorably with those of the best Australian coal in quality and quantity of gas. The inferiority of Chilean coke rests principally in its friability, as its other properties compare favorably with the gas-cokes obtained from foreign coals.

The gross production in 1914 was 1,086,946 tons, the net amount sold being 944,829 tons. In 1915, which was also slightly below the average of the previous five years, the total production was 1,171,564 tons, or 1,050,874 tons sold. In 1914 and a part of 1915, with the nitrate and shipping trades practically at a standstill, the mines were obliged to reduce their output, but when trade was again opened, the collieries entered upon a period of unprecedented activity.

In analyzing the comparative outputs of the manual labor, one is struck with the low average production per operative employed in the Chilean mines, compared with that of other countries, especially Great Britain and the United States. This is due to a variety of causes, such as the difference in the thickness of the beds, the notably capricious nature of the deposits, and the conservatism of the owners, who prefer to drag along with manual labor, instead of introducing labor-saving machinery.

The comparative annual production per operative employed is given as follows: The United States, soft coal, 550 tons, anthracite, 380 tons; Great Britain, 280, Germany, 250; France, 200; Chile, 153; Belgium, 150.

The calorific value of coal is obtained by burning it in a calorimeter. At the same time the temperature of the burning coal can be determined by means of an electric thermometer. A fine high resistance wire is inserted in the combustion chamber of the calorimeter; the resistance of this wire is determined at the beginning of the test and during combustion. There is a definite relation between temperature and resistance and by this method the greatest temperature possible from a given coal can be determined.

Who's Who In Coal Mining

William Leckie

When we conjure up the vision of Colonel William Leckie, as we have seen and known him, he "comes up smiling." Cheerfulness, they say, is a religion with the Colonel, for he has read and mastered the Gospel of the Grin. Have it your own way. All we know is that the Colonel has a heart as warm as his smile is genial, that the bewitching curve of his facial muscles is an outward and visible sign of his inward and invisible heart's warmth—a warmth as genial as that generated by the product of his coal mines.

Colonel Leckie's good will is exhibited not only to his friends and to strangers, but to the hundreds who are in his employ. He not only feels kindly toward them, but serves them faithfully as their employer, providing



COLONEL WILLIAM LECKIE

liberally for their comfort and welfare. Probably this is because this successful Scot has been "through the mill," for he has not always been a coal operator.

Time was when he worked in the mines himself, not only in this but in the old country, and hard work it was, for his parents needed his labors, seeing that he was the oldest of 14 children. His parents were Samuel and Kate McClelland Leckie. He was born on the Smith farm, in Ayrshire, Scotland, near the birthplace of Scotland's poet, Robert Burns. It was not a very cheerful prospect when, as a lad, he went to the mines. Can it be that his life-long smile was incubated then amid those none too favorable surroundings? We can only wonder. The Colonel is not a man to dilate on his troubles or his hardships other than genially. Later he helped on the farm, and until he was of age part of his working time was spent on the surface and part in the mines—an amphibious existence not uncommon among the mining population.

When he was of age he came to the United States, settling in Shenandoah, Schuylkill County, Pennsylvania, whither his father followed him six months later.

William Leckie's first work in the mines in Pennsylvania was as repairman. Inspired by an ambition to equip himself for greater usefulness in life, young Leckie at the age of twenty-three entered Dickinson Seminary, at Williamsport, remaining there for two years and a half, seizing every opportunity to improve himself mentally and yet at the same time participating in all the activities of the institution where he was a student. He had as a very young man in Scotland been regarded as one of that country's best athletes. He demonstrated the same prowess as a student at Dickinson, and it goes without saying that he was a general favorite among the student body.

Soon after leaving college William Leckie was united in marriage to Miss Annie M. Kalb, daughter of the Rev. F. H. Kalb, a Presbyterian minister of Shenandoah, and to that happy union six children were born—Jean E., Nellie K., Andrew F., William S., Douglas E. and Miriam G. Leckie.

Possessed of an excellent education, William Leckie became successively fireboss for the Philadelphia & Reading Coal and Iron Co., inside foreman for the Buck Mountain Coal Co., near Delano, Penn., district superintendent of the Lehigh & Wilkes-Barre Coal Co., and finally general superintendent of the Lehigh Valley Coal Co.'s York Farm and Blackwood collieries, a position fraught with much responsibility.

His ability as a mining executive being widely recognized, William Leckie in 1894 was appointed general superintendent of the Aronfield Coal and Coke Co., near South Fork, Penn., and two years later he became general manager of the Loyal Hanna Coal and Coke Company.

Coming to West Virginia in 1901 as general superintendent of the Pocahontas Collieries Co., which opened up the famous Pocahontas coal fields, Colonel Leckie had a direct and responsible part in developing the properties of the Pocahontas mines, which eventually were acquired by the Pocahontas Consolidated Collieries Co. For six years William Leckie remained with this company. A man of sound judgment, William Leckie was also a man with a vision, though far from visionary, and he foresaw the great mineral possibilities of southern West Virginia. As a result he finally, in 1907, started in business for himself. Just how successful he has been is best attested to by the fact that he is now president and general manager of the following companies: West Virginia Pocahontas Coal Co., Lathrop and Panther Coal companies, Leckie Collieries Co., Leckie Fire Creek Coal Co. and the Douglas Coal Co. The general offices of all of the Leckie companies are at Welch, W. Va., where Colonel Leckie resides. In addition to his numerous coal holdings, Mr. Leckie is president of the Pond Creek Coal and Land Co. and of the First National Bank of Anawalt, as well as a director or stockholder in other business concerns.

Colonel Leckie's kindness to his employees is proverbial. Reference has already been made in *Coal Age* to his thoughtfulness of the mental, physical and spiritual welfare of those who are connected with his plants, but too much stress cannot be laid on the fact that he has sought to make the surroundings of the miners such that they would be happy and contented.

Though a native of Scotland, William Leckie esteems it a privilege to have become an American citizen, marrying an American wife and bringing up an American family who cherish American ideals.



Senate Investigating Committee Gathers Testimony on Hard Coal Situation

William Wilhelm, an attorney of Pottsville, Penn., in his testimony before the Senate Committee on Manufactures, which is continuing its investigation of the coal situation, ascribed the following reasons for the shortage of anthracite coal:

1. Refusal of operators to lease or to ship culm banks.
2. Refusal to allow the equipping of collieries to mine some of the very best deposits of coal—those which can be easily won.
3. Failure to join in the campaign for a larger production of coal.
4. Penalizing the brains of the willing workers.
5. Intemperance growing out of the fact that the breweries control the political situation in the anthracite fields.
6. Poor housing conditions.
7. Corporate landlords not opening mines themselves.
8. Excessive royalties.
9. Excessive tolls.

He cited the Girard estate as the best example of the payment of excessive royalties. He stated that the estate is getting as high as $1.40 a ton on prepared sizes of Locust Mountain coal. He says the trustees of the estate are taking the wealth of Schuylkill County and planting it in Philadelphia at the rate of millions a year. This led Senator Vardaman to state that "with the authority vested in the Federal officials, there is no reason why they should not have forced a change."

Mr. Wilhelm was particularly severe in his criticism of the breweries, on whom he fastened much of the blame for shortage in anthracite production. He declared that, in normal times, most of the stockholders in the big anthracite-producing companies live out of the country and that the business is run so as to squeeze out every possible dollar of profit. Coal is held in the ground, he declared, to keep it off the market. On being questioned, however, he afterward was forced to admit that there was no shortage of anthracite, except during strikes, until November, 1917.

William Griffith, of West Pittston, Penn., a mining engineer and geologist, told the committee that anthracite has reached the peak of production. He expressed the opinion that the Fuel Administration should have arranged a secondary grade of anthracite coal which could have been sold at a lower price. He said the clean coal regulation was wrong to the extent that it forced the grinding down of small sizes so they would come within the regulations in regard to impurities. In order to supply the demand during the war, he asserted that posterity has been robbed by gouging the mines of the more easily mined coal. He took issue with statements to the effect that schools were poor and living conditions bad in the anthracite region. He declared it was one of the most prosperous sections in the entire United States. He explained in detail why anthracite operators could not extend their mining activities indefinitely.

Jonathan Day, the commissioner of public markets in New York City, was outspoken in his condemnation of the Fuel Administration and the fuel administrator of New York. He declared the municipal authorities had plans perfected to give the poor people cheaper coal. The refusal of Federal authorities to allow the carrying out of the plan has made it necessary for the poor of New York to pay $3,000,000 more for their coal this winter.

The committee was surprised when Delos W. Cooke, the fuel administrator for New York, followed on the stand and displayed the entire correspondence between himself and the mayor of New York, showing that they were in entire accord. Mr. Cooke declared there would be no anthracite shortage in New York this winter, and despite Mr. Day's assertion to the contrary, declared there would be plenty of peddler's coal for the poor. He declared that the great majority of the poor would not traverse the long distances between the projected coal piles to save five or ten cents a bucket on coal. He went into detail as to the steps which have been taken to prevent a recurrence of the shortage of last winter. Principal among these was the appointment of an official to have entire charge of ice-breaking operations. Despite the heavy recent movements to the lakes and to New England, he declared that the deliveries are only 350,000 tons behind on New York's quota.

Gary N. Gray, of Scranton, Penn., the general manager of the Wolf Creek Coal Co., who has been forty-three years in coal-mining activities, was another witness. For the last twenty years he has been washing culm. Despite vigorous questioning, members of the committee were unable to show by his testimony that the big operators were at fault in not having worked their culm banks. Many washeries, he asserted, are closing because they cannot afford to pay the increase in wages. The demand for culm is also slack, he believes, from the fact that he has a number of cars under demurrage.

F. C. Reese, auditor for the Pennsylvania highways department, stated that the labor shortage in the anthracite region was due more to poor living conditions than to the draft or for any other reason.

W. S. Tompkins wired the committee from Wilkes-Barre, asking it to ascertain if the gas being allowed to escape from anthracite mines cannot be conserved. The committee was advised that the best heat units are lost in this manner, but no one vouched the opinion that it is practicable to save this gas.

Holiday Affects Coal Production

The Thanksgiving holiday cut heavily into both bituminous and anthracite production. With the ending of the war the men do not feel the same responsibility, and the cases were many where absence from work extended from Wednesday noon until Monday morning, according to advices reaching Washington. Despite the series of circumstances which have interfered with anthracite production the feeling in Washington is that requirements for that fuel are going to be so nearly met that no hardship will result.

Planning for a Large Export of Coal

Out of the changes resulting from the war will come a new policy respecting the exportation of coal, officials here believe. It is regarded as probable that the Government will establish foreign coaling stations. Much, too, will depend on the policy along which the merchant marine is conducted. Heretofore there has been no empty tonnage leaving our shores but, it is expected, conditions will have changed a year from this time. The reduction in the amount of exports to Europe and the completion of a large number of new ships will make available bottoms for coal exports.

If the United States should become a heavy exporter of coal, important changes would be brought about in the use of coal by domestic industries in certain sections. The only coal which could be exported with profit would be the high-grade product. This would necessitate the universal use of low-grade coal by domestic industries, Government specialists believe.

Bush Resigns as Head of Priorities Division of Fuel Administration

D. D. Bush, of the Peabody Coal Co., of Chicago, who has been devoting his time to Government work since the war, has resigned as head of the Priorities Bureau of the Fuel Administration. Mr. Bush will return to the service of the Peabody Coal Co. On first coming to Washington, Mr. Bush served the committee on coal production of the Council of National Defense. Then he went with the Fuel Administration until drafted by the Bureau of Mines to assist in the administering of the explosives act. Some months ago he returned to the Fuel Administration to assist in priority matters.

The Priorities Bureau is to be continued for the present under the direction of H. E. Brennick. Coal operators are having considerable trouble in getting delivery on important supplies, and it is believed that the Fuel Administration can render further assistance in transportation matters.

German coal and coke allowed for exportation to Sweden during the month of September amounted to 133,100 tons, or 17,000 tons less than the month previous.

May Abolish Soft Coal Prices

Price and zone restrictions on bituminous coal probably will be abolished on Dec. 15, Dr. Garfield has announced. The work of the administration, except that pertaining to anthracite, will have been so nearly completed by Jan. 1 that only a nucleus of each bureau will be maintained. The statistical bureau of the Fuel Administration is to be taken over by the Geological Survey. The engineering bureau, the power bureau and the conservation bureau will be taken over by the Bureau of Mines.

French Coal Mines in Bad Shape

Eight months must elapse before any production of coal may be expected from the mines at Lens, France. It will require three years to restore them to normal operation. This is the opinion of the Fuel Administration's commission, which now is in Europe. The Commission has conferred in Paris with the French authorities in the hope that it could make some helpful suggestion.

Clay Products Industries Save Much Coal

At least 1,500,000 tons of coal was made available for other purposes during the first half of the current year by the restrictions placed upon the clay product industries. Had the restrictions remained in effect throughout the year, the saving would have been at a higher rate, as many plants chose to burn their entire allotment of fuel and then close down entirely.

Brief Washington Notes

All restrictions on the use of fuel by florists and by the manufacturers of window glass, clay products and cement have been removed. The restrictions on fuel for breweries will be continued.

A coal handling plant capable of handling 500 tons per hour is to be erected on the waterfront at New Orleans. A storage bin will be provided with a capacity of 25,000 tons. The plan has been laid before the Fuel Administrator.

All restrictions on the movement of coke to and from New England have been removed. To save cross-hauling and traffic that could be dispensed with, the Fuel Administration last May placed an embargo on shipments through New England gateways.

Adjustment of zones west of Pittsburgh is under consideration. Unexpected slackening of demand is adding materially to the surplus coal in those zones. It is believed, however, that considerable relief can be afforded by certain shifts of the zone lines.

No leniency with regard to the clean coal order may be expected because peace is in sight, the Fuel Administration announces. It is continuing to close down mines that do not properly prepare their coal. More than 100 mines have been ordered closed for that reason.

Storage of coal at Pittsburgh was allowed to begin immediately following the completion of deliveries for Lake shipments. In order to insure the supplies needed in the Northwest, it was necessary to limit all domestic and industrial storage in the Pittsburgh district to actual necessity.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

Perhaps the best labor news is the account of the labor unrest in Silesia, a part of German Poland. It is certain, of course, that German coal will never invade United States markets, but if wages were to remain low in Germany and at the same time coal were cheap, there would be a possibility of an underselling of our market by goods made in Germany; or, if not in Germany, in other countries with German coal or in other countries with the coal of those countries, cheaply mined by reason of the fact that, modeled on Germany, the wage scale in those countries continued to be low. These considerations made increased wages in Germany desirable, and also shorter hours. At last that desirable consummation seems to have been reached.

The Silesian mine workers are quite largely Poles and Russians. Formerly there was a large admixture of Entente prisoners. The prisoners are leaving, as might be expected. The Poles, not daring to revolt, are not unwilling to strike—anything to make trouble for the government. And with the Russians the magic word "Svoboda," which is supposed to mean "freedom," but in effect usually means "idleness," has done its fateful work. Wages in Silesia seem to have risen like those in Russia and are vainly striving to overtake the cost of living.

The miners were getting recently 25 marks ($5.95) per day of nine hours. They demanded the same pay for only a six-hour day. When the owners acceded to that the workers then demanded 30 marks ($7.14) for six hours. The Polish workers are believed to seek a continuance of the trouble so that they can seize the mines and declare them the property of the unions. The strike, therefore, is partly genuine labor trouble, partly socialism and partly politics. But whatever it may be, it promises good to the workers of the United States. The wage inequality is now on its way to readjustment, in fact is already readjusted. When all is done, it is likely that the walls of autocracy having fallen, the wage waters will tend to a level regardless of national lines.

* * *

We now approach the new election of officers of the United Mine Workers of America. It would seem that John P. White, like a soldier laddie, should be allowed to return to his former office now that the forces of the Fuel Administration are being demobilized and now that John P. White has sent in his resignation to the fuel board. The election will be held on Dec. 10.

Frank J. Hayes is a candidate for reëlection, having received the vote of 739 locals. John H. Walker, of Danville, Ill., a man of more radical tendencies, was nominated by 225 locals. John Lewis, who has been vice-president and desires to succeed himself, has been nominated by 880 locals. Opposed to him is Tom Kennedy, of Hazelton, president of district No. 7. He has only 23 locals behind his nomination.

Owing to the fact that there is a majority of bituminous mine workers in the union, the offices now always go to bituminous men. There are no party lines about this matter and no really clannish feeling, but the bituminous miners like to have bituminous labor leaders to settle their difficulties, and the anthracite men would like to have anthracite leaders. The bituminous mine workers always gain the day, owing to their greater numbers.

William Green, the secretary of the United Mine Workers, also seeks reëlection. He is opposed by J. L. Sims, of Linton, Ind. The greater number of nominations received by the present incumbent of the office appears to foreshadow his election.

The operators of the anthracite region are trying their utmost to meet the difficulties of the hard-coal situation. The promise that anthracite miners will be speedily demobilized offers some relief, if only there are not too extensive celebrations on their homecoming. Those in France may be some time coming home, and perhaps those who have not seen active service will be allowed to take their places in the ranks without any great consumption of time for a well-merited jubilation. However, it will almost pass belief if Scranton, Wilkes-Barre and Pottsville are not the centers of some few days of festival making "when the boys come home."

* * *

With the termination of hostilities miners in West Virginia fields are not inclined to work quite as regularly as they did when special appeals were being made to them to furnish coal for war purposes. In some districts their leaders do not and have not encouraged increased production at any time.

Labor organizers are still active in the Fairmont region, although that field is pretty well organized by this time. One of the latest local unions formed was that at the No. 7 Jamison mine of the Jamison Coal Co. Two strikes of minor importance have occurred in the Fairmont region within the last ten days. One was at the mines of the Orr Coal Co., between Fairmont and Clarksburg, the miners walking out after a dispute with officials. About 60 men are employed by the company. The trouble was adjusted within 24 hours and the men returned to work. A strike of a similar kind at the Rock Island mine in Barbour County was adjusted without much loss of time after the miners had presented their demands. About 150 men are employed at this operation.

* * *

A miner, by the name of Nick Gurkovich, employed in the Zeigler mine, has what is claimed to be the state record for loading coal. This was 333 tons for a single pay period of two weeks' duration. This pay period was the last half of October. The average for the entire mine was 13.7 tons for each loader for every work day in that pay. This high tonnage is due to the fact that the "turn" has been abolished and the men get every car they can load.

* * *

The United Mine Workers of America against the Hartford, the Coronado, the Mammoth and Prairie Creek Coal companies, all operating in Arkansas, comes up in the United States Court of Appeals, Tuesday, Dec. 10. This is a case where the operating companies obtained a $600,000 judgment against the mine workers of Arkansas in the District Court at Fort Smith, Ark., for the alleged malicious destruction of mine property during a strike. It will be remembered that the strikers deliberately destroyed by fire and other means tipples and plants of the mining companies in Arkansas which were idle when the company refused to run the mine on a union basis.

* * *

A conference of miners of District 18, which includes the eastern Section of British Columbia and the Province of Alberta, will be held on Jan. 6. At this meeting problems relative to coal-mining operations within the limits of that section and the men's attitude toward the same will be exhaustively discussed.

Thomas Graham, superintendent of the Canadian Collieries (Dunsmuir) Ltd., states that influenza has severely handicapped him in maintaining the output of the several mining properties under his charge. He asserts that the number of men who have laid off work for periods of varying length during the past few weeks runs into the hundreds. It has been impossible, therefore, to keep production up to the maximum point during November.

EDITORIALS

An Accusation That Does Not Asperse

REBUKING our friends in the press is never a pleasant task, especially when the journal is so reputable and well conducted an organ as the New York *Evening Sun*. Yet something should be said as to the unfair comment it allowed its correspondent to make on J. B. Neale's testimony in Washington, and as to the heading it permitted a headline writer to put on the story. The headline runs, "Coal Barons Dictate Price; Admit They Kept Surplus Out of Market," and the news item runs as follows:

"Something of the methods used by the anthracite operators of the country to prevent surplus production of the product and thereby prevent decreases in prices was related to the Senate Sub-Committee on Manufactures today. J. B. Neale, Director of Anthracite Production for the Fuel Administration, and himself a millionaire anthracite producer, was on the stand. Answering questions of Senator Reed of Missouri, he contended that before the period of Government supervision anthracite operators were always able to meet the demands of the country.

"'But there never was a surplus of anthracite,' Senator Reed remarked. 'There never was a surplus put on the market,' Mr. Neale corrected. 'This was done in order to keep up the prices,' asserted Senator Reed. The witness did not deny this."

The implication is that when a surplus output exists the failure to sell coal at any price, high or low, which can be obtained evidences a criminal conspiracy against the public. But is this conclusion fair? Is it not a fact that most papers sell on the stands everywhere and always at two cents a copy—no more, no less? Is it not also a fact that the newspaper publishers aim to restrict the output so that there will not be a surplus? Could it not also be proved that owing to that imperfect balancing of supply and demand to which newspaper vending is always subjected there is often a surplus of copies of these papers? What is done with the papers thus in surplus? Are they sold to the public at any price they will bring? Not at all; the price is kept at two cents uncompromisingly, and if the papers are not sold the output is deliberately destroyed.

The larger anthracite operators do not follow the journalistic detractors of the coal industry in their ruthless destruction of such property as is unsalable at the determined price. What they cannot get a fair price for they store and sell as soon as they can. Some of the small operators sell below that fair price, for they desire to keep their men working and meet their overhead; and some perhaps can afford to sell a little under the market. Any newspaper could also afford to sell its overplus under its market rate of two cents. Some could uniformly sell for less. But none of them do so. No one has yet condemned them, and why should we? But let their correspondents be more truthfully considerate of the position of the operators, for their own is, if anything, less honorable. For this reason let them exercise a genial censorship over their pages. The right of a man to ask a fair price and to insist upon it should not be questioned. If the price is not fair, that is a horse of a different color, as the correspondent we have quoted at length should, and is, doubtless able to observe.

It is interesting to note how curiously the public holds to two contrary doctrines—that of the fair price and that of unrestricted competition. The people believe they are always entitled to the lower price, whichever that may be. If competition has for years beggared an industry—and history records the time when the anthracite industry was so beggared—nevertheless nothing higher than a "fair price" must ever be put on the coal. As soon as competition reasserts itself the price must be allowed to fall to the lowest of levels without any resort to storage. Either the fair price or the competitive price should be the price set on an article. Those who call for the lower of the two require that the industry shall go on half rations, or no rations much of the time, and content itself with merely a life-sustaining meal on those rare occasions when unbounded prosperity furnishes the opportunity.

Abjure the Word "Not"

A CARTOON entitled "Early at the Garden Gate Was Late Paying for Liberty Bonds," which appeared recently in the pages of this publication, was exhibited to a friend who at one time had been an advertising man. The story it told seemed perhaps a little involved, and a criticism of that feature was fully expected. But to him that fault did not appear so large as it did to others.

The cartoon seemed to him to be badly conceived because, as he expressed it, it was "negative." It showed someone doing what he ought not to do. Our critic would rather have had it exhibit the man doing something that he ought to do, that it might stimulate others to do likewise. The man in the office saying "Nothing doing," grated on our friend's advertising sense and training. "The reply you are seeking," he said, "is 'Yes' and not 'No,' so why show a man resisting your appeal? You oppose yourself by the very nature of your communication. You arouse the very impulses which you wish to combat. You say to the man whom you address that his ideas are repugnant to those you entertain, and you have him battling at once against your point of view. Get 'Yes' into the air he breathes. Make compliance the natural course, and the work is half done."

This man was only indirectly interested in the coal industry. It is to be hoped therefore that he had not read many of the editorials that have appeared in *Coal Age* and counted just how often the negative side was taken when the positive would have been more helpful

and uplifting. If we will, all of us—operators, managers or editors—can rip out the "nots" and by a little reconstruction of our sentences express the same ideas just as clearly and forcefully without them. Let us abjure that short and savage adverbial particle "not."

There is a positive way of doing most things. Let the negative way come as a little-used expedient, as something that surprises us and the world around us, and not as the regular order of life, as it is too often with all of us today.

Greater Efficiency or Lower Wages?

REALIZING that the United States is the home of the high wage and the short working day, and therefore is handicapped when it enters into competition with foreign countries, there never have been voices wanting in the country to plead for wage reductions and longer hours. Somehow we have kept going with bigger wages and a shorter day. The source of our success has been largely in the superior intelligence and progressiveness of higher-paid and less-fatigued labor.

In efficiency lies our national strength. We have always had it, and it is to be hoped we always will. It is partly due to the physical condition of our workers, the outcome of fair wages and good living conditions. It arises partly from the intellectual quality of our artisans, the result of our common school education and of the freedom of thought which we have encouraged. It comes also in part from the good will existing between the worker and the planner, between the enterprising followers and the still more enterprising leaders in industry.

It has its origin partly in the fact that our men are in a degree the natural selection from foreign countries, the most aggressive, most physically able, the most hardy that Europe has afforded. We have for years drained Europe of its energy. Was there a man who had force in his arm, original impulses in his brain and idealism in his soul, he tended to come where all these things would have wider play—in a new field where they were likely to be less confined. As the Westerner is larger in body, broader in mind and more widely visioned than the Easterner, so in a way have we of America seen our problems and met them somewhat more originally than the people of Europe.

In 1917 the British coal mines produced only 243 tons per person, despite all the prodding which came from patriotism and necessity. It is true there were probably quite a few women among those persons, and with all regard for the fair sex most of them are not equal to men in performing the tasks around the mines. Perhaps we are not justified, therefore, in comparing "persons," male and female, with mine workers who are all males.

With this proviso we pass to the question of what we, in the United States, are doing. That is hard to determine, but Dr. Garfield, judging by the progress during the months preceding the close of the war, figured we would produce in a single year 600,000,000 tons of bituminous coal and 100,000,000 tons of anthracite. The war being over, we may not reach these stupendous figures; but if we do, seeing we have 720,000 mine workers, the average output will be nearly 1000 tons per man. The tonnage produced by each miner will be therefore between three and four times as much as that of the British operative. We probably have a few advantages in the physical conditions of our mines, and doubtless we secure part of our tonnage by being, on the whole, more wasteful of our coal; but the difference in production is remarkable in view of the fact that the coal mines of the United States are as wasteful of labor as they are of coal. The lack of coördination in the average American mine is deplorable. Men are continually waiting for cars, and the use of mechanical aids could easily be extended if only the basis of pay were such as to furnish the desired incentive to the operator. With a fixed scale per ton of output, the operator has no incentive to provide every known mechanical aid to production or to furnish the operative with effectual support.

But even with things as they are, why fear the competition of the foreigner? and why reduce wages? The man who produces three or four tonnages is entitled to better wages than the man who produces one tonnage, and such a wage can be secured to him. The only fear that we might well have is that having this splendid manhood we spoil it by forgetting how it has been obtained; how, having been obtained, it has been bettered. Let us avoid souring the laboring man by scolding him and meditating a wage reduction. He has done well, is doing well, and is going to do well if those who are undertaking his ordering and directing will see him as he is and not magnify his shortcomings, of which he has less than any workingman in any other clime or country.

Sewer Pipe for Water Lines

A GOOD way in hilly country to supply water for boilers and compressed-air engine intercoolers is by impounding water in little branch runs and directing it toward a large reservoir by sewer-pipe lines run on an extremely easy slope, following the contour lines more or less closely.

As a rule, for lack of capacity, only a part of the run-off that comes from a storm can be impounded in the reservoirs at any mining plant. But the water that is caught and rendered available during a dry spell can all be so saved. The sewer pipes, therefore, need not be large. They should be of such size as to carry satisfactorily the dry-water flows of the streams that they tap—always presupposing that taking that flow and redirecting it does not violate any riparian rights.

It might be well to block these pipes when the water is not needed, so that when the water is high and muddy they will not function and so block up. When the water is low and therefore clean, the mouths of the pipes can be opened and full use of their capacity can be made. "Sewer" lines should always be made tight and properly laid with full joints. If water can escape from the pipe, it is sure to leave the silt behind it and cause trouble.

It is a strange thing how generally the mining profession believes the sewer pipe to be a device in which only sanitary engineers are interested. There are many places where sewer pipe can be laid with advantage, but unless they are well and truly laid they will occasion trouble. There is too great an inclination among municipal, as among mining engineers, to slight the problems presented by sewer-pipe laying.

On Your Work Their Health Depends



When hard coal was rationed, New York and Philadelphia were left to the last. As they were near the anthracite field, it was expected that it would be easy to rush coal to them at any time. But influenza and patriotic celebrations have reduced the output immensely, and these good cities with their men, women and children are now, and expect to be later, extremely short of fuel. They appeal to the miner to do his best to reduce their suffering as much as possible.

DISCUSSION BY READERS

Hindrances to Coal Production

Letter No. 7—Being the secretary of the coal production committee at our mine, I am in a position to know what is the chief hindrance here to the mining of coal today. Frequent reference has been made in *Coal Age* to the booze habit of coal miners, and this I believe to be the one great cause that prevents our mines from being worked to their full capacity.

While I do not believe that coal miners as a class are intemperate, it must be acknowledged that some of our best miners drink and continue to imbibe as long as their money lasts. The result is that they get drunk and, for days, are incapacitated for work. When, finally, they do return to the mine they are in such a sad condition as to be wholly unfit either for business of for social duties.

Let me say, here, that I feel proud of the record that has been made at our mine, notwithstanding the fact that the influenza almost knocked us out, three of our men dying and thirty being off at one time. I am glad to say, however, that we are now coming out from under the influence of this terrible malady. Our men are coming back to work, weak and pale, but eager to get busy again and anxious to do their best in helping to solve the great problems following the war.

The influenza epidemic was one of those unavoidable causes with which we must occasionally contend; but it is one that comes and goes and not like the booze habit, which comes and stays. Booze among miners is therefore a worse evil and more difficult to overcome.

The Shame of Dealing Liquor Over a Bar

Speaking of intemperance, it is a shame that any individual who wants to be classed as a man will stand behind a bar and sell booze to a coal miner who he knows will get drunk and be unfit for work the next day. The small profit that comes to the hotel man is no compensation for the harm done to the coal industry by making the man drunk.

Let us say that the bar makes a profit of $2 a day from a miner who spends $5 out of his income of $8 or $10 a day. The transaction not only means a loss to the man and to his family, amounting to $12 or $15 or more in his pay, but a loss to the Government of eight or ten tons of coal every day the miner is out of his place. It seems strange that this hindrance to the production of coal and loss both to the Government and the individual miner should be permitted for the small profit of $2 a day to the booze man.

One of our men who has been on a spree for three weeks at a time tells me that his system, plan or method —call it what you may—has been the following: He would go to the hotel early in the morning, drink as much as he felt he could get home with, and then buy an extra quart to take home, as landlords in our country are not allowed to sell liquor in bottles. At home, he would drink the other quart and the next morning would find him again at the hotel. He would go through the same performance, day after day, till all his money was gone, when he would sober up and return to his work in the mine.

Let me ask if there is a Hun who, fighting against our boys "Over There," has hurt our cause as much as the man who deals out booze to the coal miner? Has not the time come for us to question the patriotism of such a dealer? I regret to say that it has recently been my duty to report five of our men for being intoxicated from one to three weeks at a time.

But, the mining of coal is not the only industry that is hindered by the booze habit of its workers. All employers of men are handicapped by reason of the same cause. We have been fighting the Hun abroad, for the sake of democracy and to make the world a safer place for living, which is surely a grand purpose; but how about the "Hun" at home? Should we not be consistent and strive equally to make our camps, boroughs, cities, county, state and country also safe for living?

Osceola Mills, Penn. S. D. HAINLEY.

Reversing an Electric Motor

Letter No. 1—Referring to the inquiry and the reply to the same, which appeared in *Coal Age*, Nov. 7, p. 878, regarding the question of reversing an electric motor, permit me to offer the following suggestions with a view to eliciting further information:

As the inquiry does not state the cause of the reversal of the current in the circuit, or how it became known that the polarity had been reversed, it is difficult to say much by way of explanation of such a fact. It is possible to reverse the magnetism of a dynamo field by an accidental short circuit between the external leads of the machine and the circuit supplied by another machine.

Early Experiences in Electrical Practice

In earlier days when, because of the limitations of electric-power plants for street service use, alternating current could not be used to advantage for that purpose, and, it was necessary to transform the current by means of a small series-wound, direct-current dynamo equipped with a regulator. It frequently happened that this machine would become grounded on the circuit of another machine, causing a residual magnetism of the field pieces. The dynamo would then build up in the wrong direction; or, as we would say, "upside-down."

It seems strange to me that a machine, which I assume was compound-wound, should become entirely reversed. It is possible that the wiring in the power house had been altered and the positive wire changed to the negative terminal. In any event, however, the

circuit is said to have been reversed and the question is, What effect such reversal would have on the motor in the mine. As stated in the reply to this inquiry, the reversal of the current in the circuit would not reverse the motor, which would continue to rotate in the same direction as before.

Electric Motors Differ from Dynamos in Not Being Self-Excited

It may be remarked, here, that all commercial types of motors used in mines are equipped with electric magnetic fields, which are excited from the main circuit. For that reason, residual magnetism is not required to build up a magnetic field to be cut by the armature, as in a dynamo, which is self-excited.

The current flowing through the field winding of the motor, in the case in question, would at once set up a magnetism in the opposite direction to that produced before reversal of the main circuit took place. Then, as has been explained, the armature circuit being also reversed, the direction of rotation of the motor would remain unchanged.

To my mind, I can see no trouble that could have occurred, unless it was caused by an attempt to parallel the reversed machine with one operating in the usual direction. The only effect of the reversed current would be probable damage to the switchboard instruments, owing to the current passing through them in the opposite direction.

W. J. Graham,
Camp Jackson, S. C. Electric Maintenance.

Iron vs. Wood Mine Cars

Letter No. 5—I have read with much interest the remarks of John T. Cox, on the question of the use of iron and wood cars in coal-mining practice, *Coal Age*, Oct. 24, p. 793. Perhaps, there is no better way to discuss the merits of the steel car, as compared with the wood car, than to take Mr. Cox's letter, conceding, of course, that he has had considerable experience in the operation of coal mines and gives, in his letter, the results of that experience. My own experience with the steel and wood mine cars differs from his, however.

In the first place, the question of low or high coal, in my opinion can have no bearing on the type of construction of a mine car. At least, it has never occurred to me that the thickness of the seam enters seriously into this question; and my experience has been gained in different mines where the thickness of the coal has varied from twenty inches to thirty feet.

Flexibility vs. Rigidity in Mine Cars

Again, speaking of the flexibility of the wooden car in contrast with the rigidity of the steel car, it seems to me that this question cannot be discussed in an intelligent way without knowing something of the design of the car or its construction. I may say, however, that the wood car has been much more liable to keep the track than the more rigid iron car. Often, while going around the mines, I have seen cars or trips derailed, and when inquiring as to the cause have been told that it was the new cars which were too stiff and rigid. My personal opinion is that new cars have been responsible more than once for such derailments owing to their rigidity. I make this statement to show, if possible, that rigidity in the construction of a mine car is of no particular advantage, but rather detrimental to the efficiency of the equipment.

Mr. Cox refers to the necessity of inspecting the wood car more frequently. Although believing that this is a debatable question, I still contend that mine cars, whether built of wood or steel, should be inspected with equal care and sent to the shop for any slight repairs whenever necessary. I may also state that the mine cars of most coal mines get far less attention than they should, by the men in charge of the mines.

The question of dust-proof cars is one of considerable importance in the soft or bituminous mines of the country. I will, therefore, not argue that point further than to say that wood cars can be made dust-proof as well as iron cars. Also, in regard to replacing derailed cars, I agree with Mr. Cox that it is easier to replace a rigid car on the track, in a thin vein, than to do the same with a loose, flexible car, whether it be built of wood or steel.

Conditions Affecting Choice of Material

The question of which kind of car will require the greatest amount of repair and attention is of the most importance, and should be one of the controlling factors in deciding the question of what material the mine cars should be constructed. The conditions that affect the choice and which should be considered, before one finally decides the matter, are the following: (1) Size and capacity of the car; (2) style of construction; (3) the conditions under which the car must operate; (4) the dip or pitch of the seam; (5) kind of haulage employed; (6) amount of water encountered in the workings and its corrosive effect. An experience of several years in the anthracite mines of Pennsylvania leads me to say that the steel car is not adapted to the mines of this field.

Allow me to cite a few instances, here, that have come under my personal observation, and give my reasons why steel or iron cars are not adaptable for use in *all* anthracite mines, at least.

Steel Cars in Anthracite Mines

As already stated, one of the items that must be considered is the capacity of the car. If the car is to carry say three tons of coal, which is frequently the case, the construction of the car must be considered. Such a car built of iron will be much heavier, in proportion to its capacity, than a wooden car of the same cubical contents. If the vein or seam has a dip of, say ten degrees, that item alone will be one of considerable importance, as a heavy car will be handled with some difficulty if the hauling is to be done by mules.

The effect of acid mine water on steel cars is of much importance. During the past fifteen or twenty years some of the large coal-mining companies operating in this field have experimented considerably with this portion of their equipment.

The Susquehanna Coal Co., having collieries at Nanticoke, Penn., purchased a large number of steel cars, for use in their Stearns shaft, and my impression, now, is that these cars did not fulfill expectations. My recollection is that the bumpers or frame were found to be the weakest part of the car. The design was, then, changed to that of part steel and part wood, the

frame or sills being of wood, while the body was of steel and was bolted to the wooden truck. Although this did not give wholly satisfactory results, it proved much better than the all steel car.

The coal-mining department of the Delaware, Lackawanna & Western Railroad Co., a few years ago, decided to try out some steel cars, at several of their collieries in the Lackawanna and Wyoming coal fields. The results, in nearly all of these cases, were unsatisfactory, however, particularly where the mine water was strongly charged with destructive acids, which was the case in many of the mines.

From my experience in the mines of the anthracite region, I very much favor the use of a wood mine car. The suggestion that steel mine cars are worth something for scrap must, in my opinion, be considered from more than one angle. I have a case in mind, now, where a trip of eight cars ran away on a plane and was badly wrecked. The cost of cleaning up this wreck and removing the damaged cars to the surface and the delay occasioned thereby convinced me that a steel mine car was a misfit in the coal mines of this valley.

Kingston, Penn. AJAX.

Letter No. 6—In connection with the interesting discussion regarding the relative advantages to be derived from the use of iron or wood cars, in coal mining practice, allow me to submit the following as showing the high regard that users of steel cars have for that type of equipment. It is my belief that facts speak louder than words that merely express an opinion.

At the Ehrenfeld No. 8 mine of the Pennsylvania Coal and Coke Corporation, in Cambria County, there are 700 mine cars in use today. These are built of "Armco" iron, and to say that the cars give satisfaction but half expresses the high regard in which they are held by every mine official about the plant. Speaking of their service in the mine, everyone uses the most flattering terms.

The mine foreman at the Cresson colliery, in reply to my question regarding the quality of these cars, exclaimed, "Good service? Fine service! I wish, to goodness, that all my cars were of that class."

In deciding on the type of mine car to be adopted when equipping a large mine, one must use every precaution; and this led me, before leaving the place, to seek out the assistant superintendent, whose views I knew were always expressed with great candor. In reply to my inquiry asking what he thought of the use of iron cars as compared with wood cars, in mining practice, he exclaimed, "They are the real thing, those cars."

To show the style of iron car in use at the Ehrenfeld mine, I am sending a photograph of a portion of a trip standing on the track at the mine entrance. These cars were manufactured by the American Rolling Mill Co., Middletown, Ohio. The illustration shows the general form or style of construction of the car used in the Ehrenfeld mine where the seam has an average thickness of only 42 in. The height of the car is reduced and its length increased to conform with the conditions in this seam. The car was built with flaring sides and an end gate and has a capacity of about 2 tons. I offer this as an interesting presentation in favor of the use of iron mine cars in coal mining.

———, Penn. PROGRESSIVE.



TRIP OF STEEL CARS, AT THE EHRENFELD MINE, WHICH IS WORKING A 42-IN. SEAM OF COAL

Justice to the Miner

Letter No. 8—The cry heard on every hand today is "cleaner coal and more of it." The man who descends into the bowels of the earth has had it put up to him squarely that he must strive for a greater production of coal. The public, which is not familiar with actual mining conditions, has not been slow to cast reflections on the miner because he does not come across with a certain tonnage every day. The miner is accused either of being intoxicated, a casual worker or even a "slacker."

At times it has even been intimated that mine officials were not making the efforts they should to increase the output at their mines.

The honest miner feels the injustice of these charges, and I want to say that we who work underground are just as patriotic as men who are employed in other industries. Unlike these men, however, we are working under conditions that at times render us helpless to do all that we would like to do.

Coal mining today cannot be compared with coal mining of a few years ago. The anthracite mines have been noted for their high coal. In some instances the seam would reach a height of 20 or 30 ft. Moreover, the coal was of such a nature that it did not require much more than ordinary skill and effort on the part of the miner to produce a large tonnage. In the early days of coal mining, work was almost wholly confined to these large seams, where men established a record that cannot be equalled in present-day mining. It is much to be regretted that these big coal seams were sought after and mined exclusively in former days, while the smaller seams were left to be mined now when the cry is "coal, and more coal." Had men been content to work the small seams as well as the larger seams, there would not be the difficulty of finding coal today sufficient to meet the demands.

Contrasting Conditions in High Anthracite Seams with Those in Low Coal

Contrast for a moment the work in a seam of coal 15 ft. high, and having little refuse, where miners have averaged from 30 to 100 cars to a single keg of powder. In such seams there was plenty of headroom on the roads, which required no brushing of the roof or lifting of the bottom in order for the cars to follow the men in their advance. The miner suffered no inconvenience in moving about in his room, where he could stand upright.

Compare this condition with work in a 3-ft. or a 5-ft. seam, having from 6 to 12 in. of refuse that must be separated from the coal before it is loaded. Under such conditions is it to be wondered at that a miner cannot get out more than five or seven cars to the keg of powder. Consider, also, that in order for the cars to follow the men it is necessary to brush the roof or lift bottom varying from 12 in. to 3 ft. in depth. When one considers these facts it is clear that the miner is working under different conditions today.

Man Power in Coal Mining, Today

Men who profited by mining the high seams in former days would today find themselves confronted with a different proposition. Not only are the difficulties of mining increased, but there is a different class of men to be handled in the mines; and the situation is made worse by the fact that the opportunities offered by other industries have drawn away many of the best miners, which has greatly reduced the capacity of our mines. The sooner something is done to conserve the man power in mining and to induce good miners to stick to their work in the mines the better it will be for all concerned.

In the anthracite field there are acres upon acres of small seams that are still to be worked. The question is, where can we get the men to work them? Men are loath to work in these seams because they want to do their bit and measure up to the men working in other seams under more favorable conditions. To do this means that they would have to exert themselves to such an extent that they would not hold out for long, and so they seek work requiring less labor.

What is needed today, in the opinion of good mining men, is better equipment and such as will be adapted to present mining conditions. Face coveyors are needed in low seams. The height of the car must be reduced a few inches. Electric or compressed-air motors must be installed and everything possible must be done to reduce the labor required in the mining of these low seams.

Deadwork Impedes a Miner's Daily Tonnage

Only a few weeks ago I watched with interest a district where 25 men were working single-handed. The first day they loaded 75 cars of coal, the second day 60 cars, the third day 55 cars, the fourth 50 cars, the fifth 63 cars, and the sixth and last day of the week 56 cars, making a total of 359 cars of coal loaded by 25 men in six days, which is an average of less than 2½ cars per man per day. The average, in this district, would be three cars per man per day, and the reason this was not realized in the case I mention was the fact that the men had to work lifting bottoms much of the time, in order to get the cars to the face of the coal where they were loaded. An average of three cars per man per day would have produced, in this mine, 450 cars a week, which shows a loss of 450 — 359 = 91 cars of coal, or practically 20 per cent.

Let me urge, in closing, that the introduction of mechanical devices to lessen labor and maintain a fair average tonnage per man per day will greatly increase the production and lower the cost. The first outlay would be the greatest; the cost of maintenance would be small as compared with lifting bottoms, laying track and cleaning the coal, as the miner would not then get the rock mixed in with his coal. To just the extent that operators give their attention to installing suitable mechanical devices will they realize better results in their mines.

L. R. Thomas, Section Foreman,
Edwardsville, Penn. Woodward Mine.

Perplexities of Mine Foremen

Letter No. 4—No doubt every mine foreman has troubles of his own; but is it not true that many foremen make much of their difficulties and perplexities? This thought suggested itself to me when reading the letter of a mine foreman, which appeared in *Coal Age*, Oct. 24, p. 793, and in which he described the difficulties growing out of a condition, in a miner's place, where the machineman had to leave a thin layer of coal at the bottom, in order to avoid striking a roll at the other end of the cut.

The simple manner in which the superintendent, later, adjusted the matter led me to think that if the mine foreman had exercised an equal amount of tact and had foreseen the trouble that would arise if the matter got out of his hands, he would have avoided the snare into which he fell.

A mine foreman must deal with all classes of men, many of whom are indifferent to the needs of our country. There are men who would sleep if their house was afire, and there are miners who, when patriotism is mentioned and their need of getting out more coal is urged, will cause a diversion, by some remark that starts the laugh so that, for a time, the getting out of coal and patriotism are forgotten. The mine foreman who is on his job is well acquainted with that kind of a chap, and loses no time in giving him a hint to get busy at once.

Difficult Problem Confronting Foremen

A machinerunner is told to waste no time in getting his machine going, as men are waiting for their coal to be cut. Does he give heed to this gentle reminder and proceed at once to hasten his work? No! Too often it happens that the machineman is independent, knowing that competent men are scarce and that his job is safe. The question arises, What is the mine foreman to do under such circumstances; can he induce or compel men to continue to work when they want to quit?

Let me illustrate: In our mine there is a full crew of haulers, timbermen, roadmen and miners, who enter the mine in the morning ready for a full eight-hour day. The coal digger or loader starts to load his car; the machinerunner gets busy cutting the coal in the miners' places and the work goes on for five or six hours when a loader is seen going home. You ask him why he is going out so early. His reply is that he has loaded all the coal cut in his place.

A little further up the entry you come across a machinerunner making his way out of the mine. In answer to your anxious inquiries, he informs you that he is "tired and played out." You suggest that he "rest a bit and come back," to which he replies that he has had "plenty for one day."

The next day diggers are waiting for their coal to be cut; everything moves slow in the mine and the day's run falls far short of the average. The foreman is perplexed; yes, "perplexed" does not express his mental condition. He is at a loss to know what he can do to get his men to work the full day.

Mine Foremen and the "Square Deal"

In the letter to which I have referred, mention was made of the impossibility of a mine foreman getting a "square deal;" but he is not the only one to whom that will apply. When the machinerunner will not cut the coal, it is the miner who fails to get a square deal and must lose his day's work. It would only be justice to charge the machinerunner with the miner's loss of time when that is due to the former's neglect or unwillingness to work his full day.

It seems to me that there is but one remedy to apply to regulate these conditions, and that is to place the coal mines under martial law or operate them after the manner that controls the building of our ships. Many mine foremen and superintendents would welcome the authority that would keep mine workers in their places and compel them to perform their whole duties. Imagine, for a moment, what would be the result if coal mines were operated today on the same plan as shipyards where the workers cannot choose the number of hours they shall work. What interest can men have in the country's needs when they work five, six or sometimes seven hours out of the twenty-four. This kind of slackerism is far too manifest in the various branches of coal mining and, in my opinion, it can only be overcome by martial control.

While on this subject, let me mention the difficulty that surrounds a mine foreman having charge of from 250 to 300 men, scarcely 8 per cent. of whom can speak the English language and, perhaps, 15 or 20 per cent. additional barely understand the instructions given them, while the remainder require to be guided finger and thumb, in order to insure their safety, from the time they enter the mine until they reach the surface again.

Two Classes of Foreign Miners

We can divide the foreign-speaking miners into two classes: First, there is the foreigner who has been in this country six or seven years and worked in the coal mines for the same period. He cannot understand what is said to him, particularly if he desires not to understand.

Second, there is the foreigner who has been in this country from 10 to 20 years, without learning to talk any English. Many of this class appear to be more susceptible to instruction and, yet, like those in the first class, it is easy for them to fail to understand when they wish.

In control of both of these classes, there is generally one or more of their kin who are cute and cunning in their methods. These understand full well what is required, and have it in their power to regulate the output of the mine often with greater skill than the foreman himself. Because of this ability such are able to lead others of their flock in any way they desire, which puts the output of the mine largely in their control and adds greatly to the foreman's difficulties.

Foreign Miners Should Learn English

My suggestion, in this regard, may seem drastic. It is that the foreigner should be given a reasonable time to learn sufficient English to understand the instructions given him in the mine and after that should be compelled to make his wants known in English. As far as practicable, the speaking of a foreign language underground should be forbidden. The children in the schools should be urged by their teachers to talk English to their parents and older brothers who work in the mine.

It is my belief that the failure to learn to understand and speak English after a reasonable time should exclude a foreigner from the mine. This seems all the more important when one considers the seeming failure of attempts to bring foreign miners to know and obey the mining laws and regulations. These have been printed in the various languages and distributed through the mines. But, when a foreigner is caught violating one of the rules or laws, he feigns not to have understood that he was doing anything wrong. Therefore, it would seem that the prohibition of the use of the foreign tongue, in coal mining, is necessary to insure the safe operation of the mine.

Perryopolis, Penn. R. W. Lightburn.

INQUIRIES OF GENERAL INTEREST

Centrifugal Mine Pumps

Kindly answer the following questions regarding centrifugal mine pumps: (1) Is there any advantage in having either the suction or discharge pipes larger than what is called for on a centrifugal pump, and would such a larger size of discharge pipe prove any disadvantage in the operation of the pump? (2) What is the effect of a greater or lesser head than that for which a centrifugal pump is designed? (3) Is a long suction, say 500 ft., any particular disadvantage?

Pittsburgh, Penn. SUPERINTENDENT.

1. In replying to this question, it is necessary to understand what is meant by the size of discharge pipe "called for." We assume that our correspondent has reference to the size of the discharge portal of the pump as calling for the size of discharge pipe required. If that is the case, he is wrong in assuming that the diameter of the discharge portal calls for an equal diameter of the discharge pipe. The fact is the size of a discharge portal of a centrifugal pump is always less than the required diameter of the discharge pipe. As has been explained in *Coal Age*, Vol. 7, p. 263, the ratio of the diameter of the discharge pipe to that of the portal is independent of the quantity of water discharged and varies directly as the fourth root of the discharge head against which the pump operates. A convenient rule, in practice, is to make the ratio of the diameter of the pipe to that of the portal equal to 4/9 of the fourth root of the head expressed in feet.

For example, assume a No. 9, double suction, volute pump discharging against a head of 256 ft. The number of the pump is commonly taken as equal to the diameter of the discharge portal expressed in inches. Thus, the diameter of the discharge portal of a No. 9 pump would be 9 in. In that case, the ratio of the diameter of the discharge pipe to that of the discharge portal is $4/9 \sqrt[4]{256} = 4/9 \times 4 = 16/9$, and the diameter of the discharge pipe is, therefore, $16/9 \times 9 = 16$ in.

These remarks are based on an assumed perfection in the design of a double-suction, volute pump in which the tip velocity of the revolving vane approaches more or less closely to the velocity head of the water in the volute space surrounding the vane. This velocity is very high as compared with that permissible in the discharge pipe. While the theoretical velocity for a head of 100 ft. is practically 80 ft. per sec. (4800 ft. per min.), the flow in the discharge pipe should not exceed 6 or 8 ft. per sec., in order to keep the losses due to friction at a minimum.

2. Where a double-suction, volute pump is operating chiefly against frictional resistance, and there are few sharp bends or other obstructions to the flow, it can be assumed that the quantity of water discharged will vary approximately with the square root of the head. This, however, is only a general statement, and the effect of an increased or decreased head must be determined, in any case, by the characteristic curve of the pump, as furnished by the manufacturer.

3. A great length of suction is always a disadvantage, owing to the increased frictional resistance, which adds greatly to the suction head and increases the total head under which the pump must operate.

Hoisting Shaft Problems

We have sunk a shaft 130 ft. in depth, measured from the surface to the bottom of the coal. Kindly state what size of coal pillar should be left for the proper protection of the shaft. The coal is 6 ft. thick. Also estimating on hoisting a total load of 4 tons, including the weight of the cage, car and coal, what horsepower of engine will be required for the work in this shaft?

Corning, Ohio. MINE ENGINEER.

Numerous rules are given for determining the diameter of the shaft pillar required for the protection of a shaft. Most of these are based only on the depth of the shaft. The rule giving the least value for the diameter of a circular pillar or side of a square pillar is that of Merivale, which makes this dimension (d), in yards, equal to 22 times the square root of the depth (D) of the shaft, in feet, divided by 300, giving in this case,

$$d = 22\sqrt{\frac{D}{300}} = 22\sqrt{\frac{130}{300}} = 14\tfrac{1}{2} \text{ yd. or } 43\tfrac{1}{2} \text{ ft.}$$

The rule giving the greatest value for the same dimension is that of Hughes, which requires 1 yd. for each yard of depth, making the value of the required dimension, in this case, 130 feet.

A rule that gives better and more uniform results makes the value of the required dimension (d) three times the square root of the product of the depth (D) of the shaft and the thickness (t) of the seam, all expressed in feet, giving in this case,

$$d = 3\sqrt{Dt} = 3\sqrt{130 \times 6} = \text{say } 84 \text{ ft.}$$

In calculating the horsepower required for any given hoist, it is customary to add one-third to the total load hoisted, to allow for friction, etc. This increased load is then multiplied by the speed of winding (ft. per min.) and the product divided by 33,000, which will give the effective horsepower. This result must then be divided by the efficiency of the engine, which may be estimated as 85 per cent. for an ordinary slide-valve, noncondensing engine.

Assuming, in this case, a speed of hoisting of, say 15 ft. per sec. (900 ft. per min.), gives for the required horse-power of the engine.

$$H = \frac{4/3(4 \times 2000)900}{0.85 \times 33{,}000} = 342+ \text{ hp.}$$

EXAMINATION QUESTIONS

Mine Examiners' Examination Springfield, Ill., 1918

(Selected Questions)

Ques.—What are the duties of a mine examiner?

Ans.—The coal-mining laws of Illinois (Sec. 21) specify the following: (1) To examine the underground workings of the mine within 8 hours of the time when the men enter for work, or less if required by the mine inspector. (2) The mine examiner must carry a safety lamp that is in good condition and a rod or bar for sounding the roof. (3) He must ascertain that the air current is traveling in its proper course and that a sufficient volume of air is in circulation. He must measure the air passing in the last crosscut of each pair of entries, or the last room of each division in a longwall mine, and elsewhere if necessary, and must make note of these measurements in a book kept for that purpose. (4) The examiner must inspect all places where men are required to pass to and fro or to work and make note of any dangerous roof or accumulation of gas or obstructions of any kind in the rooms or airways. He must examine the edges and all accessible parts of falls and old gobs and aircourses to see that they are clear of gas. (5) The examiner must mark on the walls of each place, not on the face of the coal, the date of his examination. (6) He must place a conspicuous danger signal at the entrance of each place found to be dangerous, and place at least two obstructions, not less than 20 ft. apart, across the roadway leading to a room or heading where gas has been found, one of which must be outside the last open crosscut. (7) He must make a daily record of each examination, in a book kept for that purpose, before permitting the men to enter the mine for work. (8) The mine examiner must take possession of all entrance checks of men whose working places he has found to be dangerous, and deliver these checks to the mine manager (foreman), whose duty it will be to hold back the men from proceeding to their work.

Ques.—When do you consider the quantity of air entering the downcast shaft sufficient for the ventilation of the workings?

Ans.—The quantity of air entering a mine must be sufficient to comply with the requirements of the mining law and satisfy the mine inspector of the district. In addition to this, the total circulation must be sufficient to supply the particular needs in each district of the mine and keep the working faces free from accumulations of gas, assuming that the main current has been divided and the air distributed in proportion to the needs in each section of the mine. The velocity of the air at each working face must be sufficient to dilute, render harmless and sweep away the gases that would otherwise accumulate there or in any void and abandoned places in the mine.

Ques.—What will be the rubbing surface in an airway 3000 yd. long, 6 ft. high and 12 ft. wide?

Ans.—The perimeter of this airway is $2(6 + 12) = 36$ ft. The rubbing surface is then found by multiplying this perimeter by the length of the airway, which gives, in this case $36 \times 3000 \times 3 = 324{,}000$ sq.ft.

Ques.—Name the gases found in the coal mines of this state.

Ans.—The mine gases commonly found in Illinois are the following: Methane or marsh gas (CH_4), carbon dioxide (CO_2), carbon monoxide (CO), besides the nitrogen and oxygen of the atmosphere. In addition to these, also, there are sometimes found small quantities of hydrogen sulphide (H_2S) and the hydrocarbon gases, olephiant gas (C_2H_4) and ethane (C_2H_6), together with traces of hydrogen (H_2).

Ques.—State how you would make an examination of a coal mine, as mine examiner.

Ans.—Having prepared and carefully examined the safety lamp to be used in making the examination, start in time to complete the work in a thorough manner before the men must enter the mine in the morning. Before going into the mine, however, ascertain that the fan is working properly in the usual manner. Then, proceed at once to the foot of the downcast shaft or the intake airway and observe whether the usual quantity of air is passing into the mine. Having reached the district in charge, enter and examine each working place in order, following the air current from place to place, making a special test for gas in each place and examining the roof and coal to ascertain that they are in a safe condition for work. In each place examined, mark the date on the wall, as evidence of your visit.

In this manner, proceed throughout the district, examining not only the working face in each room and heading; but, also, the edges of all falls and the accessible parts of abandoned workings. Having completed the rounds, make a full record of the examination in the book kept for that purpose, noting those places where danger of any kind has been found and explaining its nature. This must be done before permitting the men to enter the mine for work. Finally, the mine examiner must take from the board all checks belonging to miners whose places he has found unsafe for work, and deliver such checks to the mine manager who will not permit the men to enter until their places are made safe for work.

Correction

A typographical error appeared in the answer to the last examination question appearing in *Coal Age*, Oct. 31, p. 838. The last lines of the answer given should read, Assuming a stroke of 18 in., the piston speed being 600 ft. per min., this engine must run at a speed of $(600 \times 12) \div 18 = 400$ strokes per minute, or 200 r.p.m.

COAL AND COKE NEWS

Harrisburg, Penn.

Members of the draft boards declare that they had not received any information as to when the many thousands of miners will be returned from the army by the War Department to their pre-war positions. As to the miners being given the priority of discharge from service, the draft boards were inclined to believe that if the Government contemplates such a move they will receive notification. If all return to their former occupations it is expected that it will result in an additional 300,000 tons of coal being mined every month in the hard coal fields, and it is deemed possible that the majority will resume their former task, as at the present time mine workers are receiving the highest wages in the history of the industry.

The coal companies have already placed requisitions with the Federal and State employment bureaus showing the number of men needed to bring the coal production to the maximum set by the Fuel Administration.

An important conference will be held in this city during the next two weeks, which will be attended by representatives from both the anthracite and bituminous regions, to prepare to secure an appropriation from the legislature at the coming session to make the Susquehanna River navigable, so as to secure a better outlet for coal and at the same time to get lower freight rates.

One of the leaders of the movement is Major Gray, whose survey made a few years ago revealed that the Susquehanna can be made navigable at a cost much less than that New York expended for the barge canal that extends across New York state.

Uniontown, Penn.

Acceptance of coke at the point of shipment rather than at the point of destination, provided in the contracts for coke for the first half year of 1919, mark an entirely new departure in the relations of producers in the Connellsville region with their customers, the blast furnaces. The clause in virtually all the new contracts will make necessary an inspection of all coke at the yards here, and commencing the first of the year many blast-furnace coke inspectors are expected to be assigned permanently to the Connellsville region.

All contracts made for the first half quote the Government fixed price of $6, but contain provisions making them subject to future price rulings of the Fuel Administration. Should the Fuel Administration be discontinued during the period of the contract, the contracts will be terminated at the last prevailing price of the administration. Although there have been intimations that the Government will shortly relinquish its control of the bituminous coal industry, no such action is expected for the present in the coke industry, which is so closely related with the production of iron and steel.

Although influenza is still responsible in a large measure for the continued reduction of output in the Connellsville fuel field, comparison of last week's output with the high war-time record presents in a fair way what the war-time stimulus did toward increasing production. The production for the week ended Nov. 23 shows a net decrease of 225,663 tons of coal from the high record of Oct. 12.

How highly the region was geared up to top-notch efficiency under the war demand for fuel is just now being appreciated by fuel administration officials who directed the war-time organization. They believe that throughout the war-time campaign the workers, especially the Slovaks, had a keener appreciation of the importance of their work than they were given credit for. With the war ended there is everywhere a tendency to relax effort, and no program has yet been outlined again to speed up production. The region is gradually being stabilized to conform to new conditions, but there is now no indication of attaining the peak production of early October.

There is yet an acute situation in by-product coal, some of the plants served by this region accepting high sulphur coal from which the byproducts may be developed. The coke produced from this coal is of an inferior grade, which may be sold for domestic purposes. Consumers are accepting this inferior coal rather than be forced to close down their plants.

Charleston, W. Va.

An ample flow of cars into the Fairmont district has resulted in a material increase in the coal output of that region. The car supply is now being stabilized, as the service all during the week ending Nov. 23 demonstrated. The average run of cars in the district during the period mentioned was in the neighborhood of 1700 cars a day, although Saturday was not such a good day, late deliveries being in evidence. While most of the coal went to the east, there was promise of heavier western shipments, especially in view of the fact that the Ohio market for byproduct fuel had been opened up.

Labor shortage is still cutting the output of the Tug River and Pocahontas districts to the extent of 47,120 tons a week, the total loss from the last report being 61,000 tons. There has been a slight though not marked tonnage loss from car shortage—about 7000 tons. Weekly production is about 415,000 tons. Coke production has diminished somewhat, though not materially, being 49,000 tons.

The mines of the Logan mining district are showing up a little better than was the case early in November, the last report showing a total production of 207,912 tons as against 186,922 tons for the previous week. The production loss has been reduced from 70,000 to 52,000 tons a week.

No diminution in the demand for coal has been felt in the New River field. The smokeless coal from that district is still in heavy demand, most of it going to New England and tidewater points. Mines in the district experienced a little difficulty again during the week ending Nov. 23 in securing sufficient power for all requirements. Car supply was ample for all needs, although coal movement eastward was slower than usual owing to congestion at certain points.

A damper was put on production in the Kanawha region by an embargo which began Nov. 18. On Nov. 25 the ban was lifted and coal began flowing again. No district has had a more restricted field in which to sell its coal than the Kanawha district. In justice to the district it is believed the Fuel Administration will modify some of its zone regulations so as to permit Kanawha coal to find its natural outlet, the slight congestion in the district being due to the unduly rigorous zone restrictions.

Birmingham, Ala.

Coal production in Alabama and the Birmingham district is disappointing. For the week ending Nov. 16 only 329,190 tons were mined. There is need for labor in some sections of the Birmingham district, and it is expected that quite a number of men will be available when demobilization begins.

The coke production of the district is being held back to some extent by the lagging coal output. Work on 304 byproduct coke ovens in the Birmingham district, 154 at Fairfield, 120 new byproduct coke ovens at the plant of the Sloss-Sheffield Steel and Iron Co. in North Birmingham, and 30 ovens at the new byproduct coke ovens plant of the Birmingham Coke and Byproducts Co. is being rushed. Announcement is made that machinery, material and all appurtenances for these plants are being gathered for shipment here at an early date, due to the fact that they are more easily obtained now.

The following statement on the situation in the district was obtained from Judge H. C. Sellheimer, Federal manager of production: "Alabama coal interests are likely to permanently lose a good part of the trade they controlled prior to the war unless some means of increasing the output is found. When the Fuel Administration created the zone system last spring it took away a considerable portion of the territory supplied by this district and placed it in other zones. Tennessee and Kentucky mines were permitted to ship to the Tennessee Valley towns, and Illinois and western Kentucky to the Mississippi Valley. Birmingham district mines have been unable to supply even the restricted territory assigned it and will not be able to do so again until production is considerably increased."

Victoria, B. C.

The collieries of Vancouver Island during the month of October mined 46,933 tons, an increase of 14,238 tons over the results of the previous month. Despite the loss due to influenza, the production of the Island for October stands the third highest for any month of the year, being only 4099 tons less than the output for March, the record month for 1918, and 1374 tons less than April, which ranks next in order. The Canadian Collieries (D), Ltd., is first with a total of 74,366 tons for the Comox and Wellington collieries, while the Canadian Western Fuel Co. is second with a production of 59,219 tons for the Nanaimo colliery. All the collieries show an increase over the month of September, except the Jingle Pot and the Grant. The tonnages mined by the collieries in the Nicola-Princeton district for the month of October aggregated 15,299 tons, an increase of 468 tons over the September total.

Six sets of the Gibbs oxygen breathing apparatus have been installed by the Department of Mines of British Columbia at the Fernie mine rescue station. These are the first specimens of this apparatus to be introduced into Canada. The Gibbs apparatus was recommended to the Minister of Mines by the chief inspector of mines, George Wilkinson, after investigation, and the former immediately gave the instructions necessary for their purchase and use in this Province. It is practically assured that the Gibbs apparatus will supersede that with which the other mine-rescue stations of British Columbia are equipped as soon as possible. It was thought best to place the first sets received at Fernie because of the very gaseous condition of the mines of the Crow's Nest Pass Field. It is understood that the Canadian Western Fuel Co. has some of this equipment on order, so that it is probable that the Gibbs soon will be in common use in this part of the Canadian West. Following the lead of British Columbia the mine authorities of the Province of Alberta are installing the same apparatus at coal mining centers.

PENNSYLVANIA

Anthracite

Hazleton—The Worthington Pump and Machinery Co. has released several hundred munitions workers. Many of these are former mine workers, and they are seeking their old positions.

Upper Lehigh—The Upper Lehigh Coal Co. suspended operations for the past two weeks, while the machinery of its old breaker was being transferred to the new breaker building, just completed.

Tamaqua—A washery erected on the Gerber tract, near here, by the "City of New York," has not yielded that municipality the return expected. An estimated daily output of 15 cars has reached but five cars daily, and that after a long delay.

Sandy Run — Operations at the new breaker of the Upper Lehigh Coal Co. will start about Dec. 1, work on the plant having been completed. The output of the mine will be greatly increased when operations in the breaker begin.

Hazelton—The Lehigh Valley Coal Co. on Nov. 26 raised the cost of fuel sold to employees. They must now pay the $1.05 increase allowed the operators by the Fuel Administration, but even at that the scale of prices is about $1 a ton less than to the general public.

Wilkes-Barre—The Hudson Coal Co. is ready to run the culm bank of the No. 2 colliery through the washery. The larger sizes will be mixed with freshly mined coal and sold to the retail and foreign trade. The bank has been in existence for about 40 years and contains thousands of tons of marketable coal.

Scranton—Owing to illness, it is said that John T. Dempsey, President of District No. 1, U. M. W. of A., in the anthracite region, has relinquished the duties of his office and they are now being performed by John Yanis, of Plymouth, the vice-president of the district organization. From a reliable source it was learned that members of the executive board of the district, in a recent meeting at headquarters, agreed to this plan.

Hazleton—Lehigh coal field operators face the winter with an immense amount of "dead work" to do to reach the coal. The cream of the coal, easily reached through culm banks, strippings and robbing pillars, has been taken at many collieries, and new tunnels, etc., must be driven to get to portions of the beds hitherto untouched. The new work will entail expenditures that will cut heavily into the reserve funds permitted by the Government under the income tax provisions.

Mahanoy City — James Mathews, of Shenadoah, was defeated by Chris Golden of Shamokin, for the presidency of District No. 9, United Mine Workers, in the anthracite region. The result was announced at the convention held on Nov. 27. Other officers elected are: vice president, John Strambo, Mahanoy City; secretary-treasurer, John J. McAndrew, Locust Gap; International executive board member, John J. Matts; subdistrict executive board member, George Litwin, New Philadelphia.

Avondale—Officials of the Delaware, Lackawanna & Western R. R., Coal Department, say that the destruction of the Avondale washery, on Nov. 28, will not seriously affect production at the Avondale colliery, as the machinery can be placed in position to resume operations immediately. None of the men employed in the washery will be thrown out of employment, but will be put to work readjusting the machinery and rebuilding the plant. For a time it was feared that the breaker would burn, fire breaking out on one side of the structure several times. This breaker was burned to the ground on Sept. 6, 1869, smothering to death 108 miners, who were at work. This was one of the largest disasters in the history of anthracite coal mining.

Bituminous

Washington—The McClane Mining Co. has contracted with the Roberts & Schaefer Co. for the installation of a Marcus picking table screen, to be installed at their tipple at Rich Hill Mine No. 1.

Pittsburgh—The United Coal Corporation has contracted with the Roberts & Schaefer Co. for the installation of a barge loading conveyor to be installed in the tipple at the Ella mine.

Johnstown—On account of the increased number of influenza cases in the soft-coal region of Cambria County, the fuel administration has ordered all saloons closed in a chain of mining towns from Gallitzin to Portage.

Washington—R. C. Masten, of Pittsburgh, president of the Masten Coal Co., has purchased 860 acres of coal for $450,000, according to information received here. The coal is located on the land of Owen Murphy, Donegal township, ten miles west of this place.

Homer City—A bathhouse has been erected here by the Homer City Coal Co., for the use of its employees. The structure is well equipped. Separate lockers for the clothing of the men and special equipment for drying and airing clothes, as well as showers with hot and cold water, are features of the building.

Huntingdon—A mine squeeze which occurred recently in the mine of Adam J. Black, at Broad Top City, was the greatest and most destructive in the history of the district. It happened in Cook Mine No. 3, and besides throwing 110 miners out of employment, the loss to Black is estimated at $35,000. There were 57 mine cars, 100 tons of iron, equipment and miners' tools inclosed by the squeeze.

WEST VIRGINIA

Logan—With all equipment in place and with a new tipple completed, the No. 2 mine of the Maher-Purseglove Mining Co., at Chauncey, has been put in commission.

Beckley—The Mead-Tolliver Coal Co. is about ready to begin operations at its new "Thistle" mine, battery haulage hotors having been received within the last few days, this virtually completing the equipment for the mine.

Orange—In the near future the Orange Gas Coal Co. will begin the mining and shipping of coal from its new mine in the Henshaw seam, at Orange, in the Coal River section. A. E. Moore is the general manager of the company.

KENTUCKY

Toler—The Roberts & Schaefer Co. has installed a Marcus picking table screen in the Bailey Coal Co. tipple.

Maysville—The Dodson Coal Co.'s elevator was destroyed by fire on Nov. 23, with a loss of about $38,000, on which there was only small insurance.

ALABAMA

Birmingham—A. H. Carpenter has been appointed assistant to Production Manager H. C. Selheimer, of the Fuel Administration in Alabama, and will devote his attention to the coke industry, endeavoring to bring about an increased yield and also an improvement in the quality of coke produced. As a result of demoralized conditions in coal mining, coke production has been badly hampered by the lack of the necessary coal for charging the ovens and also a shortage of labor. This situation is showing improvement and the output of coke is gaining slowly. The Brookside-Pratt Mining Co. has rehabilitated the battery of beehive ovens at the Murray Mine, near Blossburg, Ala., which has been idle for a number of years and will begin producing coke for the trade in the near future. There are 100 of these ovens. There is a shortage in the supply of both furnace and foundry coke. The New Castle Coal Co. is shipping about 2500 tons per month to the smelting interests in northern Mexico.

ILLINOIS

Edwardsville—The Beck-White Coal Co. has closed down its mine here and is removing the equipment.

Mt. Olive—The coal mines of this vicinity, after being closed several days on account of influenza, have reopened.

Springfield—It is estimated that the tonnage of Illinois coal in the past 30 days has been cut 50 per cent. on account of the influenza epidemic and the peace celebrations. The normal monthly supply of 4,500,000 tons will be reduced to about 2,000,000 tons for November.

Springfield—Miners of Springfield and vicinity have started a movement for the erection of a permanent home in this city. Under the present system the different locals meet in various parts of the city. Preliminary plans were made at a meeting of presidents and secretaries of the locals at the courthouse.

Springfield—The various locals of the United Mine Workers are considering the permanent leasing of a hall for the meeting place of these organizations. At the present time there is no regular and permanent meeting place and the locals meet all over the city. Better results can be expected if the locals meet in one place, it is believed.

Marion—An interesting event in the past week was the breaking through from the Peabody No. 3 mine into the workings of the old Carterville district mine, which was abandoned on account of fire about four years ago. The old workings were found in good condition, with very little water and gas. The gas was the cause of the worry when the connection was made.

Murphysboro—The State Miners' Examining Board, of which William Hall, of Springfield, is president, held examinations here and in Duquoin on Dec. 2, and on Dec. 3 and 4 in Herrin. Other examinations announced are Dec. 5 and 6, West Frankfort; Dec. 7, Harrisburg; Dec. 9, Christopher; Dec. 11, Belleville; Dec. 12, Collinsville; Dec. 16, Danville; Dec. 17, La Salle; Dec. 18, Peoria.

Carlinville—An advertisement of a sale of alien property in this vicinity has aroused considerable local interest. The sale involves about 30,000 acres of coal rights owned by the Ely Coal Co., of Girard, which has been seized by A. Mitchell Palmer, Alien Property Custodian, as alien-owned coal lands and will be sold at public sale to "100 per cent. Americans." It is expected that there will be some spirited bidding, as a large acreage of coal rights in one body in the state is uncommon and hard to purchase.

Foreign News

St. John's, Newfoundland.—The Reid Newfoundland Co. is developing along scientific lines a highly promising coal seam recently discovered near Codroy, on the west coast of the island, within one mile of the railroad and accessible to tidewater. It has been found to be 11 ft. in width and it is believed to be an extension of the coal deposits of Cape Breton. Should its development prove commercially profitable, it is estimated that within 18 months it should be possible to obtain from this mine the 200,000 tons of coal now annually imported to Newfoundland from Nova Scotia. Important iron ore discoveries are also stated to have been made by the company, but no official announcement respecting them has been made.

Personals

J. Frank Hay, purchasing agent for the Buck Run Coal Co., Minersville, Penn., has resigned to accept a similar position with a railway company at Pottsville.

Joseph E. McGowan has been elected a member of the board of directors of the Maryland Coal Co., of Maryland, and the Maryland Coal Co., of West Virginia, succeeding Howard S. Dickson, deceased.

Thomas Kelshaw, inspector for the Coxe estate in the Hazleton region, has resigned to enter the employ of the Girard Water Co., as superintendent of its coal and water business in Schuylkill County. **W. E. Millington**, formerly with the Girard estate, Pottsville, Penn., will succeed Mr. Kelshaw.

Dwight P. Robinson, a former partner of Stone & Webster, in charge of their construction and engineering business, has opened offices in New York under the name of Dwight P. Robinson & Co., Inc., constructing and consulting engineers. Associated with him will be **R. M. Henderson**, in charge of construction; **C. W. E. Clarke**, mechanical engineer; **R. A. Philip** and **D. L. Galusha**, electrical engineers, and **M. E. Thomas**, structural engineer.

Lieut.-Col. L. G. McCrum, who in private life is general manager of W. H. Bradford & Co., Inc., with mines in Somerset, Cambria and Huntingdon counties, Pennsylvania, and president of the Victor Coal Mining Co., of Somerset, Penn., has met with considerable success since he assumed the general managership of the Government Arsenal at Rock Island. In fact, so free from labor trouble was the arsenal, and so great a spirit of coöperation and loyalty had Colonel McCrum succeeded in inculcating among the thousands of employees, that his results have attracted the attention of official Washington. Colonel McCrum will resume his duties with the Bradford company when his work with the Government comes to an end.

Obituary

F. N. Day, of Hazleton, Penn., secretary of Pardee & Co. for many years, died recently of ailments incident to old age.

John Pugh, of Kingston, Penn., aged 67, one of best known mining men in the anthracite coal region, died on Nov. 26, at his home, following a prolonged illness. He was a man well versed in sinking mine shafts and his operations extend throughout the anthracite and soft coal fields of Pennsylvania and Virginia. His widow and three sons survive.

Evan D. John, director of the Illinois Department of Mines and Minerals, died at St. John's Hospital, Springfield, Ill., Thanksgiving morning, at 6:45 o'clock, after an illness of five weeks due to a complication of diseases. Mr. John was 57 years of age and had been prominent in state mine work for a number of years. He served several terms as mine inspector under Governors Tanner and Deneen, and was a member of the state mining board in 1910, serving for a time as its president. After the consolidation of various state bureaus under the direction of Governor Lowden, Mr. John was named Director of the State Department of Mines and Minerals. In this capacity he had shown excellent judgment and ability, especially during the period of the war, when the mines of the state were taxed to their limit in producing coal. Mr. John was 57 years of age. His home was at Carbondale, Ill. He is survived by his widow, one son and three daughters.

Recent Coal and Coke Patents

Coal Mining Machine. J. Gricar, Lowell, Ariz., 1,278,333. Sept. 10, 1918. Filed Jan. 25, 1917. Serial No. 144,518.

Automatic Dumping Mining Car and Tipple. D. S. Allison, Salt Lake City, Utah, 1,278,551. Sept. 10, 1918. Filed Mar. 7, 1918. Serial No. 221,450.

Coking Apparatus. F. Pribyl, Wilmette, Ill., 1,279,757. Sept. 24, 1918. Filed Nov. 4, 1913. Serial No. 799,113

Dump Car Mechanism. S. Brown, Chicago, Ill., 1,280,152. Sept. 24, 1918. Filed Apr. 17, 1918. Serial No. 228,995.

Mine Working Machine. N. A. Newdick, Columbus, Ohio, 1,278,196. Sept. 10, 1918. Filed Jan. 28, 1916. Serial No. 74,744.

Smoke Consumer. A. Habig, Montreal, Quebec, Can., 1,278,639. Sept. 10, 1918. Filed Oct. 26, 1915. Serial No. 58,007.

Smoke Consumer. R. J. Johnson, Lake Benton, Minn., 1,278,937. Sept. 17, 1918. Filed May 10, 1917. Serial No. 167,770.

Safety Device for Mine Cages. L. Pichler, Fort Wayne, Ind., 1,278,742. Sept. 10, 1918. Filed Jan. 10, 1918. Serial No. 211,207.

Coupling for Mining Cars. H. J. Williams, Nanticoke, Penn., 1,278,541. Sept. 10, 1918. Filed May 4, 1918. Serial No. 232,534.

Smoke Consuming Apparatus. I. Therrien, Quebec, Can., 1,279,939. Sept. 24, 1918. Filed Mar. 12, 1917. Serial No. 154,197.

Furnace Arch. J. S. Fulton, assignor to United Stokers Corporation, Chicago, Ill., 1,278,326. Sept. 10, 1918. Filed Oct. 31, 1917. Serial No. 199,577.

Furnace Structure. R. M. Spencer, assignor Columbus Heating and Ventilating Co., Columbus, Ohio, 1,278,777. Sept. 10, 1918. Filed Jan. 23, 1913. Serial No. 743,721.

Industrial News

Manchester, Ky.—The Horse Creek Coal Co. has filed notice of an increase in its capital to $24,000.

Columbus, Ohio—The Flint Ridge Coal Co. has increased its authorized capital from $1000 to $275,000.

Louisville, Ky.—The Harlan Coal Co. has filed notice of an increase in its capitalization from $200,000 to $250,000, to provide for proposed extension.

Youngstown, Ohio—The Youngstown Sheet and Tube Co. has completed arrangements for the construction of a large new coal-handling plant at its works.

Phillipsburg, Penn.—The Hindle Coal Co. has been incorporated with a capital of $20,000 to operate a general coal business. W. H. Hindle is the principle incorporator.

Sunbury, Penn.—The Shoop Coal Co. has been granted permission by the State Water Supply Commission to dredge coal from the Shamokin Creek in the vicinity of Sunbury.

Philadelphia, Penn.—The Holler Coal Co. has been incorporated with a capital of $20,000, to engage in general coal-mining operations. B. D. Jones is the principal incorporator.

Chicago, Ill.—The Chicago Pneumatic Tool Co. announces the appointment of L. C. Sprague as assistant secretary of the company, with headquarters at 52 Vanderbilt Ave., New York City.

Dover, N. H.—The Boston & Maine Railroad Co., Boston, Mass., has awarded a contract to the H. Wales Lines Co., 134 State Street, Meriden, Conn., for the erection of a new coaling station at its local properties.

Ashland, Ky.—The Lackey Mining Co., capital $12,000, has been incorporated by J. W. Kitchen, Sam Porter and R. D. Clere. Mr. Kitchen is an extensive lumber operator with large interests in Kentucky and Tennessee.

Webster, Penn.—The United Coal Co., First National Bank Building, Pittsburgh, has awarded a contract to Phiel & Miller, Wabash Building, Pittsburgh, for the construction of a new river coal tipple at its local properties.

Morton's Gap, Ky.—The Peerless Coal Mining Co. has been incorporated with a capital of $60,000 to develop coal properties in the Morton's Gap district. H. L. Browning, Cleve Medlock and William O'Bryant are the incorporators.

Charleston, W. Va.—The American Eagle Colliery Co. has been incorporated with a capital of $600,000 to engage in general coal-mining operations. V. L. Black, George S. Crouch and L. G. Summerfield are the principal incorporators.

Chicago, Ill.—The John A. Stewart Electric Co., John A. Stewart, president, formerly of Cincinnati, Ohio, has opened offices in Chicago at Room 1034, 208 S. La Salle St. The company will handle second-hand machinery, both electric and steam.

Clarksburg, W. Va.—The Gaston Coal Co. has been incorporated with a capital of $25,000 to engage in the development of coal properties in the vicinity of Clarksburg. James Cain, Elkins; and R. L. and H. L. Hart, Clarksburg, are the incorporators.

Scranton, Penn.—The Barton Coal Co., Scranton Life Insurance Building, is planning for the immediate erection of a new coal washer at its properties at Peckville, to have a capacity of 500 tons. The structure is estimated to cost $15,000.

Sandy Run, Penn.—M. S. Kemmerer & Co. have completed arrangements for the construction of a new one-story coal breaker at their local properties, estimated to cost $10,000. Frank B. Davenport, Coal Exchange Building, Wilkes-Barre, is engineer.

McKeesport, Penn.—The Firth Sterling Steel Co. has awarded a contract to Phiel & Miller, Wabash Building, Pittsburgh, for the construction of a large new coal-handling plant at its works, to cost, in connection with other improvements, approximately $200,000.

Charleston, W. Va.—The Charleston Coöperative Coal Co., recently incorporated with a capital of $96,000, is planning to commence work at an early date on the development of approximately 900 acres of coal properties in the Riverview section, to have a capacity of 100 tons daily. H. J. Ferimer, Catlettsburg, Ky., is president.

Fairmont, W. Va.—A ruling of the state fuel administration, recently issued, requires all retail coal and coke dealers to register with the county fuel committee on or before Dec. 10. Such registration, which will be made without charge, is to be a prerequisite to the transaction of any business, and each such retail dealer must register in each county in which he deals.

Wilmington, Del.—It was announced on Nov. 25 that the Pennsylvania R. R. has purchased ten acres of land adjoining the tract secured by them some time ago at Gordon Heights, for their proposed coal piers, which are to be moved from Greenwich Point. The lands purchased will enable the company to construct miles of tracks adjoining the piers and runs parallel with their present main line.

Wilkes-Barre, Penn.—Wilkes-Barre's coal land assessment will be 25 per cent. higher during the next three years. This was decided on Nov. 23, at a meeting of the board of assessors under the triennial assessment. The coal lands today are valued in the city at $15,000,000 and will be increased to almost $21,000,000. Under the old assessment anthracite taxable property brought $130,000 yearly in taxes to the city.

Bluefield, W. Va.—The King Coal Co., according to a well-substantiated report, became a part of the extensive interests of the Houston Coal Co., headed by T. E. Houston, of Cincinnati, on Dec. 1. The King Coal Co. includes what was formerly operated as the Tidewater Coal and Coke Co. While the consideration involved has not been made public, it is said to involve a large sum and the deal is said to be one of the largest and most important consummated in West Virginia in some time.

Cincinnati, Ohio—At a meeting of leading members of the coal trade, including prominent operators and dealers, held at the Hotel Sinton on Nov. 25, the situation in this section was declared to be satisfactory for the coming winter, although the amount of coal available for distribution was stated to be limited. The volume of fuel stored by domestic consumers is such that there will be little suffering should very severe weather come, it was stated. The labor situation at the mines was discussed, as was the outlook for the export trade.

Charleston, W. Va.—Changes have been made in the districts of several of the district mine inspectors by the State Department of Mines. James Golden, of the Ninth district, has been transferred to the Fourth district at Fairmont. H. L. Butler has been transferred from the Fourteenth district to the Thirteenth at Welch. R. L. Lambee goes from the Tenth to the Ninth district at Macdonald. L. B. Holliday has been transferred from the Thirteenth to the Sixth district at Charleston, and Eli Mason will hereafter have charge of the Tenth district, being transferred from the Fifth district.

Charleston, W. Va.—The Chesapeake & Ohio Ry. has cut down the daily quota of cars for each mining district receiving empties from its lines because of the reduction of production during a part of October, due principally to the influenza epidemic. Operators declare this is not fair because production would have been extremely large but for the epidemic. The road has promised, however, to see that mines have enough cars. The allotment reductions for empties measured in tons per day are as follows: Kanawha, from 42,570 to 26,650; New River, from 41,940 to 26,890; Coal River, from 16,400 to 9870; Guyan, from 67,930 to 41,340.

Washington, D. C.—At a meeting of the executive committee of the National Retail Coal Merchants Association, held here Nov. 11 and 12, a number of important matters were discussed. Cyrus Garnsey, Jr., assistant Federal Fuel Administrator, met with the committee and discussed freely many of the problems confronting the Administration and the retail dealers. The organization went on record as favoring 2000 lb. as the standard weight of a ton of coal, and the officers were authorized to secure legislation to that end. A resolution was adopted proposing the continuation of the Fuel Administration for the remainder of the coal year.

Columbus, Ohio—War prosperity, together with careful management, has resulted in the lifting of the receivership of the Sunday Creek Coal Co., of Columbus. The receivership was brought about more than three years ago by creditors, and John H. Winder was named as receiver. Previous to that time an equity in the company had been acquired by John S. Jones. During the receivership all of the claims were paid off, and Mr. Jones acquired practically all of the outstanding securities, including stocks and bonds. Attorney Barton Griffith has been president, but he is expected to resign, and Mr. Winder will be named to that position.

Philadelphia, Penn. — The Greensburg Coal and Coke Co., Commercial Trust Building, has received a letter from the commanding general of the Eastern Department Headquarters of the United States Army, expressing deep appreciation of the hearty coöperation rendered by the company in the recent campaign to secure candidates for the Infantry Central Officers' Training School, at Camp Fremont, California. The Greensburg Coal and Coke Co. furnished office facilities and clerical assistance to Capt. H. G. Vawter, examining officer from the Eastern Headquarters, and rendered a service that was deemed of great value to the War Department.

Morgantown, W. Va.—What may be termed the salvation of the Scott's Run operations, whose owners belong to what is known as the Scott's Run Operators' Association, is the decision of the Railroad Administration putting into effect a prorate between the Morgantown & Wheeling Ry., over which coal is transported to the connecting line—The Monongahela Ry.—and the latter line, relieving the operators of 40c. a ton on coal for a very short haul—a charge which threatened to drive the Scott's Run people out of business. Before the new rate becomes effective it will have to be approved by the circuit court, since the short-line railroad company is being operated by a receiver.

New York, N. Y.—The Exchange Bureau of the wholesale Coal Trade Association of New York, Inc., will be put into operation on Dec. 9, and the first list of offerings and requirements will be distributed the following day. But one change has been made in the rules, a summary of which has already been printed in *Coal Age*, (Vol. 14, No. 22, p. 1006), the price at which coal is offered will not be shown, it being decided by the Board of Directors that all matters other than the mere bringing together of the parties should be left to those directly interested. The Board of Directors also reached the conclusion that it will not be possible to extend the privileges of the Coal Exchange to retail dealers.

Toledo, Ohio—With the lake season almost over, lake shippers at this port are going over records to see just what the season had in store for them. On the whole the season was probably the most successful in the history of the lakes and a large tonnage was moved to the Northwest. The Hocking Valley docks up to Nov. 23 loaded 5,021,345 tons, which is almost 200,000 more tons than were loaded during the entire season of 1917. The docks loaded 100,487 tons during the week ending Nov. 23, compared with 125,798 tons the previous week. Officials of the Hocking Valley Railway said that there were approximately 1600 cars yet to be loaded on vessels. The Toledo & Ohio Central docks during the week ending Nov. 23 loaded 50,000 tons as compared with 135,000 tons the previous week, making a total of 2,174,028 tons.

MARKET DEPARTMENT

Weekly Review

Opinion Divided as Regards Continuation of Federal Control of Soft Coal Industry—Strong Arguments for Returning Industry to Competitive Basis — Anthracite Situation Will Probably Right Itself by End of Year

SHALL the Federal Fuel Administration continue to exercise its control of the coal industry, or shall it wind up its affairs at once and permit the law of supply and demand to prevail, as in pre-war days? This, in essence, is the all-absorbing question now being discussed in coal-trade circles. Opinion is by no means unanimous. Operators who are mining high-grade bituminous coal are emphatic in their demands that the industry be returned to a competitive basis, while those mine owners who are not so favorably situated as regards the excellence of their product desire that the Administration function until its life expires with the signing of the peace treaty. Indications, however, point to an early relinquishment of control of the soft-coal industry by the Administration; and the stage is being set with this end in view.

When the country was at war, every step taken to encourage maximum production was a step in the right direction, and every restriction placed on distribution was so placed for a very definite reason. With the country at peace, however, most of these radical innovations are no longer necessary. Instead of quantity, the demand of the consumer is now for quality. The market is overstocked with soft coal, much of it of an inferior grade that can find no buyers. In the meantime the high-grade coals that consumers in certain zones would gladly purchase are being produced by mines in other sections of the country; and, unfortunately, many of these mines have been forced to curtail operations because the zoning laws prohibit them from shipping their product outside the established boundaries.

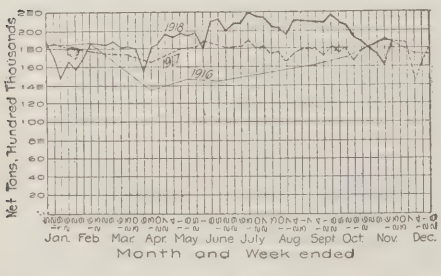
It is evident, therefore, that the Fuel Administration will go far toward stabilizing the coal industry and benefiting the consumer when it gives up control of bituminous coal. Inefficient mines, and mines producing poor coal, will then no longer be in position to market their product at prices which are beyond all reason, and high-grade coals will once more be enabled to sell in localities where a demand exists for them.

It can be stated as an axiom that whatever is true of soft coal is untrue of anthracite. This being the case, therefore, the continued control of the production and distribution of hard coal by the Fuel Administration would seem to be the most logical course to pursue in order to prevent profiteering. Anthracite is as scarce as bituminous is plentiful, though the shortage is confined chiefly to Pennsylvania, Delaware, New Jersey and New York—states that are quite near the source of supply.

The anthracite shortage in the localities named amounts to 626,776 tons, which is less than three average days' output of the mines. With augmentations to the labor forces from the ranks of those released from the army and discharged from munitions works and other war industries, it is expected that the deliveries of hard coal will be brought up to the allotments set by the authorities by the end of the year.

WEEKLY COAL PRODUCTION

The record-breaking steady decline in the production of bituminous coal, from the high point of over 13,000,000 tons a week, the last of September, to less than 10,000,000 tons, seven weeks later, came to an end the middle of November. In the week ended Nov. 23 production rose to nearly 11,000,000 tons, a gain of 12.5 per cent. The estimated production in the week of Nov. 23, 1918, was 10,931,000 tons, compared with 9,703,000 tons in the week of Nov. 14, and 11,187,000 tons, or 2.3 per cent. less than in the corresponding week



of 1917. The average daily output rose from 1,617,000 tons to 1,820,000 tons, but below the figure of 1,865,000 tons for the corresponding week of 1917. The total production of bituminous coal and lignite, including coal coked, Apr. 1 to Nov. 23, is estimated at nearly 400,000,000 net tons, a gain over the corresponding period of 1917 of 40,000,000 tons, or 11 per cent.

Reports of production and working time for the week of November 16 show for the first time this year loss of production because of no market comparable to the loss because of transportation disability. The transition in the comparatively short period of a few weeks from a condition of car shortage to one of car surplus is significant because indicative of the possibility of a reversal later with a return of unfavorable conditions. This condition has been brought about by the accumulation of stocks, made possible by the heavy shipments during the past four months, the possession of which has taken the keen edge off the industrial demand, and by the fair weather for this time of the year that, while favoring transportation, decreases the consumption of coal.

The production of anthracite in the week ended Nov. 23 is estimated at 1,778,000 net tons, an increase compared with the week of Nov. 16, of 373,000 tons, or nearly 27 per cent., but 263,00 tons, or 13 per cent., below the corresponding period in 1917. The total production of anthracite, Apr. 1 to date, is estimated at 65,358,000 net tons.

All districts except southwest Virginia shared in the increase in the week of Nov. 23 over the previous week, but all districts except Fairmont were below the corresponding week of 1917. The totals for the year to date for all districts are greater than the same period of 1917.

Coal dumped at Lake Erie ports, including vessel fuel, in the week ended Nov. 23 was 567,990 tons, a decrease of 71,500 tons compared with the week of Nov. 16. Nov. 23 marked the official closing of the lake season of 1918, and with nearly 28,000,000 tons of cargo coal dumped at lower lake ports set a new high record. Loading of coal at the mines for lake shipment ceased (except for small quantities of special-purpose coal) on Nov. 16, two weeks earlier than last year.

Shipments of bituminous coal to New England in the week ended Nov. 23 were 412,376 net tons, 1200 tons less than in the week of Nov. 16, but below the average per week from Apr. 1 to date of 569,729 tons. Under the recently revised estimate of requirements New England is now up to schedule as to receipts of soft coal. In the week ended Nov. 23 increases over the previous week were recorded in the movement from Hampton Roads and Baltimore, and decreases through New York harbor and through New England all-rail gateways.

Bituminous coal dumped at North Atlantic ports decreased from 755,932 net tons in the week ended Nov. 16 to 735,843 tons in the week of Nov. 23. A slight increase at Baltimore was more than offset by decreases at New York and Philadelphia and at Hampton Roads.

The production of beehive coke in the United States in the week ended Nov. 23 is estimated at 521,000 tons, a decrease of nearly 6 per cent. below the previous week and 19 per cent. below the corresponding week of 1917. Although the output of byproduct coke increased the total production of coke declined. Two-thirds of the decrease in output of beehive coke was in the Pennsylvania regions, where shortage of labor continues to be the chief limiting factor. Operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania report production of 275,497 tons of beehive coke and shipments of 135,550 tons of coal, both representing decreases compared with the week of Nov. 16.

The production of byproduct coke increased slightly in the week ended Nov. 23 from 571,00 tons to 574,800 tons. The percentage of capacity obtained in output decreased, however, from 88.7 to 88.3, and the increase in output is due to a gain in capacity, mainly in Pennsylvania and Ohio. The chief factor limiting output continues to be repairs to plants and affects nearly all sections, particularly Alabama, Kentucky, Massachusetts, New York and Pennsylvania. Capacity production was reported from no state.

BUSINESS OPINIONS

Marshall Field & Co.—Current wholesale distribution of dry goods is running slightly less than for the corresponding week of 1917. Road sales for both immediate and future delivery also were a little below the total for the same period a year ago. The number of customers in the house was about the same as for the corresponding week of 1917. Collections are excellent.

Bradstreet's—Trade and industrial reports are more irregular than at any time since the peace armistice was signed, cancellations of government orders vying in

interest with reports of former non-essential lines starting up or preparing to assume their old importance, and the general tendency is to strike a waiting attitude pending clearer views of future supplies and prices of materials and labor.

Dry Goods Economist—Retailers in all sections of the country report business as excellent, with the principal activities on holiday goods and materials needed for winter wear. The relief from the tension of war conditions is reflected in increased purchases of various commodities. Collections are good. Because of the practical ending of the war, the restrictions of the Council of National Defense which had been put on the sale of holiday goods, and on the employment of extra salespeople, by retailers, have been called off.

The Iron Age—The Steel Section of the War Industries Board has notified all steel manufacturers that it will discontinue allocation of steel on Nov. 30, and thereafter dealings will be directly between Government and other purchasing agents and the manufacturers. A conference at Washington, Dec. 11, between the manufacturers and the Price Fixing Committee may result in extending official prices, with or without change, for another three months, but there is a growing feeling in favor of an early return of the industry to a free basis. Nothing definite has developed concerning the large amounts of pig iron and steel said to be required for Europe. The need is not immediate and the supply of ships is problematical.

American Wool and Cotton Reporter—Until wool values have been definitely established for the readjustment period into which this country is now entering, the woolen and worsted industry must remain in great uncertainty as to future procedure. Canceling of orders for goods has disorganized the industry from top to bottom, and it may be some little time before a satisfactory working basis can be brought about. The Indian cotton crop is 2,000,000 bales short, so the Continent must come to this country for supplies to make up for this lack. As the Indian cotton crop is of low-grade quality, the demand on this account without doubt will absorb large quantities of the low-grade cotton here. Cancellation of Government orders for cotton goods since the armistice is the outstanding feature, offset by the talk of increased freight allowance for the same.

Atlantic Seaboard

BOSTON

Stagnation in the steam trade. Prospect of an end to price-fixing interests the trade. Receipts further reduced. Pennsylvania operators seem indifferent to New England business, yet it is hard to see where tonnage will be placed later. Hampton Roads situation unchanged. New York market dull. Question whether Tidewater Coal Exchange will be continued. Bituminous department of New England Fuel Administration now disbanded. Anthracite receipts show slight increase. Mild weather a sign of steady improvement. Retail prices advanced and restrictions practically off. Municipal distribution in Boston causes comment.

Bituminous—A more lifeless market it would be hard to imagine. With overtime discontinued, and more than a few industries shutting down for two- and three-day periods, not to mention the average reserve supply of twenty weeks, steam coal is today the "druggiest" commodity in trade. It is almost amusing, after the tremendous efforts to save fuel and speed up the unloading of cars, that now, on the verge of winter, it is next to impossible to find a buyer, and the New England railroads are actually storing empty coal cars because their Western connections are not taking them back to the region. Indeed, there are empty coal cars stored on all connecting lines as well, and were it not for Government control there is more than one railroad that because of the extremely light traffic of all kinds would not pay expenses. Movement of coal in this territory is certainly at a low ebb, and there seems no one wise enough to make a safe prediction for the interval between now and Apr. 1.

Should the Government price cease to be effective, as now rumored will be the case, we shall have a highly interesting situation. It is thought that such a move will not in any way create an additional market, but what will become of the thousands of contracts approved by the Fuel Administration and stipulating the last effective Government price as the figure established for the balance of the contract term? In such a situation does any one suppose these provisions, although the essence of the contract, will remain unaffected if the market level is a dollar a ton less? There are a lot of interesting problems to work out, but apparently the fuel authorities have no wish to supervise the process.

Receipts continue the lightest of the year. The average daily movement of bituminous at the five New England gateways has dropped to 260 cars, and railroad fuel has been reduced to 58 cars, a total of 318 cars as compared with 750 in July and August. Water receipts show an even larger reduction. There are agencies at Hampton Roads that are practically confining themselves for the present to making up their debits in the Tidewater Coal Exchange, and chartering almost no bottoms at all. The larger distributors inland have their hands full to find outlet for such coal as reaches the terminals at this end, and every available inch of storage is being used in order to free boats without excessive demurrage. "Orders" are being padded freely. Some glaring cases of shipment being made on requisitions long out of date are the subject of comment among the trade.

While a few operators in Pennsylvania are taking advantage of some of the emergency orders filed with them months ago, a large number of the mining interests have apparently no difficulty in moving their reduced output readily. In the high volatile fields production has diminished to such extent that emergency orders have been obliged to wait. In directions other than New England railroad fuel is in good request, and that has been a reason for the diffidence on the part of operators toward new business in New England. Some of the same shippers have coal due railroads in this territory, but they are headed for disappointment if they expect the coal to be received.

Wagon-coal has now disappeared from the market, so far as this district is concerned. Open-top cars are also being furnished the wagon-loaders, but on this equipment the 75c. extra does not apply, and sales are few and far between on any coal of this origin.

The situation at Hampton Roads continues about the same as when last reported. Bottoms are available about as fast as the coal reaches the piers, and there are now comparatively few cases of detention. The number of boats loading for New England, however, is relatively small, due to the great difficulty of arranging for disposition at this end.

An interesting question involves the future of the Tidewater Coal Exchange. Through our troublous period all will agree that it has made a surprisingly good showing, and undoubtedly railroad management in general will strongly favor its continuance. On the other hand, the coal of individual shippers and agencies loses its identity, and thereby the shippers in many cases are deprived of a great asset in trade. All things considered, the latter interests are likely to prevail in the end, for too much of the competitive feature of the business would be eliminated.

The New England Fuel Administrator announced on Dec. 1 that he relinquished all control of the distribution of bituminous, leaving the steam grades to be handled through normal trade channels. The bituminous staff has therefore been disbanded.

Anthracite—Receipts of domestic sizes all-rail improved slightly the week beginning Nov. 24. The daily average was 337 cars, or 21 more than for the week previous. Water receipts were also somewhat better, although there is room yet for improved shipments by barge from New York.

There are multiplying signs of easier conditions in hard coal generally. There has been a great deal of duplication in entering applications on the part of the general public, and this situation has been extremely hard to police. The recent advance of $1.05 at the mines and the end of the war have accomplished what no amount of regulation could have achieved. The result is a great sifting of the orders now on the books of retailers, and householders beyond number are discovering they have on hand in their cellars enough to see them comfortably through the season. The mild weather has also had a great deal to do with this, and should it continue for a few more weeks and production increase, as we have reason to expect, there will soon be a marked change in the anthracite situation. In many cases retailers who supposed themselves to be far short of the receipts they should have had are finding their current business much reduced in comparison with normal years. The buying of bag coal and fractions of a ton has been very much reduced, due to higher wages and the great extent to which the laboring class bought their six-ton lots as fast as the coal could be had.

It is probable that the fuel authorities will retain supervision of anthracite for some weeks to come, although there are indications here that even this will be of short duration. Emergency coal to the extent of 70 cars daily is moving to the order of Mr. Storrow at the five gateways, but it is apparent that something like the "last call" will soon be issued to those towns that are still behind on their quotas. These latter are communities where the retailers have rather weaker connections, and it is to assist such situations that "free Storrow coal" is still being distributed.

Effective Nov. 29, the Boston Fuel Committee, acting on the advice of Mr. Storrow, allowed an advance of $1 a ton at retail to take care of the wholesale advance applying on coal mined beginning Nov. 1. Boston local prices are now as follows:

Broken, egg, stove, and chestnut	$12
Pea	11
No. 1 buckwheat	10

The local fuel committee has again urged pea coal upon the attention of householders as being an effective substitute for the larger sizes.

Mr. Storrow has now authorized in Massachusetts a general modification of the two-thirds delivery rule, and local fuel committees have been asked to use their best judgment in dealing with local situations. It has been pointed out that it would be desirable to fill existing orders up to two-thirds with the lower-priced coal before any such modification, but when this is accomplished by some method of coöperation between dealers who have less orders and those who have more, the retailers are then to be directed to clean up in full all orders of six tons or less, delivery of four tons on all orders where that tonnage is required, and then delivery up to 80 per cent. on all orders above twelve tons, and finally the completion in full of all orders on the books of dealers. This authorization will be welcomed, of course, by a large number of communities where deliveries have lately been at a standstill because no one would give authority to make deliveries beyond the original two-thirds rule, regardless of the local situation.

The Boston City Council has called in question the methods pursued by the municipal fuel bureau. Those in charge of the latter have apparently been following a safe and sane policy, having regard for the emergency character of the service to be rendered, and some regard also for profit and loss. This is not satisfactory to some of the city fathers, who profess to believe that a municipality can and should sell for less than the regular trade agencies. That the fuel bureau was discouraging sales seems to have caused high dudgeon.

NEW YORK

Domestic sizes of anthracite short, and various industries must not be served with egg, stove or chestnut. Supply of buckwheat and smaller sizes plentiful. Epidemic reported to be lessening. Return of soldiers will be the salvation of the industry. Slump in bituminous narrowly averted. Slow up in production believed to have prevented drop in prices. Additional pools added to coals available for bunker purposes.

Anthracite—Conditions in the New York market are far from satisfactory from the viewpoint of a consumer of domestic sizes. Users of pea and the smaller coals have nothing to fear. There is more than plenty of these sizes to take care of their needs, and many household consumers are using No. 1 buckwheat in their furnaces with egg coal. There is plenty of this size to be had while the quantity of pea coal on hand is said to be unusually large for this season of the year. This is due to the failure of the consuming public to take advantage of the opportunity to secure pea coal, which could be used in most instances instead of chestnut.

An order dated Nov. 22, issued by Reeve Schley, New York County Fuel Administrator, forbidding the delivery of domestic sizes, including pea and larger, to office buildings, banks, retail and department stores, city club houses, loft buildings and numerous other similar classes of consumers, was temporarily modified on Nov. 27 so as to permit the delivery of pea coal to such consumers. At the same time retail dealers are urged to make every effort to substitute broken or pea sizes to domestic consumers who have ordered egg, stove or nut sizes, even to the extent of advising such consumers that they may not be able to obtain the size they have ordered.

Reports from the anthracite fields received here indicate a slight increase in production, with a continued increase in sight

now that the influenza epidemic seems to be letting up, and mine workers who temporarily bettered themselves in other industries are returning to the mines. It is estimated that if the 7500 mine workers to be released by the War Department will return to their former jobs their return will increase the output of coal from 300,000 to 350,000 tons a month.

The Anthracite Committee of the Fuel Administration continues to place embargoes on shipments to communities in various states, directing the distributors to concentrate deliveries to other points in the same states. The Committee also issued an order discontinuing shipments of domestic sizes, including pea, to 216 communities in the Province of Ontario, Canada, and directing that shipments be concentrated to other communities in the Province.

Dumpings at the local docks continue to show a falling off. For the week ended Nov. 29, 4869 cars were dumped as compared with 5599 cars the previous week. For the 30 days of November 21,891 cars were dumped, according to the reports of the Regional Director of Railroads, as compared with 26,616 cars in October and 27,944 cars in September.

The situation as regards egg, stove and chestnut in New York is serious. Dealers are well booked ahead with orders for these three sizes. There is an unusually large supply of broken coal on hand, while pea coal is more plentiful than usual.

With No. 1 buckwheat being delivered to householders, the supply will soon diminish to normal conditions. There is a large accumulation of rice and barley, with some cutting of barley prices reported. Inducements, it is reported, are being made to buyers of these two sizes of an equal quantity of bituminous coal if wanted.

Current quotations, per gross ton, f.o.b., tidewater, at the lower ports are as follows:

	Circular	Individual		Circular	Individual
Broken	$7.80	$8.55	Buck	$5.10	$5.90
Egg	7.70	8.45	Rice	4.65	5.10
Stove	7.95	8.70	Barley	4.15	4.30
Chestnut	8.05	8.80	Boiler	4.60	
Pea	6.55	7.30			

Bituminous—The influenza epidemic has proved to be the salvation of the situation. To its ravages many shippers attribute the present stability of the market, for without it or some other agency which would have resulted in a curtailing of production, such as the epidemic caused, there would have been a surplus of coal as to have resulted in an overloaded market and a severe cutting of Government prices. At present there is no great surplus of coal and prices are holding steady.

There is a good demand and producers of high grades are having more or less trouble in taking care of their regular trade. This is due in most part to the numerous Government orders and demands for railroad fuel. Cars are in good supply, but labor is short because of illness which is said to be increasing in certain sections of the central Pennsylvania fields. The situation in that section is serious, and producers find themselves hardly able to take care of current needs.

The cancellation of the storage regulations had no appreciable effect on conditions. While the ban has been lifted from many of the so-called non-essential industries, there is a shortage of labor and no need for a full supply of fuel such as would be necessary under normal conditions.

Producers say that many of the mine workers who have been ill from influenza are now returning to their work, but owing to their weakened condition are not able to remain all day. They are, however, showing their willingness to do their part in regaining some of the tonnage already lost. Not much hope is held out by the producers that the tonnage lost will be made up, but the operators hope to increase production sufficiently to take care of current needs and to prevent any further shortage. Considerable will depend, however, upon the time required for industrial conditions to become adjusted.

The report from Washington on Nov. 30 that Dr. Garfield may remove the price restrictions on bituminous elicited little comment among the trade. No one cared to vouchsafe what might or might not happen in such an event.

Improvement in bunkering conditions is expected to follow the adding of Pools Nos. 4 and 10 to that class, giving vessels the choice of Pools Nos. 1, 4, 9, 10 or 11 from which to receive their coal. While some delay has been occasioned by a lack of suitable fuel for this purpose, most vessels have been able to make sailings on time. With shipping increasing now that hostilities have ceased, there is likely to be a demand for bunker fuel that will be hard to meet.

The decrease in production is reflected in the dumpings at the local piers for the week ended Nov. 29, 5037 cars having been dumped as compared with 6121 cars the previous week. For the month of November, 24,582 cars were dumped as compared with 28,568 cars in October and 30,440 cars in September.

Current quotations, based on Government prices at the mines, net ton f.o.b., tidewater at the lower ports, are as follows:

	Mine Gross	F.o.b. N. Y. Gross
Central Pennsylvania:		
Mine-Run, prepared or slack	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of Mine	3.08	5.23
Prepared	3.36	5.51
Slack	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite dealers complain of light deliveries. Improvement sporadic. Retailers planning for peace conditions. Stove and nut scarce, pea fairly free, egg plentiful. Inside information is that situation will be met. Steam sizes about normal. New wage demands upon retailers. Bituminous shows some signs of stiffening. High-grade coals scarce. Wagon mines cut. Bunker coal scarce.

Anthracite—Another week of strained relationship between the dealers and their shippers must be recorded. Just as the climax of dissatisfaction appeared to be reached, the largest operating company commenced consigning coal to this market. From present plans, it would seem that the trade of these shippers, which is located chiefly on the Philadelphia & Reading tracks, will receive substantial allotments for two or three weeks. This is not certain, however, and the trade has been so advised, because past experience has shown that preferential instructions may be received from the fuel people for some other points that may change the present arrangements. It is intimated that the present improvement is due to the shutting off of lake shipments, although we hardly believe this can account entirely for the increased shipments by one company, which is continuing a fair volume of tonnage all-rail to lake destinations.

In spite of severe criticism of the Fuel Administration, all hands admit, however, that the regulation of prices and the selling of coal at a fixed margin of gross profit has been most beneficial. Dealers are already discussing the possibilities of coöperation after peace has been finally declared and the Fuel Administration has gone out of existence. They hope to keep their business on the high plane which the administration has placed it, and to eliminate the price cutter, whose methods were often questionable. This city was probably the worst affected community in the country from the point of price-cutting and its attendant evils, such as extension of long credits in order to procure competitive business.

As for the past few weeks, the cry is still for stove and nut sizes, and unquestionably there is less of these two sizes in the yards than at any time since last winter. Every dealer is being tormented by his customers, and the dealers in turn are making miserable the lives of their shippers. With the possible exception of several of the suburban yards, all report as being in very fair shape on egg coal. Pea coal is still in stock in a number of the yards, where efforts are being made to have buyers accept it as a substitute for chestnut.

In talking with representatives of various operating interests, they are most optimistic as to the city's needs being cared for this winter. A number of them predict that they will actually have their sales forces on the road in March soliciting orders, and go further in saying that if the winter is a mild one this will happen even earlier. Some concerns even now occasionally send out their sales forces to ascertain the lay of the land, as it is felt that the business of each concern will be considerably rebuilt when the dealers once more have the opportunity of selecting their shippers.

In the steam coals, buckwheat has recently shown unexpected strength. In this connection one of the local retailers advertised buckwheat as a domestic fuel this week, quoting a delivered price of $6.75 per gross ton. This was the first direct advertising of any coal dealer for over a year. Rice has also improved to a moderate degree, while the same cannot be said of barley. Ever since bituminous became easier the demand for the anthracite steam sizes under buckwheat have fallen off very much.

The retail dealers have lately been confronted with new wage demands by their help. The yardmen want a minimum wage of $26. The men insist on a half-day Saturday, except July and August, when the yards shall be closed, but with full pay. Overtime to be at the rate of 75c. an hour after 5.30 p. m., and time and half time after 12 noon Saturday. Inasmuch as the fuel administration has refused to grant the retailers an increased margin, the demands have practically been rejected by the retailers.

The prices per gross ton c.o.d. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.25	Buckwheat	$3.40	$4.45
Egg	4.80	6.15	Rice	2.90	3.80
Stove	5.05	6.40	Boiler	2.70	3.70
Nut	5.15	6.50	Barley	2.40	3.30
Pea	3.75	5.00	Culm	1.25	2.15

Bituminous—While the general situation is still somewhat easy, there is a growing scarcity of real high-grade coals. There is a good supply of ordinary fuel, but even this coal is being moved with less effort than during the past three weeks. Reports are occasionally heard of price shadings on this latter coal, but even this is growing less. One factor tending to a tightening of the situation is that many of the wagon mines are almost out of business, due to their inability to get cars. The railroad authorities have practically denied them a supply of box-cars, claiming they have greater need for this equipment in other lines.

At the piers there is a scarcity of coal in bins Nos. 9 and 10. This is stoker coal of the highest grade, such as South Fork and Scalp Level. Many ships are standing idle waiting for fuel, and it is stated in the upper ports there were as many as 100 waiting at one time. They can obtain the ordinary coal, but are insisting on the best.

BALTIMORE

Every day sees an increase in soft-coal offerings, although best grades are still held tightly. Hard-coal situation aided by mild weather.

Bituminous—An easing bituminous situation is in evidence. For the first time in months there are a number of men here with coal to sell or who will have coal to sell shortly; and many letters are coming through daily from mines offering coal to jobbers or consumers, or feeling out for future relations as soon as additional war contracts are announced. Box-car coal has been almost completely kept from the market for a few days, and in some regions the Baltimore & Ohio placed an embargo against movement of that character.

The receipts of open-top coal here, and some little box-car coal, chiefly on orders of some little standing, have been ample to care for all needs. Better grade coals are still tightly held, however, through the fact that the Government has not released them to the general market. In this connection it is a little odd to know that while such coals are not available in any quantity as yet for the open market, that at times there is a big accumulation here for Government account. In some cases several hundred carloads of high-grade coal have remained on sidings and at terminals here for many days at a time before being moved. At one time last week one Government pool here had over 400 carloads of high-grade coal standing.

Reports from the mining district are to the effect that production has dropped off because miners will no longer hustle as they did under the lash of patriotic endeavor. Two-, three- and four-day-time men are again developing, and the higher wage scale of these days seems an inducement in many cases to do only a part week. For the time being, however, this cut in production has probably aided materially in stabilizing the market and preventing quotations here from going below the Government maximum.

Anthracite—The hard-coal situation here has been made a little easier than expected through the continuance of mild weather. The estimate that around 100,000 tons still remained on the books undelivered, and that as much more would like attention at least in part immediately, has been softened by the fact that a number of additional consumers have been given one- and two-ton lots. Stove and nut coal remain very scarce here, and those who can only use those fuels are in more serious plight than consumers who can use egg or pea.

Lake Markets

PITTSBURGH

Market shows no softening. Celebrations and influenza cut deeply in production. Wagon mines still operating.

Prospects of the Pittsburgh coal market dropping below the maximum Government limits have receded almost to the vanishing point, the curtailment in production in the past three weeks disclosing what light stocks were carried by consumers tributary to the district. In this regard the situation is different from that obtaining with much territory served by Ohio and more western districts. The increased demands made upon the Pittsburgh district for coal for lake shipments, beyond the original quota for the district, prevented any material accumulation of Pittsburgh coal by consumers.

Production of coal in the Pittsburgh district had reached a rate of about 1,200,000 net tons a week, when lake shipments were at from 300,000 to 350,000 tons a week. Owing partly to the peace celebration and partly to increased effects from the epidemic of influenza, production was only 700,000 tons in the week ended Nov. 16, the week of the peace celebration, and there was an increase only to 800,000 tons in the following week. Production last week, with a holiday, is not reported yet, but was probably less than 800,000 tons, as working forces on Friday were not as large as in the first three days of the week.

Shipments of Pittsburgh coal have been shut off except to certain specified consumers, including railroads, byproduct coke ovens, public utilities and retail dealers, but application can be made for coal by consumers who show that they have no stocks to draw upon. The byproduct ovens are but indifferently supplied, and have little by way of stocks.

There has been no important cessation of operation by wagon mines, and they are still obtaining full limit prices. By reason of the extra trucking charge allowed, on which a profit is made, their selling prices are higher than those of rail mines, and if there is to be any decline in the regular Pittsburgh market it will be preceded by a closing of many of the wagon mines. Thus, apparently the trade would have ample warning of a prospective market decline; yet there are many consumers even now seeking to buy at cut prices, entirely without success, and the market is quotable firm at Government limits; slack, $2.10; mine-run, $2.35; screened, $2.60, per net ton at mine, Pittsburgh district.

CLEVELAND

Excepting only an occasional holdover cargo, the lake season has come to an end. Steam-coal users, for all practical purposes, are not buying a ton, seeking to use up the high-cost fuel in their stockpiles. Domestic users have supplies sufficient to tide them over the turn of the year, when they believe prices will recede.

Bituminous—Big blocks of low-grade coal, comprised mainly of the outcrop from stripping operations, have been thrown on the market in northern Ohio at from 50c. to $1 under the Government maximum. A concession of 70c. seems to be the favorite figure. While it no doubt is true that a few scattering operators, alarmed at seeing surplus piles at the mines increasing, have made slight concessions on standard No. 8 coal, the great majority of operators appear to be standing pat. Declarations that they will shut down their mines before they will shade the Government schedule are frequently and firmly made.

The steam-coal market seems to have developed into a tug between buyers and sellers. Industrial plants now have the labor to bring in fuel from stockpiles and are not buying at all. The few plants that must have spot supplies are buying from hand to mouth. Opinion is unanimous among steam-coal users that prices are going down. Operators on the other hand are just as insistent that under present conditions they cannot make much of a concession before they reach the deadline on profits. The weight of the "bear" argument is that if enough buyers hold out long enough prices will tumble. Stripping property operators and producers of No. 6 and other so-called low-grade coal have succumbed, and are making many of their proffers on this basis: "If you won't consider this block at so much off the Government maximum, what will you offer for it?"

Car supply at Ohio mines has picked up markedly, and now is less than 15 per cent. short. So far as production and shipments are concerned, the supply is 100 per cent. The end of the lake trade for 1918 has resulted in some gondolas being put in storage. The railroads themselves now are taking very little fuel for they, like the industrials, have stockpiles to reduce. With Thursday out for Thanksgiving, the hunting season on and influenza not yet entirely bested, last week virtually was a three-day one. Operators are content with such a situation, not pressing their employees or seeking to obtain more than a nominal output, with the market so much narrower.

Cold weather that set in early last week made the domestic market much more brisk, but not to any great extent. Domestic consumers have half their winter's coal in, generally speaking, and are showing a disposition not to buy the other half until necessity impels. Retailers are seeking business just as earnestly as in pre-war days, but without resorting to cut prices except in occasional instances.

Anthracite—County Fuel Administration officials have definitely stated the cessation of hostilities will not effect an increase in the district's allotment of anthracite. Receipts continue nominal and, if anything, are decreasing. Domestic consumers are preferring the better grades of No. 8 coal now available to the No. 1 buckwheat they are offered.

Lake Trade—The Northwest's 28,000,000 tons of bituminous was floated by the official ending of the lake season Nov. 23, and the daily loadings at Lake Erie ports last week, which had to be specially arranged through the Coal and Ore Exchanges, averaged less than 40,000 tons, or four vessels. Anthracite will be shipped from Buffalo so long as the carriers are operated.

DETROIT

Heavy stocks of bituminous at industrial plants and in yards of retailers prevent normal seasonal business. Anthracite supply deficient. Lake movement drags.

Bituminous—Due to the somewhat frenzied buying of a few weeks ago, many of the leading users of steam coal and numerous retail dealers find they are holding larger stocks than they desire to carry. This situation has cut down the volume of buying and produced a market condition more sluggish than is customary at this season of the year. Jobbers have been able to do very little business, aside from that coming from steam-coal consumers whose storage facilities are restricted and who therefore find it necessary to operate on a basis of hand-to-mouth.

The circumstance that considerable of the coal in stockpiles is the product of mines in Indiana and Illinois that are not producers of the best coals in those states is said by some of the jobbers to be the probable explanation of why a number of the stockpiles have taken fire. The fact that much of this coal has also found its way into yards of retailers is one of the reasons suggested for slow absorption by household consumers.

Such buyers who have been compelled to forego the exclusive use of anthracite in heating plants feel that if bituminous is to be substituted, it should be a high quality of bituminous from West Virginia and Ohio, instead of the lower grade coals. The retailers who are loaded up with the Illinois and Indiana coal, however, are not now in position to supply the better class of stock.

Anthracite—Householders are still clamoring for anthracite, while the supply remains light. Receipts in the local market in November are much short of the movement in October. The state fuel administrator has given warning that chestnut and stove sizes are to be reserved to enable distribution of another two tons to users of baseburner heaters.

Lake Trade—Loading of coal for lake shipment was practically finished on Nov. 23. There are, however, a few shippers who are still striving to fill shortages on their commitments. Because of the active demand for vessel capacity for holding storage cargoes of grain, the supply of tonnage to be had for moving coal is becoming daily more limited. Anthracite forms a considerable proportion of the present lake shipments.

COLUMBUS

The coal trade in Ohio is still rather weak, more especially in steam grades. Consumers are using surplus stocks and are loath to buy heavily at this time. Some price cutting results.

The Ohio trade is in a period of readjustment, which is affecting every department of the industry. The domestic trade is least affected because of a good demand for lump among certain dealers. Retailers look forward to a good trade as soon as weather conditions are more favorable, but so far there have been no cold snaps to stimulate trade. Reports show that fully 75 per cent. of the fuel required in cities has been stored by householders. In the rural sections, however, it is believed that no more than 35 or 40 per cent. has been stored. Consequently, dealers in the smaller towns are looking for a good trade in the near future. Retail prices have not been cut, and there is no indication of shading soon. The so-called fancy grades, such as New River and splints, are in the best demand. No Pocahontas is coming into the local market. Anthracite is practically out of the market. Dealers have considerable mine-run, which will probably prove an elephant on their hands.

The steam business shows the most weakness. Steam users have reserve stocks to last for two to five months, and are thus not inclined to buy for the future. As a result there is a slight overproduction of mine-run and slack. Some mines have been closed down for want of orders, and others will probably follow suit unless conditions are radically changed. Railroads are not taking as much fuel as formerly. On the whole, the steam trade is in bad shape.

The lake trade is now practically over, although some coal was loaded during the past week. The cargoes were generally those of boat lines controlled by shipping companies. The Northwest is now well supplied with fuel, and no famine is anticipated in that section. The season was one of the most active in the history of the lake trade.

Production in Ohio fields is still curtailed by influenza. In addition, lack of orders is cutting into the output. As a result of the slowing down, the production in the Hocking Valley field is estimated at 60 per cent. Pomeroy Bend is producing about 55 per cent., and the same figures are reported from Cambridge and Crooksville. Eastern Ohio has been having a good car supply, and the output is nearly 70 per cent.

CINCINNATI

Colder weather has stimulated demand somewhat, but industrial demand continues cautious. Supplies are improving, with better conditions at mines.

Decidedly colder weather during the past week, the most wintry of the season so far, resulted in the usual stimulus to business, as the demand for coal for heating purposes developed from both domestic and other consumers who had not stored fuel during the summer and early fall months. Retailers are well supplied, however, and the flurry did not cause any great excitement among jobbers and operators' agents. Discussion among the trade has centered principally on the prospects for industrial business during the remainder of the winter and next spring, as cancellation of war orders among some branches of industry has resulted in some alarm regarding the future of these industries.

Reports from Washington indicate that there will be come effort made to prevent undue hardship on concerns having war contracts, but this is not expected to enable them to continue operating on the same full basis which has been the case for the past year. In lines not dependent on the war, activity promises to be on a normal scale, if not larger, and consumption of fuel will accordingly be up to the usual mark.

On the whole, prospects for the coal business are taken as satisfactory, although the unbroken record of an excess of demand over supply which existed last winter is not expected. More vigorous sales work is therefore in prospect than has been necessary for more than a year, and the trade is getting down to business under conditions approximating those prevailing before the war.

LOUISVILLE

Colder weather only prospect for increased business at the present time. Domestic demand very quiet, industrial demand quieter, and general market dead. Some price cutting reported.

The steam demand represents merely hand to mouth, or actual requirements of consumers. Everyone apparently has stopped stocking, and the general opinion of consumers now is that they can get all the coal they want, when they want it. With industrial conditions unsettled, the steam consumers do not care to tie up money in coal. Many industrial plants are reducing working hours from ten to nine and even eight, including some of the railroad shops. This is naturally reducing steam consumption, as industrial demand of all kind has slacked off since peace was declared and cancellations of orders started coming in.

In the mining sections things are virtually at a standstill. Many new companies, incorporated recently and planning developments, are holding up until they see

how things are going to work out. Several concerns which had taken bids on additional buildings have held up contract awards. Many of the larger mining companies have no business on hand and very little in sight. While few companies are reported to be laying off labor, at the same time no one is replacing men who are leaving, or making any attempt to secure hands or get back men who went into other industries. Unless the demand picks up shortly it is believed that some of the mines will be forced to cut working hours and lay men off.

The powder plant at Nashville which had been taking a large volume of coal from western Kentucky has reduced operations materially, and this has thrown an additional supply on domestic and steam markets which had been figured for Nashville.

The operators of the Pittsburgh and West Virginia fields, who for some time have been forgetting river coal and making no attempt to ship to lower Ohio and Mississippi River points, are showing interest in recruiting barges and towboats to handle river coal. Some fair shipments have come down the Ohio whenever boating stages would permit.

Several reports have been received during the past few days relative to price cutting. A few small retailers have been cutting prices 15c. to 20c. under Government prices in order to secure business. Wagon mines have also been cutting prices in order to get business on inferior coal and to dispose of box-car shipments which are not wanted. However, the open-car supply is improving so rapidly that box-car shipments will not be made much longer.

BIRMINGHAM

Steam trade requirements fair, but no insistent demand except from the railroads and public utilities. Domestic holds up strong, with no improvement in the supply. Production from 75 to 80 per cent. normal.

Steam coal consumers in industrial lines appear to be fairly well stocked on coal and are content with receiving their regular stipulated shipments, and in some cases have expressed a desire for a curtailment. However, the railroads and public utilities seem to be short and are taking all the coal that is available for application on their requirements. They are probably looking ahead to the Christmas holidays, as it is pretty generally anticipated that mine workers will celebrate more extensively this season than usual, and there will be a heavy slump in the output. Local coal men are of the opinion that the trade will hold up well through the coming winter and that there will be ample demand to absorb the anticipated production. The Fuel Administration has lifted the ban on coal storage and supply for industries classed as non-essential during the war, which should increase the demand to some extent.

Domestic trade is active and there is a great scarcity of coal of this grade. Retailers have not accumulated stocks to any extent, as consumers have kept up a lively demand since Apr. 1 and there is far more coal in storage than ever before in this section.

Production is improving slowly, owing to the great extent to which idleness exists on the part of the mine workers, and the output for the week ending Nov. 16 reached the low level of 329,190 net tons, a decrease of some 19,000 tons compared with the previous week.

Director General William G. McAdoo spent a short time in the city Thanksgiving day, and during his visit reviewed with representatives of the civic associations the proposed plans for Warrior River development, which have been favorably reported upon by Government investigators.

Coke

CONNELLSVILLE

Increased curtailment in production, leading to blast furnaces banking. Terms of contracts for first half. Market firm.

The curtailment in Connellsville coke product that began in October was at first not felt by blast furnaces, which seemed still to be adequately supplied. The blast furnaces had some stocks, but they averaged less than a week's supply. As production has continued to decline, the blast furnaces have been seriously affected. The Carnegie Steel Co. alone has banked five blast furnaces on account of insufficient coke supplies, and all the banked furnaces are tributary to the Frick ovens in the Connellsville region. The company has blown out one stack at Ferrell, for rebuilding, thus releasing some byproduct coke, or the situation would be worse. The company now has 50 furnaces operating, with five banked and four out of blast.

During September production of coke in the Connellsville and Lower Connellsville region averaged fully 340,000 tons a week, there being a progressive decline, until at the end of October the rate was under 300,000 tons. Week before last production was under 250,000 tons, chiefly on account of influenza, and last week's production, with a holiday intervening also, may not have been over 225,000 tons.

Among coke consumers there was an expectation the end of the war would be followed rather promptly by a decline in the coke market from the Government maximum limits. If a decline really was due, it has been forestalled by this sharp decrease in production, and there has also been a decrease, although a relatively slight one, in the production of byproduct coke. The majority of blast furnaces that use merchant coke have made contracts at one time or another for their supplies for the first half of the new year, the usual form of contract specifying the Government price at time of delivery, or if there is no Government price then the open market obtaining. There has been so much of this contracting that there is a little question whether, in the event of Government price control being withdrawn, there will be enough open market business to establish clearly an open market price from time to time. The market is quotable very firm at Government limits: Furnace, $6; foundry, 72-hour selected, $7; crushed, over ¾-in., $7.30; clean screenings, over ½-in., $5.50, per net ton at ovens.

The "Courier" reports coke production in the Connellsville and Lower Connellsville region in the week ended Nov. 23 at 242,105 tons, a decrease of 17,825 tons, and raw coal shipped at 165,796 tons, a decrease of 19,444 tons.

Middle Western

GENERAL REVIEW

Coal production falling off. Buyers not in market and producers do not expect any change in market conditions before Jan. 1.

A glance at the recent Government reports on tonnage of coal produced in the United States shows a big decrease in production. This general tendency holds true in the producing districts of this territory, as the figures in the district representative's office show that the tonnage for this week will be even smaller than that of the week previous. Under the circumstances, this decrease is a good thing, as it is keeping the market from becoming utterly demoralized.

Operators have made up their minds to close their mines one or two days a week, rather than operate at full time and have unsold coal on their tracks at night. This decrease in the production figures for Illinois and Indiana has had little effect on the buying public. Instead of being alarmed over the situation, they are not interested and are not purchasing coal. The state of mind of the average purchasing agent appears to be that he now has an opportunity to burn the storage coal he laid in during the summer, and has therefore cut off all further shipments of coal.

The gist of interviews with a number of the larger operators appears to show that the general opinion is that the coal industry in the Mid-West district will have to face an unprecedented hardship until say from Jan. 1 to Mar. 31. After that period the optimists claim that the reconstruction program will be well under way, and consequently will work a relief to the operators. In the meantime, not much change in market conditions is to be looked for, at least before the first of January.

CHICAGO

In spite of cold weather market conditions are sluggish. Anthracite situation improving.

Chicago had one or two days of cold weather last week, but it was not enough to make much change in either the steam or retail situation. Both the householders and the large industries have enough coal on hand to last for some time, and, contrary to previous conditions, the market will not be subject to much fluctuation on account of weather conditions. During the height of the cold spell there was little demand for domestic coal, either the cheaper grades or the best to be had from the Southern fields of Illinois.

The anthracite situation is perhaps a little better than heretofore, as most of the dealers are getting all the anthracite they have room for. The trouble appears to be that once the dealer receives his hard coal, he is unable to dispose of it, on account of the many rules and regulations devised by the state fuel administration.

ST. LOUIS

The market continues quiet with mild weather. Plenty of cars, transportation good, and no demand for steam or domestic. Railroad coal movement good. Prospects not encouraging.

The St. Louis market continues heavy, with nothing encouraging to look forward to, unless it be some extraordinarily severe winter weather. The local retail demand is practically nothing. A little coal is moving, but the tonnage is so small that it is not a factor. The current steam business helps a little, but in a general way there is no coal coming into St. Louis to speak of. The same condition applies to the country business.

Large steam plants are using up their surplus, realizing that no buying on the part of a large number has a tendency to bring the market down, so that when the time is ripe they can begin to put coal away, if necessary. One large plant is taking one half of its current needs out of the storage pile and buying on the open market at greatly reduced prices.

Screenings are heavy from all fields and in the Standard market are bringing about $1.50 at the mine. Carterville screenings are plentiful, and here and there a slight break in the Government price is reported.

The railroads at this time are the lifesavers in the Standard coal fields, and this applies also to the Mt. Olive and Carterville fields. The tonnage of railroad coal the past week has increased and it is likely to from now on. Some large contracts are being made right now that will carry through to the first of April on railroad business, running into several hundred thousand tons from the Standard field.

Throughout the field the tonnage is increasing at the individual mines, although it means less days of work, because the miners affected by the influenza epidemic are returning to work. In the Mt. Olive field the mines are working exceptionally well, and a good tonnage moves north.

In the Carterville and Du Quoin fields there is a slight surplus of coal. Prices are holding remarkably well. Railroad tonnage here continues good, cars are rather plentiful and the supply of men is getting better.

There are no outside coals coming into the St. Louis market except a little Arkansas, and this does not run over ten to twelve cars per week right now. The price of this coal is so outrageously and unreasonably high that the public in St. Louis will not stand for such imposition.

Coke is plentiful, with no buyers, because the price is too high.

With the exception of Standard coal prices, on which screenings are $1.25; 2-in. lump, $1.75; 6-in. lump, $2, and 2 x 6 egg at $2, and Mt. Olive lump slipping a trifle, there is no change from the Government maximum prices, which are, f.o.b. mine per net ton:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.55@2.75	$2.55@2.75	$2.40@2.70
3x6-in. egg	2.55@2.75	2.55@2.75	2.40@2.70
2x3-in. nut	2.55@2.75	2.55@2.75	2.40@2.70
Washed:			
No. 1	3.05@3.20	3.05@3.20	.....
No. 2	3.05@3.20	3.05@3.20	.....
No. 3	3.05@3.20	3.05@3.20	.....
Mine Run	2.35@2.50	2.35@2.50	2.20@2.30
Screenings	2.17@2.32	2.17@1.32	1.50@1.60

Special preparation on Carterville is 10 cents extra.
Williamson & Franklin Co. rate is $1.10.
Other fields 95 cents.

General Statistics

BALTIMORE & OHIO

The following is a statement of the coal and coke tonnage moved over the Baltimore & Ohio system and affiliated lines during the month of July, 1918, as compared with the corresponding month of the previous year:

	1918 Tons	1917 Tons
Coal	4,564,857	3,259,844
Coke	290,772	316,557
Total	4,855,772	3,576,401

COAL AGE

Volume 14 New York, December 12, 1918 Number 24

That We May Continue Joyful

THANKSGIVING day has come—and gone. We have offered our thanks for a bountiful harvest; but that bounty of nature, cut and garnered, will do us little good if by lack of care we let it heat, sour and spoil. We have rendered thanks for the victories of the war, but we must never forget that what is gained by valor is often lost by poor diplomacy and the mutual jealousies of the victors.

ABOVE all, we gave thanks for the new spirit of mutual understanding, perhaps the best gift of the war and also the most fleeting. That unity of hearts may well disappear as mysteriously as it came. The war found capital and labor organized into bodies to wage an economic conflict, but the contending parties quickly forgot their old enmities as they became absorbed in their new duties. The keynotes of the war are not hatred and violence, but rather mutual respect and helpfulness.

LET us be careful lest this good grain garnered in generous measure, but carelessly housed, furnish us with nothing but impotent regrets. We have learned since the war so much as to the essential uprightness of all men—manual laborers, mental workers and capitalists. We have acquired a generosity which has surprised us all. We have renewed our beliefs in the importance of all those things the value of which cannot be expressed in money.

We have seen that under favorable conditions there are the possibilities of good in all assemblies of men, whether the men thus assembled form labor unions or employers' associations. The generous spirits of men refuse to permit them to confine their discussions to the promotion of their selfish interests. We have learned that if we only appeal to the good, that the good is there; that the making of agreements can be such a pleasant occasion as to be the source of friendships rather than the occasions of embitterment. We have been surprised by the small part played during the war by narrow self-interest.

We have seen the influenza come and take nearly six times as many victims as the war, and from that fact we have learned how important is medical attention and universal education in the art of prophylaxis. We have learned the dangers of having a population of foreigners which we have done little to welcome and nothing to educate. We have been encouraged by the patriotism of the alien and by his ready appreciation of the little we have done to win him.

LET us keep all we have gained, every foot of the spiritual domain we have conquered, all the joy of giving, all the democracy, all the faith in others, all the largeness of vision, all the depth of our Americanism, all the pleasure of our larger world consciousness. The things which the war has given us are big, the biggest of all things. We have drunk deep of the new elixir of life. Let us not willingly go back to the small beer of the days before the war—to its squabbles, its doubts, its meannesses and its animosities. Thanks to the Germans, we have learned how bad is evil and how glorious is our heritage of kindliness and good will.

Use and Abuse of Electric Headlights on Mining Locomotives*

By K. W. MACKALL
Syracuse, N. Y.

THREE different types of headlights are in use on mining locomotives today, and each has certain characteristics peculiar to its type. A thorough understanding and application of these characteristics will overcome most headlight troubles. There is nothing mysterious about a headlight. It is simpler than the motors, controller, wiring, etc., which comprise the electrical equipment of a mining locomotive, but it seems to be abused more than all the rest of the machinery combined. It is unfortunate that not only the motormen but even the men who couple cars consider themselves competent to "fix" headlights instead of leaving that to the shop electricians.

The luminous arc headlight possesses the inherent advantage of high illuminating efficiency, owing to the composition of the lower electrode. It is the most efficient of all types of headlights commercially available, unless it is possible to operate the extremely low voltage, high-current Mazda lamps, such as the 6-volt, 18-amp. lamp. The maintenance cost of this headlight is low, since it requires no inclosing globe for the arc and the upper electrode is practically non-consuming, while the lower electrode has a life of from 125 to 150 hours of burning.

Owing to the fact that the upper electrode is practically non-consuming, the arc is always maintained at the focal point of the lens or reflector. Adjustment of this upper electrode is necessary only once in two or three months' time.

A headlight of this type has the disadvantage that a certain amount of fumes that must be wiped away are given off from the arc, and the headlight is not quite so simple as an incandescent headlight because it has several moving parts. One other disadvantage which it possesses in common with all arc headlights is that the natural travel of the arc around the electrodes causes the beam to wander slightly from side to side, but its many advantages more than offset these.

One of the greatest causes of poor illumination from luminous arc headlights is improper care of the upper

*Paper presented before the Coal Mining Institute of America, at Pittsburgh, Penn., Dec. 5, 1918.

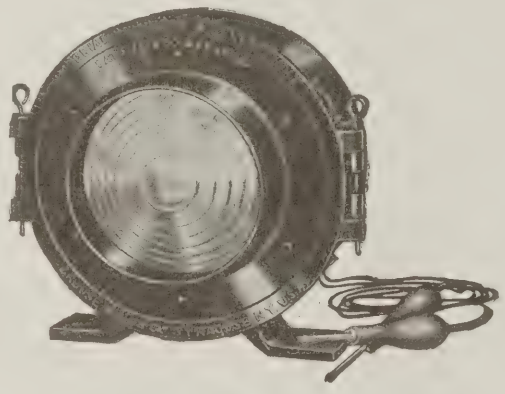


FIG. 1

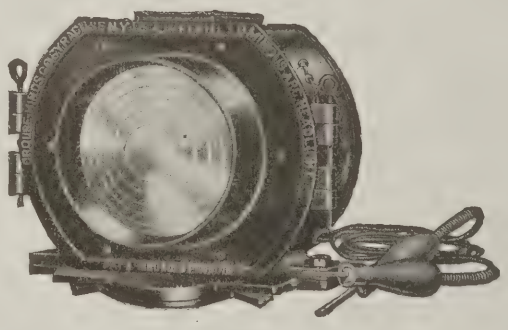


FIG. 2

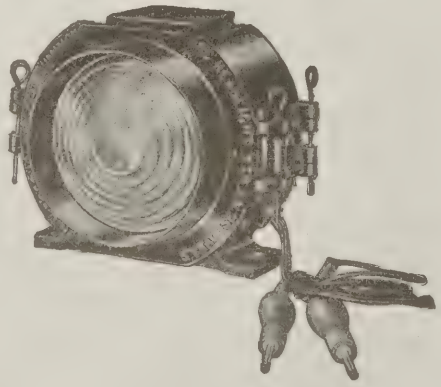


FIG. 3

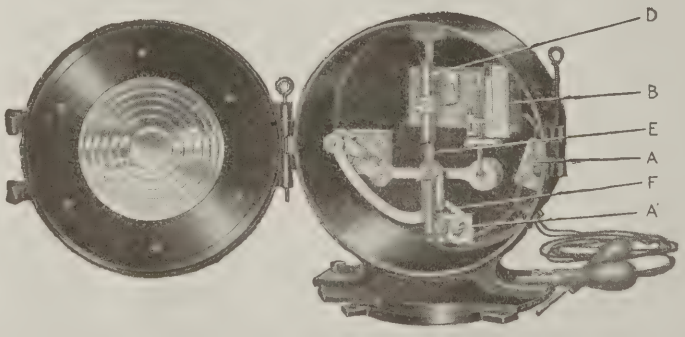


FIG. 4

FIGS. 1 TO 3. VARIOUS TYPES OF LUMINOUS ARC HEADLIGHTS. FIG. 4 SHOWS INTERIOR OF A SINGLE-COMPARTMENT LUMINOUS ARC HEADLIGHT

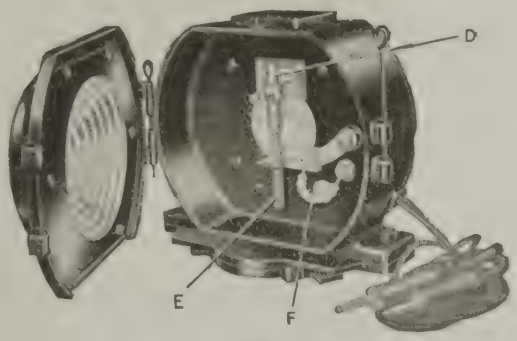


FIG. 5

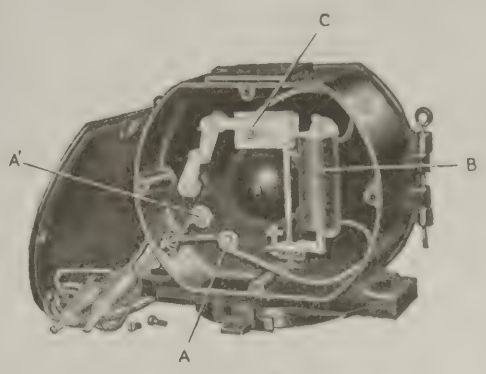


FIG. 6

FIGS. 5 AND 6. ARC COMPARTMENT AND MECHANISM COMPARTMENT OF LUMINOUS ARC HEADLIGHT

electrode. This electrode should be adjusted once in every two or three months' time, but I have seen cases where they have not been adjusted for perhaps a year. This means that the upper electrode is burned away from $\frac{1}{2}$ to $\frac{3}{4}$ in. and the arc is struck that distance above the center line of the headlight, resulting in poor track illumination.

The result of this inattention to the seemingly unimportant headlight is obvious to all, and I have seen headlights operating under conditions which would bid fair to lay up a locomotive if another piece of the equipment upon it were run in a similar manner.

The earlier forms of luminous arc headlights were of the single compartment type; that is, the arc and mechanism were in the same compartment (see Fig. 4). Later development brought out the two-compartment headlight (Figs. 5 and 6). Fig. 5 shows the front compartment containing the electrodes, between which the arc is struck. This compartment is hermetically sealed from the rear compartment (Fig. 6), which contains all the operating mechanism. In this type of headlight the fumes given off by the burning arc cannot accumulate on the mechanism parts. Therefore, the headlight works more freely and gives practically no trouble from a "sticky" mechanism. The chief advantage of this two-compartment headlight is that the mechanism is out of the way and, therefore, unauthorized persons are not so liable to tamper with it. This advantage sometimes works to a disadvantage, for when major repairs are necessary, the headlight must be entirely removed from some locomotives, because it is mounted too close to the frame to permit repairs to be made. Notwithstanding this, the two-compartment headlight has proved more reliable and more economical than the single-compartment headlight.

The connections are traced as follows (see Figs. 5 and 6): Starting at binding post *A*, the positive side, the current flows through the magnet coil *B* and then to the insulated stud *C*, through the partition. This insulated stud connects directly with the upper electrode *D*. Current then flows through the lower electrode *E* to the flexible connector *F*, to the negative terminal post *A*. It is essential that these connections be observed, particularly the polarity.

The external connections are simple, as everything is connected in series. The circuit runs (Figs. 7 and 8) from the trolley through a protecting fuse and a resistance to the contact switch, which may be either one-way or two-way, according to whether one or two headlights are used per locomotive. From this switch current flows through the headlight back to a negative receptacle, which is grounded. Plugs and receptacles have been found advantageous for connecting the headlight to the circuit, since it is then possible to change to the proper headlight polarity, if the trolley for any reason becomes negative.

The headlight is shipped from the factory carefully adjusted for proper operation. If repairs are necessary, the mechanism should be readjusted as follows: First of all, loosen the magnet stop screw *C* (Fig. 9) and raise it so that it will clear the top of the armature *B*. Lift the armature *B* with the finger until the clutch *D* engages the stop *E*, and then raise or lower the clutch stop *E* until the arc length is from $\frac{5}{16}$ to $\frac{3}{8}$ in. The arc length may be measured (not guessed at) from the back by measuring the distance between the bottom of the clutch *D* and the top of the support *F*.

A final check should be made by actually measuring the arc length itself in the front compartment. Still holding the armature *B* so that the clutch *D* strikes its stop *E*, the magnet stop screw *C* should be lowered until it touches the top of the armature *B*—a slight pressure on the armature will give evidence of this touching.

Now back the screw *C* out about a half to a full turn and lock it in place. There must be a slight clearance between the bottom of the screw *C* and the top of the armature *B*. To be sure there is a clearance, let the armature *B* drop and raise it again, first holding a piece of tissue paper between the clutch *D* and its stop *E*. When the armature *B* is held in the top position the tissue paper should be held tightly between the clutch *D* and its stop *E* and should tear rather than pull out.

The idea is to obtain the proper arc length, with the clutch *D* striking its stop *E*, and then to have a slight clearance between the armature *B* and the stop screw *C*. If this clearance is too great, it will materially weaken the pull of the magnet, particularly at low voltages.

In order that the arc may be in the focal point of the lens, the bottom of the upper electrode should be $1\frac{1}{2}$ in. from the lower edge of the holder in Types MLD and

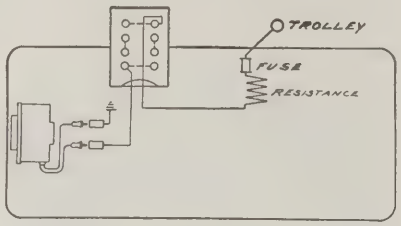


FIG. 7

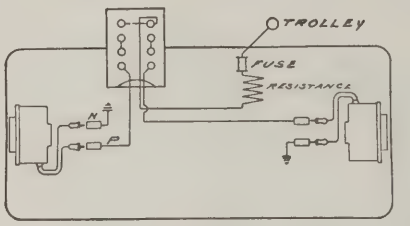


FIG. 8

FIGS. 7 AND 8. DIAGRAMS OF CONNECTIONS EMPLOYED WITH STATIONARY HEADLIGHTS
Fig. 7—Wiring diagram for stationary headlight with single-end equipment. Fig. 8—Wiring diagram for stationary headlight with double-end equipment

MLK headlights, while in Types ML and MLF this distance should be 1¼ in. The lower electrode should be so placed that its upper end is 1 to 1¼ in. above the upper edge of its holder. The proper knowledge and application of these adjustments will insure satisfactory operation of the headlight.

When the current is off, the electrodes are together. At the instant the current is switched on, the magnet coil is energized and lifts the armature. This motion is carried through the clutch rod to the mechanism and the arc is struck and maintained. The arc length remains practically constant since the rate of consumption of the electrodes is slow. Natural circuit interruptions, such as circuit breakers, sectionalizing switches, etc., cause the arc to break often enough to prevent its becoming too long.

The electrodes of luminous arc headlights burn a long time. The upper, positive electrode is made of copper and has a life of 3000 hours. Every two or three months it should be adjusted so that its lower face is the proper distance from the bottom of its holder. The lower, negative electrode has a life of 125 to 150 hours on 4-amp. headlights and 200 to 225 hours on 2-amp. headlights, and after ten hours' burning should be adjusted so that the burning end of the electrode is 1¼ in. from the top of its holder.

The arc voltage is 80 in both the 4-amp. and the 2-amp. headlights, and the difference between the arc voltage and the line voltage is taken up in the dead resistance which is connected in the circuit. To insure the proper arc voltage it is only necessary to keep the arc $\frac{5}{16}$ to $\frac{3}{8}$ in. in length.

The upper copper electrode is positive and the lower electrode negative. This polarity should be maintained. A reversal of polarity will mean poor operation, since the arc will be dim and unstable. Every arc is characteristic of its negative electrode. In the luminous arc headlight the negative electrode is a magnetite composition which burns with a brilliant white light.

When a new lower electrode is put in the headlight, it should be burned for about 5 min. before being sent out on a trip. This time is necessary to burn off the iron cap on top of the electrode, during which period the arc is somewhat unstable. Two leads with plugs are furnished with all luminous arc mining headlights so that proper polarity may be maintained at the headlight regardless of trolley polarity.

The headlight casing is ventilated and the air outlet so baffled that the arc cannot be blown out nor can rain beat in. On top of the casing is a ventilator, at the back of which is a long narrow opening. As the locomotive runs along, the air rushing past the sides of the headlight creates a partial vacuum in the ventilator, thereby causing the fumes to flow out of the casing.

About once a day the headlight should be cleaned; that is, the deposit from the electrodes should be wiped or blown from the lens and casing. In nearly every car shop compressed air is available, and this can be used to good advantage in blowing the deposit away. The mechanism entirely in the rear compartment should be kept free, but no oil should be used. The front door should be kept closed always and a broken lens replaced immediately. This is to prevent wind from blowing out the arc. A test for free operation of the mechanism is to switch the current on and then off again. The lower electrode will immediately come up against the upper with some little force.

Carbon arc headlights have the advantage of low initial cost and also that no fumes are given off by the arc to depreciate the reflector or lens. They are a reliable headlight and will operate for long periods of time with practically no attention to the operating mechanism. However, the lower efficiency of these headlights as well as the higher maintenance cost as compared with the luminous arc headlights, have caused them to take a position of secondary importance on

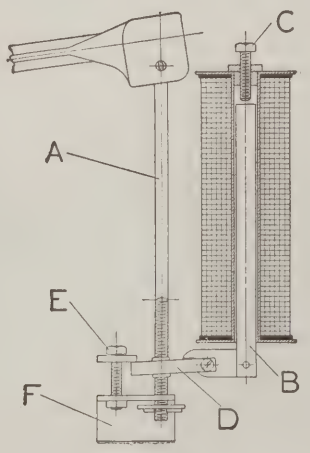


FIG. 9

FIG. 9. CLUTCH MECHANISM OF LUMINOUS ARC HEADLIGHT

haulage motors. This high maintenance cost is due to short-life electrodes and the necessary inclosing globe. Since both the upper and lower electrodes are consumed during the burning of the arc, it is necessary that the arc be readjusted to the focal point of the reflector every two or three hours. This adjustment is accomplished by moving the lower electrode up to its original position.

The carbons in all 4-amp. headlights burn 30 to 40 hours before they have to be renewed. In the 2-amp. headlights the carbons burn 50 to 60 hours. Only straight, fine-grained carbons should be used.

The inclosing globe is made of heat-resisting glass, carefully annealed to prevent cracking or melting. The ends are ground to insure perfect fit against globe seat and cap.

Figs. 14 and 15 show the external connections usually employed with carbon arc headlights. These connections are simple, since everything is connected in series. The circuit runs from the trolley through a protecting fuse and a resistance to the control switch, which may be either one-way or two-way, according to whether one or two headlights are used per locomotive. From this switch the current passes through the headlight to the ground.

The following adjustments are carefully made at the factory before headlights are shipped, and they should be maintained when making repairs. In the vertical carbon headlight the clutch picks up against the spacing bushing *Q* (see Figs. 16 and 17), which regulates the length of the arc. The stop screw *S* is adjusted so that there is a slight clearance between it and the top of the armature *C*. This adjustment is secured by holding the armature *C* up and moving the screw *S* down until it touches the top of the armature, and then backing the screw out a half to a full turn and locking it in place.

When replacing the reflector or the magnet coil *N*, care must be taken to see that the reflector does not touch the upper electrode holder. This can only come about through a variation in castings. To compensate for this variation the entire mechanism may be rocked slightly by means of the screws *T* and *T'*. When replacing the magnet coil *N*, the yoke must fit the coil head snugly. If the coil is allowed to "ride up," it may not center itself around the armature. It is always a good plan to bend the ends of the yoke together and spring them apart when putting the coil in place.

The internal connections of the headlight are simple and should be observed. The positive plug of the arc circuit terminates at the binding post *A*, to which is also connected one end of the magnet coil. From the other side of the magnet coil the current flows through the upper carbon to the lower carbon. The knurled wheel *K* is under spring tension and bears directly on the lower carbon. The entire lower carbon-holder is grounded. (See Figs. 16 and 17.)

In the Type M carbon arc headlights the arc current is from 4 to 4½ amp., and in Types V and VR headlights the current is from 2 to 2½ amp. The arc voltage of all headlights is 70 to 80 volts. To maintain this arc voltage it is only necessary to keep the arc length $\frac{3}{16}$ to $\frac{1}{4}$ in. The difference between the arc voltage and the line voltage is taken up by a dead resistance connected in the circuit.

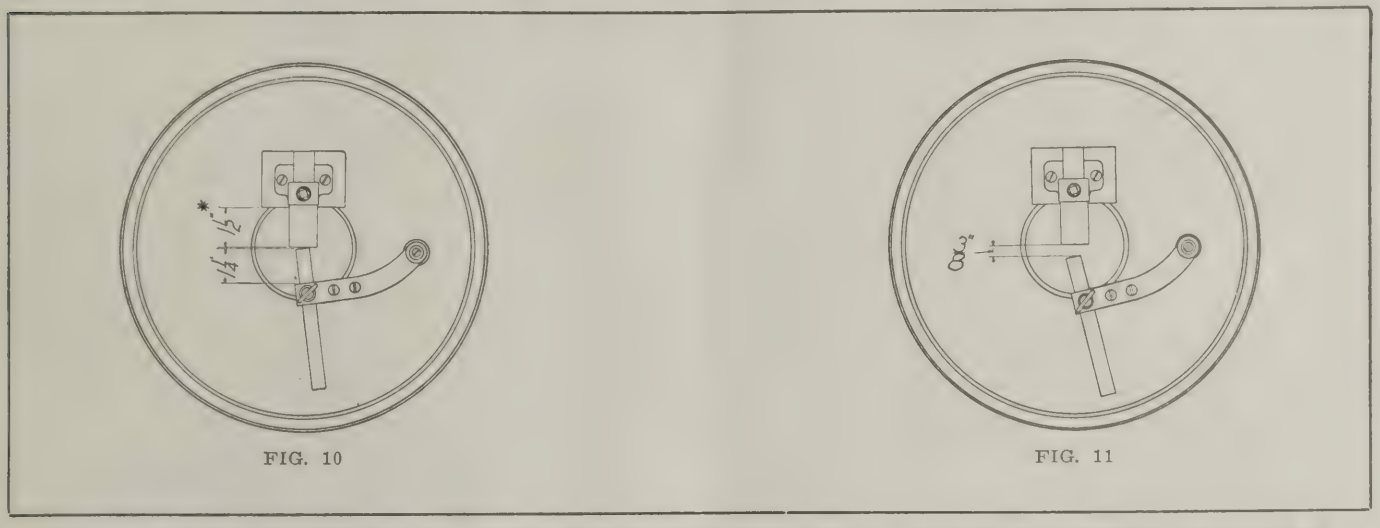


FIG. 10

FIG. 11

FIG. 10. ELECTRODE SETTING OF LUMINOUS ARC HEADLIGHT. FIG. 11. SHOWS ARC LENGTH OF LUMINOUS ARC HEADLIGHT

When the current is off, the two carbons are together. At the instant the current is switched on, the magnet coil is energized and lifts the upper carbon $\frac{3}{16}$ to $\frac{1}{4}$ in., thereby striking an arc between it and the lower carbon. The position of the lower electrode is fixed. Natural circuit interruptions, such as circuit breakers, sectionalizing switches, etc., cause the headlight to feed often enough to prevent the arc from becoming too long. If the headlight is left burning when the locomotive is standing still, the circuit should be broken at least once in 30 min. As the carbon burns away, the position of the arc changes—that is, it burns down out of focus. After about two hours' burning, the headlight should be refocused by turning the thumb wheel *B*. This should be done only when the current is turned off, because when the current is on the upper carbon is held up, and moving the lower carbon only increases or decreases the length of the arc.

A trimming gage (Fig. 18) is shipped with each headlight. This is to be used in properly focusing the arc. For this operation the upper carbon is removed and the trimming gage put in the holder until the shoulder rests against the top of the carbon-holder. The

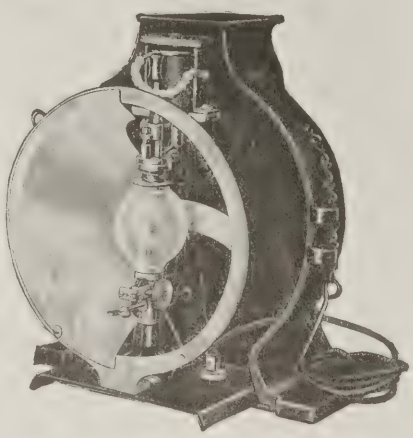


FIG. 12

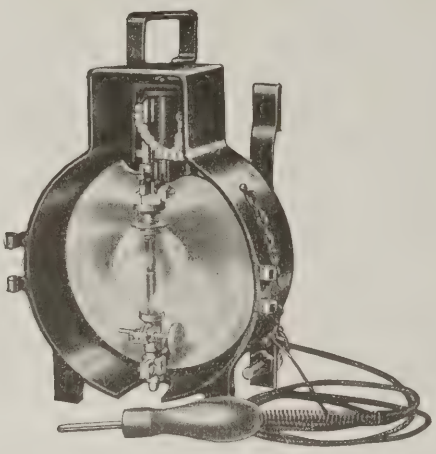


FIG. 13

FIGS. 12 AND 13. TWO TYPES OF CARBON ARC HEADLIGHTS

lower carbon should then be moved up until its top strikes the bottom of the trimming gage. After a little practice, however, the arc may be focused by the eye; that is, by simply moving the lower carbon until the narrowest obtainable beam of light is thrown down the track.

In all carbon arc headlights the upper carbon is positive and should be kept so. The headlight is so adjusted that when the arc is struck the tip of the upper positive carbon is at the focal point of the reflector. For the most part, the light of the carbon arc comes from the crater of the positive carbon, the actual light distribution being as follows: Upper (positive) carbon, 70 per cent.; lower (negative) carbon, 25 per cent.; arc stream, 5 per cent. If the polarity of the arc were reversed and the upper carbon made the negative side of the line, the arc would be out of focus.

In all carbon arc headlights the carbons may be renewed or adjusted without disturbing the globe, and, with the exception of Types V and VR, each headlight has its entire mechanism mounted on a frame which slides out of the headlight casing. These sliding mechanisms are moved forward a little for trimming. The stub of the upper carbon *G* (Figs. 16 and 17) is taken out of the top of its holder by simply lifting it. The lower carbon *H* is removed by turning the thumb wheel *B*. The lower carbon should be inserted first and adjusted to its proper position; the trimming gage shown in Fig. 18 should be used at this point, and should be put in the upper carbon-holder and the lower carbon moved up until its tip touches the bottom of the gage. Then the upper carbon should be inserted and the flexible conductor *F* slipped over its top. This flexible conductor should always be used as it insures positive electrical contact at all times. The use of this flexible conductor is necessary because no dependence can be placed on the sliding contact between the carbon and its holder. When the flexible cable is used there can be no arcing between the carbon and holder. This flexible cable must not dangle loosely against the reflector, since the cable is the positive and the reflector the negative side of the line. In Types V and VR headlights the mechanism is permanently attached to the back of the casing and therefore will not slide out. In these headlights both the upper and lower carbons are removed through the lower carbon-holder. Both carbons are released quickly by pulling outward on the shaft *K* of the thumb wheel *B* (Figs. 16 and 17). In renewing the carbons, the upper one should be put in first and moved up by turning the thumb wheel *B* until its top enters the upper carbon-holder, and then the lower should be put in. The lower one will raise the upper carbon to its proper position. In all headlights in which the carbons are vertical, the stub of the consumed carbon is the right length to be used as the lower carbon for the new trim.

In order to remove the globe *E* for cleaning, it is only necessary to lift the globe cap *I* against its spring and move the lower end of the globe forward. The carbons

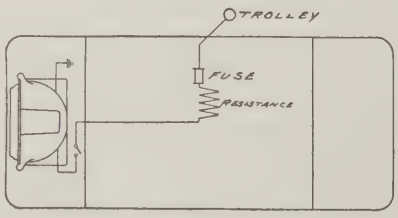


FIG. 14

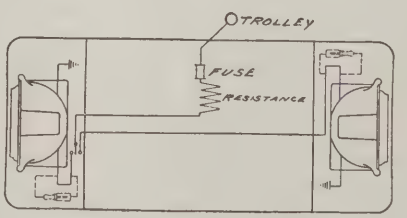


FIG. 15

FIGS. 14 AND 15. DIAGRAMS OF CONNECTIONS EMPLOYED WITH CARBON ARC HEADLIGHTS
Fig. 14—Wiring diagram for headlight with single-end equipment. Fig. 15—Wiring diagram for headlights with double-end equipment

must be removed before taking out the globe. In replacing the globe, be sure that it fits true on its seat, so as to exclude air. The top and bottom openings of the globe are parallel ground faces and seat against machined surfaces. The headlight should not be operated without a globe or with a broken globe; to do so shortens the life of the carbons.

It is occasionally necessary to polish the reflector, and this should be done carefully. If a cotton buffing wheel is available, use it; if not, the reflector may be buffed by hand. First, dust it out lightly with cotton waste and then rub with clean chamois skin. The lint side of canton flannel may be used. Always rub a reflector radially from the outer edge toward the center.

The incandescent headlight possesses the advantage of extreme simplicity and steadiness, and, in the smaller sizes, the maintenance cost is somewhat less than that of arc headlights, though if a large incandescent lamp is used which gives an illumination comparable with a good arc headlight, the item of expense for lamp renewals is apt to be considerably greater than the entire maintenance expense of an arc headlight. As mentioned before, an incandescent lamp, whether it is used in a headlight or not, is highly susceptible to fluctuations in potential, since the illumination varies as about the cube of the voltage.

The incandescent headlight is considerably more fragile than the arc headlight, and the constant vibration to which incandescent lamps are subjected in actual service makes them uncertain for mining work.

The question of voltage variation of the trolley is one which governs to a certain extent the selection of a headlight. Arc headlights operate much more satisfactorily under wide variations than do incandescent headlights. It is not uncommon for an arc headlight to operate satisfactorily on trolley circuits varying from 675 to 250 volts where the average is 550. This means that the headlight will withstand about 25 per cent. over-voltage and will operate on 45 per cent. of normal voltage. The reduction in candlepower of the arc is about proportional to the 1.5 power of the reduction in voltage. The incandescent headlight will not withstand as wide a variation in potential as will the arc.

Every incandescent lamp has a label on which its proper voltage and wattage are indicated, and to secure the best results from every standpoint it should be operated at this rating. In mining work it is impossible to operate the incandescent lamp at its labeled voltage all the time, owing to the wide variations in trolley potential, but the average voltage conditions should be determined and the headlight lamp and its resistance should be designed for this pressure. If there is a wide

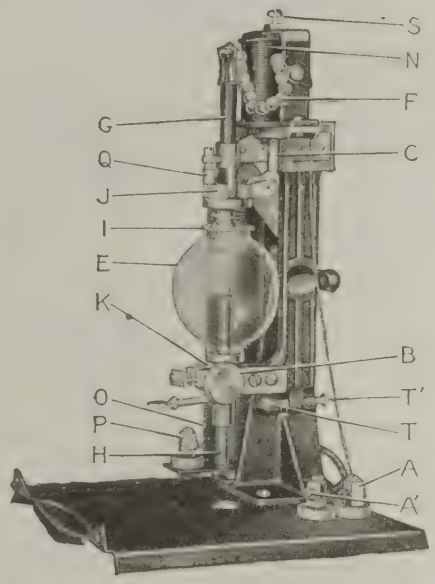


FIG. 16

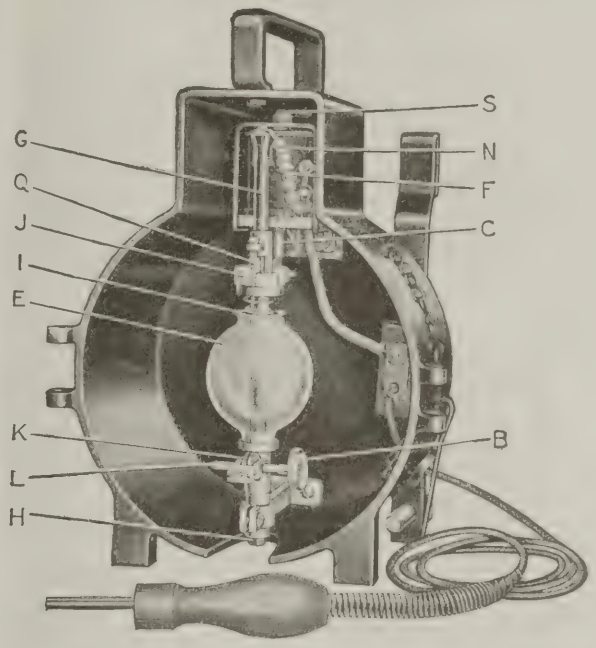


FIG. 17

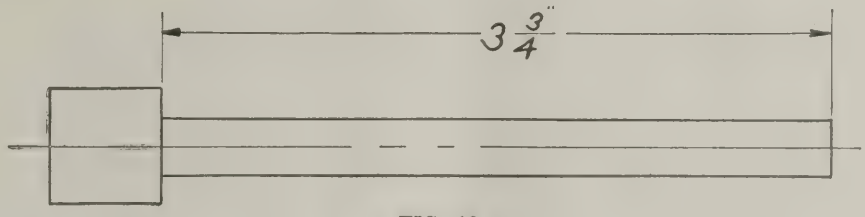


FIG. 18

FIGS. 16 AND 17. MECHANICAL DETAILS OF CARBON ARC HEADLIGHTS. FIG. 18 SHOWS TRIMMING GAGE USED FOR FOCUSING THE ARC



FIG. 19

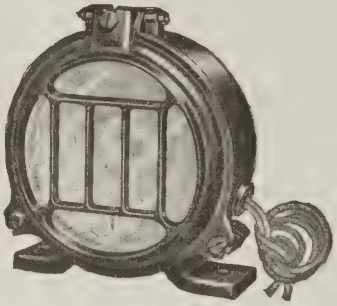


FIG. 20

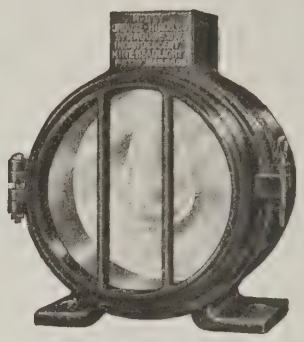


FIG. 21

FIGS. 19 TO 21. VARIOUS TYPES OF INCANDESCENT HEADLIGHTS

difference between the average and the maximum line voltage the lamp must be operated nearer the maximum, say within 5 per cent. of the maximum. If the lamp is operated below the normal voltage the amount of light will be greatly reduced, as shown in the accompanying curve (Fig. 22)[1], which emphasizes the necessity of burning the lamp at its proper voltage if the lamp is to give its rated light. Fig. 23 shows the variation in candlepower of an arc headlight with variation of arc current. The arc is considerably less susceptible to changes in current.

On the other hand, operating incandescent lamps at any voltage above the normal is detrimental. Overvoltage increases the efficiency of the lamp but reduces its life considerably, and too high a percentage of overvoltage will burn out the lamp filament entirely. This is particularly true of Mazda C lamps.

A great many different kinds of reflectors are used in headlights and a discussion of their relative merits may be of value. From a standpoint of efficiency for light projection, the following tabulation is given; the reflector with the highest coefficient of reflection is placed at the top of the list.

	Coefficient of Reflection,* Per Cent.
1. Silver plated copper	90
2. Clear plate glass mirror	83
3. Canary glass mirror	79
4. Polished aluminum	67
5. Nickel plated copper	64

*W. F. Little. Electrical Testing Laboratories.

The coefficient of reflection, however, is not the only thing to be considered in selecting a reflector, and the following list is given based upon the permanency of the reflecting surface:

1. Clear glass and canary glass.
2. Nickel plated copper.
3. Polished aluminum.
4. Silver plated copper.

As is perfectly natural, these various reflectors have a different initial cost and the third arrangement is given based upon this item, the lowest in cost being placed first:

1. Polished aluminum.
2. Nickel plated copper.
3. Silver plated copper.
4. Clear glass.
5. Canary glass.

[1]Curve taken from Bulletin of National Lamp Works.

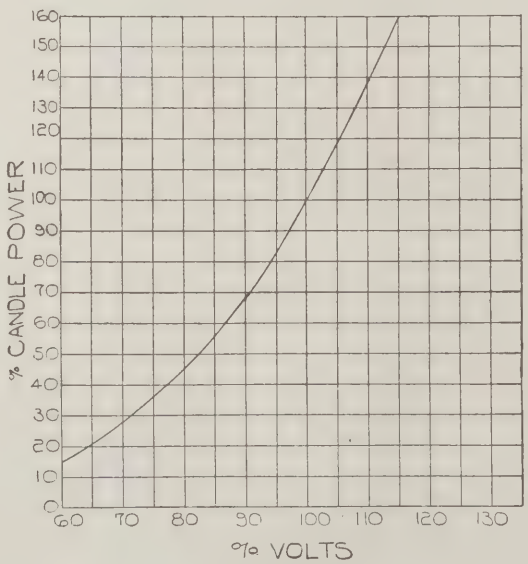


FIG. 22

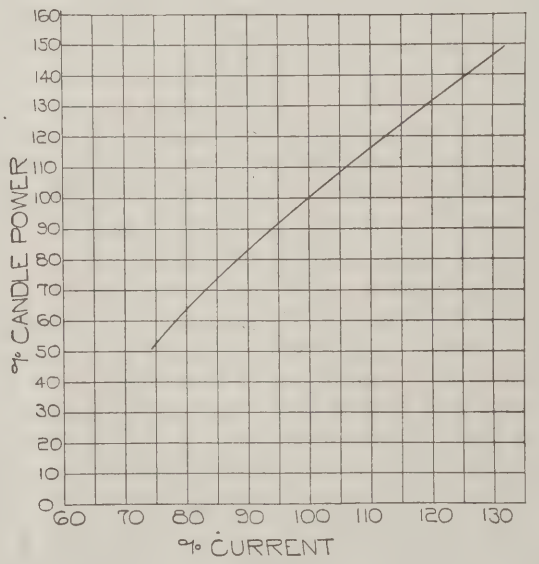


FIG. 23

FIG. 22. VOLTAGE-CANDLEPOWER CURVE OF INCANDESCENT LAMP. FIG. 23 SHOWS CANDLEPOWER-CURRENT CURVE OF LUMINOUS ARC HEADLIGHT

As has been set forth, there are three different light sources which are used in various headlights—the luminous arc, the carbon arc and the incandescent lamp. Without going into the theory of the arc formation, the light emitted by the luminous arc comes almost entirely from the arc stream. Since this is the case, larger diameter, long-life electrodes are used which are kept reasonably cool during the operation of the arc. In the carbon arc, at least 95 per cent. of the light emitted comes from the heated carbon tips, and by far the largest stream itself must be kept small and in the carbon arcs, the positive carbon tip must be kept small since this tip is placed at the focal point of the reflector.

In all headlights it is of the utmost importance that the primary light source shall be located as near the focal point of the reflector as possible. To illustrate the necessity of accurate focusing, a test was made using a 6-volt, 36-watt, focus-type Mazda lamp in a 16-in. diameter, 3-in. focus reflector. With the lamp $\frac{1}{16}$ in. ahead of the focal point, the intensity of the beam was

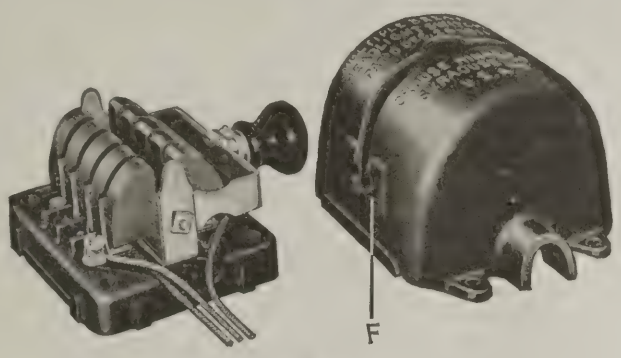


FIG. 24

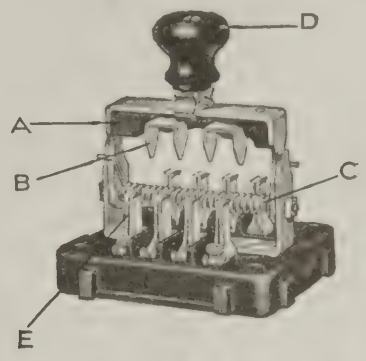


FIG. 25

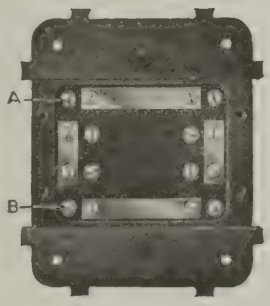


FIG. 26

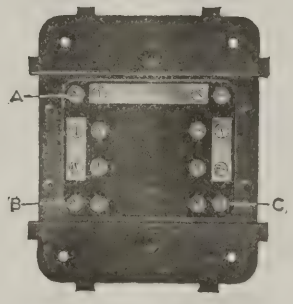


FIG. 27

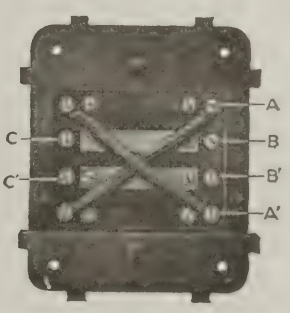


FIG. 28

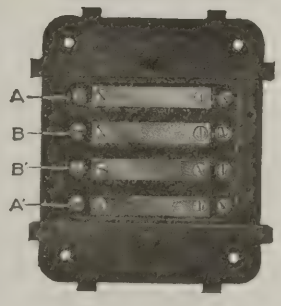


FIG. 29

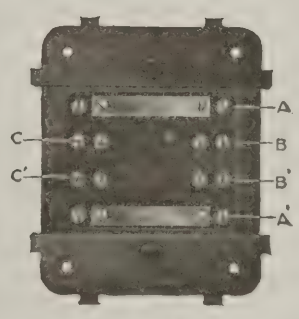


FIG. 30

FIGS. 24 TO 30. DETAILS OF VARIOUS TYPES OF MULTIPLE BREAK SWITCHES

percentage of the light comes from the white hot crater of the upper positive carbon. For this reason carbons of small diameter are used that they may be heated to a high intensity. With an incandescent lamp, all of the light comes from the incandescent filament and therefore the filament must be wound in as small a space as possible so that the angle of divergence of the beam may be only a few degrees. With a given reflecting or refracting medium, the volume of the light source determines the shape or rather the angle of divergence of the beam. In luminous arcs, this means that the arc reduced to 54 per cent. of the original intensity; $\frac{1}{8}$ in. ahead of the focal point, the intensity was reduced to 34 per cent. and $\frac{1}{4}$ in. ahead the intensity was only 6 per cent. of what it would have been if the filament were located at the exact focal point. The foregoing emphasizes strongly the necessity of accurate focusing of the light source. The light source in question was extremely small. In ordinary work it is impracticable to use light sources of these small dimensions; so the case cited above is somewhat exaggerated, but it serves

(*Continued on page 1079*)

Some Characteristics of American Coals in Byproduct Coking Practice—I*

By F. W. SPERR, JR.
Chief Chemist, The Koppers Co., Pittsburgh, Penn.

SYNOPSIS — *The products of the byproduct coke oven have a varying importance depending on the location of the oven plant and the demands of the times. At present coke is vital to the iron and steel industry; its byproducts are considered indispensable to the conduct of modern warfare. It would be difficult to do without coal tar derivatives and gas is valuable for light, heat and power. The striking power of a nation may be measured by its byproduct coke plants and its deposits of coal and iron. These and other facts are commented upon in a most interesting way by the author in the following article.*

BEFORE taking up the more technical phase of the subject it may not be amiss to discuss some of the broader relations of the American byproduct coke industry. The bulk of our material civilization during the past century has been built up by iron and energized by coal. These two are linked by coke. Next to the substitution of the shaft furnace for the old forge or bloomary, the greatest improvement in the iron industry was the substitution of coke for charcoal. It is difficult to realize that this important step was taken, with many misgivings, less than two centuries ago in England and less than 70 years ago in America. It was between 1730 and 1735 that Abraham Darby[1]—after six sleepless night, it is related—succeeded in making the first cast of iron from a coke-fed furnace in England. Other sporadic efforts had undoubtedly been made previous to that time, but it was then that a continuous development of the coke industry in England may be said to have started. On the continent of Europe the regular use of coke was not introduced until a number of years later, while in America it was not until 1850[2] that it began to exert an appreciable influence upon the manufacture of pig iron. In 1849 there was not a single coke furnace in blast in this country. Immediately after the Civil War, however, the demand for coke underwent a phenomenal development, at a rate which shows no signs of slackening. The coke industry is now truly regarded as an integral and vital part of the iron and steel industry. Not more than 110,000 tons[3] of coke were consumed in the production of pig iron in 1865. Twenty-five years later, in 1890, the annual consumption was about 10,000,000 tons. Fifty years later, in 1915, 36,700,000 tons of furnace coke and 1,700,000 tons of foundry coke were consumed. Last year (1917) the consumption of furnace and foundry coke was probably in excess of 50,000,000 tons. Thus in the past two years alone the industry has increased even more than in the phenomenal 25-year period preceding 1890.

Up to about 1893 the country was dependent upon beehive coke alone. Now please note that so soon after the establishment of the industry, when it had already attained an enormous growth and had so revolutionized the iron industry that coke instead of charcoal was recognized as the standard fuel for the blast furnace, even at this time men could foresee within a comparatively short period the same extinction that had virtually befallen the charcoal industry. Only a narrow range of coals can be used to make good metallurgical coke in the beehive oven. The supply of such coals was rapidly approaching exhaustion. In Belgium and Germany the exhaustion of beehive coals had begun to force the introduction of the byproduct oven, irrespective of any other economic considerations.

In a paper read a year ago, before The Franklin Institute, by C. J. Ramsburg,[4] there were brought forward three facts that are of great importance in this connection: (1) For every ton of coke made in the byproduct oven there is saved in fuel value alone the equivalent of 825 lb. of coal. (2) For every ton of coke made in the byproduct oven and applied to blast-furnace purposes there is a direct saving of 482 lb. of coal (200 lb. wasted in beehive oven + 282 lb. saved in blast furnace, due to the superiority of byproduct coke). (3) The byproduct oven, by reason of its great flexibility of control, enables us to make good metallurgical coke from a very wide range of coals.

Vital to Iron and Steel Industry

The development of the byproduct coke oven is as vital to the modern iron and steel industry as was the substitution of coke for charcoal. For all practical purposes it has indefinitely prolonged the life of this great business, because the new reserves of coking coal that it has opened up and that are actually in sight are far more than sufficient to take care of the estimated iron ore resources of the world.

The phase of any industry that vitally interests us nowadays is its relation to winning the war. Industrially and scientifically, only those subjects that have a bearing on this great problem should occupy our attention at this time. Let us consider this aspect of the byproduct coke industry. The vital connection of its main product—coke—with the iron and steel industry would alone suffice to place it in the front rank of the "essentials"; but, more than this, its byproducts are recognized as being indispensable to the conduct of modern warfare. One need only mention ammonia, the indispensable source of ammonium nitrate and the potential source of nitric acid; benzene; phenol; picric acid; napthalene with its mono-nitro derivative; cresol for antiseptic surgery; and, finally, toluene and trinitrotoluene, which is veritably the super-necessity of up-

*Presented at a meeting of the Franklin Institute held Mar. 20, 1918.
[1]Percy's Metallurgy (1864), p. 886.
[2]"Iron in All Ages," Swank, p. 370.
[3]Figures throughout this paper are in net tons, except where otherwise indicated.

[4]"Journal Franklin Institute," Vol. 183, 1917, p. 391. Reprinted in a series of articles in the Apr. 27 and May 4 and 11, 1918, issues of "Coal Age" under title of "Byproduct Coke and Coking Operations," by C. J. Ramsburg and F. W. Sperr, Jr.

to-date artillery. Besides these, there are a host of coal-tar derivatives, employed for military and surgical purposes, which it would be very difficult to do without. The byproduct coke oven is by far the largest source of these materials. Its relation to our toluene supply is of particular concern. Trinitrotoluene (TNT), which can only be produced from toluene, is the only known high explosive that combines the merits of safety, reliability and extraordinary power with the requisite capability of large-scale production. Notwithstanding the fact that we have one or two other large sources of toluene, it is unquestionably true that the byproduct coke oven is by far the most important producer. Moreover, it is the one and only source that can be absolutely depended upon to make toluene of the highest purity—especially in respect to freedom from paraffins.

All the facts, when carefully studied, justify the assertion that the byproduct coke industry is one of the most vital to the winning of the war. So essential is this industry to the conduct of modern warfare that the striking power of each nation may, to a great extent, be measured by its supply of the byproducts of coke. The extent of German preparation and advantage in this respect warrants our earnest consideration.

Hard to Obtain Reliable Statistics

It is difficult to obtain trustworthy statistics as to the actual amount of byproduct coke made in the various countries of the world. Fortunately, however, we have very reliable figures[5] for ammonium sulphate. Such figures as have been tabulated for the production of this material from coke ovens may be taken as an index to the extent of byproduct recovery practiced in each country.

In 1907 Germany produced 282,700 tons of ammonium sulphate from byproduct coke ovens. This was more than the production from the same source in all other countries combined. In the same year the United States produced 68,970 tons of ammonium sulphate from byproduct coke ovens. In 1913 the German industry produced 523,114 tons, which exceeded by over 100,000 tons the combined production of the coke ovens of the United States, England, France, Belgium and Holland. The seizure of Belgium and northern France probably gave the Central Powers an advantage in coke-oven resources equivalent to an annual production of 100,000 tons of ammonium sulphate more than the combined production of the Entente Allies plus all the neutral countries of the world. Roughly, this advantage is equivalent to the product of coking 10,000,000 tons of coal. The military significance of these figures is not difficult to realize.

The fact that in the short space of three years great steps have been taken toward equalizing this advantage is an everlasting credit to American enterprise. The year 1917 showed a gain of more than 10,000,000 tons of byproduct coke over the year 1914, which is probably equivalent to an increase of 14,000,000 tons of coal used in byproduct ovens. Ovens now under construction have an additional capacity of over 10,000,000 tons of coal per annum.

Even under the most favorable conditions, however, the American production of byproduct coke in 1918 will be less than the German production at the beginning of the war. The total German production for 1912 was about 32,000,000 and for 1913 about 35,000,000 tons, while the United States produced 22,000,000 tons in 1917 and will probably produce 27,000,000 tons in 1918. When it is recalled that we are still making beehive coke at the rate of 33,000,000 tons per year—nearly as much as the entire German production in 1913—it will be seen that there is still much work to be done.

In fact, it must be admitted that the byproduct oven has so far accomplished little more than taking care of the natural increase of coke production in America. It is a mistake to suppose that we have really done much toward abolishing the beehive oven. The amount of beehive coke made per year has undergone no appreciable diminution since 1906.

These 33,000,000 tons of beehive coke represent the loss of the following products:

Coke	2,475,000 tons
Tar	396,000,000 gal.
Ammonium sulphate	545,000 tons
Surplus gas	300,000,000,000 cu.ft.
Benzene	82,500,000 gal.
Toluene	20,000,000 gal.

Let us consider very briefly what these figures mean. Two and one-half million tons of coke per year, which is based upon the loss in the beehive oven alone and does not take into account the large saving due to superiority of byproduct coke in metallurgical practice, would keep fifteen 450-ton blast furnaces in continuous operation, or would supply the entire foundry business of the United States and leave over three-quarters of a million tons available for domestic purposes.

Four hundred million gallons of tar would, if used for fuel purposes alone, be equivalent to 2,200,000 tons of coal. It would supply enough fuel to produce 10,000,000 tons of open-hearth steel—which would fill the total estimated yearly requirements of the United States and its allies for steel for military purposes.[6]

TABLE I. BITUMINOUS COAL RESERVES OF THE WORLD—CONTINENTS

	Million Tons—Metric
North America	2,239,693
Asia	760,098
Europe	693,162
Oceanica	133,481
Africa	45,123
South America	31,397

BITUMINOUS COAL RESERVES OF THE WORLD—COUNTRIES

	Million Tons, Metric	Equivalent to
United States	1,955,521	Virginia, Tennessee, North Carolina, South Carolina, Georgia, Alabama and Mississippi.
China	607,523	Colorado.
Germany	409,975	Missouri.
Canada	283,661	New York.
Great Britain and Ireland	178,176	Maine.
Australia	132,250	West Virginia.
Russia	86,883	Connecticut, New Jersey and Delaware.
India	76,399	Massachusetts and Connecticut.
South Africa	44,540	New Jersey.
Austria	40,982	New Jersey.
Columbia	27,000	Connecticut.

NOTE—Assuming the above quantities of coal to be distributed in each country in a single solid seam 6 ft. thick, the respective coal bearing area would compare as noted.

TABLE II. BITUMINOUS COAL PRODUCTION OF THE VARIOUS COUNTRIES FOR 1910

	Million Tons		Million Tons
Australia	10.0	Great Britain	264.5
New Zealand	2.23	Spain	3.55
China	14.59	France	38.57
India	12.09	Belgium	23.13
Japan	14.79	Germany	221.98
South Africa	5.5	Austria-Hungary	38.0
Canada	13.01	Italy	0.40
United States	445.81	Sweden	0.21
Mexico	2.45	Russia	24.57

Other countries . . 8.0 million tons

[5] Annual reports on sulphate of ammonia prepared by the American Coal Products Co. The original figures in the report for 1914 are given in metric tons, which are here transposed to net tons.

[6] "Iron Age," Jan. 3, 1918, p. 57—estimate for 1918.

Five hundred and forty-five thousand tons of ammonium sulphate are nearly equivalent to the entire annual production of the German Empire just prior to the war. This annual waste of valuable ammonia would furnish about 438,000 tons of nitric acid. A discussion of what this means from a military standpoint is not my purpose, but it would be of interest, in passing, to note that the estimate made previous to the war, by military authorities, for the annual nitric acid requirements of this country in case of war was 180,000 tons.

From the standpoint of food supply this is even a more serious proposition. The permanent loss every year of more than half a million tons of ammonium sulphate—one of the most important nitrogenous fertilizers—might well arouse solicitude at a time when every effort is being made to increase our crop production. By ordinary agricultural practice about 100 lb. of ammonium sulphate are used per acre of cultivated land. We are therefore burning up every year in the beehive ovens enough nitrogen to fertilize 11,000,000 acres. It has been thoroughly demonstrated that the application of 100 lb. of ammonium sulphate to an acre of average wheat land (producing normally, say, 20 bu.) will increase the yield by about 8 bu. Our wasted fertilizer would therefore be capable of increasing our wheat production by 87,000,000 bu. a year without additional labor.

Natural Gas Supply Diminishing

Three hundred billion cubic feet of gas are nearly equivalent to the amount of natural gas consumed for industrial purposes in the states of Pennsylvania, Ohio and West Virginia, which are the three largest consumers of natural gas in the Union. The diminution of the natural gas supply is a matter of grave concern in many important industrial centers, and byproduct coke-oven gas is undoubtedly one of the most promising sources of relief. The same piping and appliances now used for natural gas can with insignificant changes be used for coke-oven gas, and the great benefit that would result from obviating the radical and expensive alterations of equipment otherwise necessary hardly needs to be pointed out. A value of 8c. per thousand cubic feet for the coke-oven gas is a conservative figure from a natural gas standpoint, and would make the loss amount to $24,000,000 a year for this product alone.

Eighty-two million gallons of benzene would be of great value in replacing or supplementing gasoline as a special motor fuel for military purposes, to say nothing of its application to making picric acid, an important high explosive. One hundred gallons of benzene are equivalent, in efficiency, to 115 gallons of gasoline; for any sort of military vehicle of limited fuel-carrying capacity this is an important fact. Eighty-two million gallons of benzene would, if used for such purposes, effect a saving of about 12,000,000 gallons of gasoline. Twenty million gallons of toluene would furnish enough TNT to make 100,000,000 three-inch shells—quite a formidable argument.

Military values are what count nowadays, and one cannot estimate military values in terms of dollars and cents. Yet, for the sake of completeness, we may sum up this situation in terms of very conservative money values under normal conditions (Table III).

It is important to realize that this annual sum total of nearly $100,000,000 worth of the country's natural resources is not merely going unutilized every year, but is absolutely destroyed—gone without the slightest possibility of recovery. It exceeds the value at the ovens of all the coke made in the United States in 1914. In comparison with this gigantic waste, the cost of replacing the antiquated beehive with modern byproduct recovery apparatus sinks into insignificance; even at present prices the replacement could be accomplished for less than $300,000,000. The war is costing the United States about $30,000,000 per day. This rate of expenditure would pay for the abolition of every American beehive oven in ten days.

TABLE III. MONEY VALUE OF COKE BYPRODUCTS

2,475,000 tons coke at $3.80	$9,405,000
396,000,000 gal. tar at 3½c	13,860,000
545,000 tons ammonium sulphate at $60	32,700,000
300,000,000 M. cu.ft. gas at 8c	24,000,000
102,500,000 gal. motor fuel [7] at 15c	15,375,000
Total	$95,340,000

Perhaps we are departing too far from the scope of what was intended to be a technical paper, but this phase of the subject is one that vitally concerns all of us at the present moment, and every possible agency should be interested and engaged in accelerating the change of the industry to the modern basis. The principal—and probably the only important deterring—factors are the present high cost of material and labor and the difficulty, under present conditions, of financing the expensive plants required. There is a rather strong temptation—which must be thoroughly understood and guarded against—to resort to cheaper forms of construction that have been tried and found wanting in the past, and which, if yielded to, will only discourage and delay the complete establishment of the industry. It would seem that the Government might well assist in furnishing or reinforcing the capital necessary for a wholesale and immediate eradication of the beehive oven. The immediate practical, military benefits would be a sufficient argument, aside from the permanent conservation and the assured stability of the industry. Any development that can increase our wheat crop by nearly 90,000,000 bu. per year, that can more than double our material for high explosives, that is absolutely necessary in order to insure to America and its allies an unquestioned superiority in modern munitions, should be encouraged and hastened with every possible facility.

TABLE IV. CONSUMPTION OF COAL AND LIGNITE IN THE UNITED STATES IN 1915

(M. R. Campbell, U. S. Geological Survey, Professional Paper 100-A.)

	Net Tons	Per Cent. of Total
Railroad fuel	122,000,000	28
Steamship fuel	10,700,000	2.3
Beehive coke	42,300,000	9.3
Byproduct coke	19,500,000	4.3
Coal gas	4,600,000	1.0
Domestic and small steam trade	71,300,000	16.0
Industrial steam trade	143,800,000	33.0
Exported	18,800,000	4.0
Used at mines	9,800,000	2.0
Special uses	700,000	0.1
Total	443,500,000	100.0

Nor must it be forgotten that the beehive is not the only spendthrift of the important byproducts of coal. The householder who burns a hundred tons of Pittsburgh coal in the winter months is likely, while standing aghast at the "crime of the beehive oven," to forget that he himself is accessory in what is in the aggregate a greater crime. Table IV, compiled from the sta-

[7] Including only benzene and toluene. If all the available light oil constituents were included we would have at least 120,000,000 gal. motor fuel.

tistics of the United States Geological Survey for the year 1915, shows the distribution of the coal produced in the United States.

Every encouragement should be given to the use of coke, gas, and briquetted fuel, which not only are important in national conservation, but are intrinsically cleaner, more economical and more convenient.

All such considerations, vital as they may seem to the needs of the present moment, are in a larger sense dwarfed by the significance of America's enormous preponderance in reserves of coking coals. These are such as to insure the stability and normal growth of the industry for many centuries in a sense that is true for no other country. The statistics given in Table I were taken from the elaborate report of the Twelfth International Geological Congress on the Coal Resources of the World.

The figures for bituminous coal may be taken as a comparative index of the reserves available for making coke. It is the byproduct oven that makes this broad generalization possible. Consider, with these statistics, the supplementary figures in Table V for the principal iron reserves of the world, compiled by Edwin C. Eckel.[8]

TABLE V. PRINCIPAL IRON ORE RESERVES OF THE WORLD

United States	Minimum	Maximum
Lake Superior region	2,000,000,000	2,500,000,000
Southern red ores	1,500,000,000	2,000,000,000
Texas brown ores	600,000,000	1,000,000,000
Other Southern ores	500,000,000	750,000,000
Northeastern States	300,000,000	600,000,000
Western States	300,000,000	700,000,000
Total United States	5,200,000,000	7,550,000,000

Continent	Actual Ore Tonnage	Equivalent Tons Metallic Ore
North America	14,710,000,000	6,455,000,000
South America	8,000,000,000	5,000,000,000
Europe	12,032,000,000	4,733,000,000
Total	34,742,000,000	16,188,000,000

It needs no prophetic imagination to foresee that the future of the vast industries that are based on these two materials must largely rest with America, and her duty to conserve such resources becomes more than a local necessity; it is an international obligation.

It may be of interest to survey the present distribution of the byproduct coke industry in America, and the way in which the various coal fields are being utilized.

Byproduct coke is now being made in the following states: Massachusetts, New York, New Jersey, Pennsylvania, Maryland, West Virginia, Alabama, Kentucky, Michigan, Indiana, Illinois, Wisconsin, Missouri, Minnesota, Tennessee and Washington. Plants are also being built by The Koppers Co. in Colorado and Rhode Island —eighteen states in all. Of these, only six—Alabama, Colorado, Ohio, Pennsylvania, Tennessee and West Virginia—were coke producers of magnitude before the advent of the byproduct oven. Together with this tendency to distribution, there is also an effort of concentration which is important. The effect in transplanting the business of coke manufacture from more or less secluded mining districts to important industrial centers is very marked. Two-thirds of the byproduct coke producing capacity of the United States (including ovens under construction) is located within two hours' ride of one or another of five large cities: Chicago, Pittsburgh, Cleveland, Detroit and Birmingham. The amount of byproduct coke capacity in these five metropolitan districts exceeds the total coke (beehive and byproduct) made in the United States in 1900.

[8] "Iron Trade Review," Jan. 15, 1914.

The intensive concentration of plant capacity made possible by the byproduct coke oven is especially noteworthy. A striking example is the plant being built by The Koppers Co. for the Carnegie Steel Co. at Clairton, Penn. This plant, the largest in the world, will soon be put into operation with 640 ovens, having a capacity of 4,000,000 tons of coal per year. The plans provide for an extension of this plant to a total of 24 batteries of 64 ovens each. Some data as to the capacity and production of such a plant are as follows:

ANNUAL CAPACITY OF 1,536 OVENS

Coal	9,600,000 tons
Coke	6,720,000 tons
Tar	80,640,000 gal.
Ammonium sulphate	110,880 tons
Surplus gas	60,480,000,000 cu ft.
Benzene	16,800,000 gal.
Toluene	4,032,000 gal.

This great plant, when completed, will have a coking capacity equivalent to 11,200 beehive ovens (one 12-ft. beehive oven producing 600 tons of coke per year). In ordinary double-row construction (120 beehive ovens to a block 900 ft. long) this would make 16 miles of beehive ovens. The byproduct plant, including some vacant space, is only 1500 yd. long and 1200 yd. wide.

(*To be continued*)

Purification of Coal Gas by Electricity

By M. Meredith
Liverpool, England

The deposition of tar and other impurities from coal gas by electrical means has recently been undertaken and satisfactory results have been attained. High-tension direct current is discharged between a cage made of thin wires and a tube, the system of wires being mounted in the middle of the tube. It is essential to prevent access of air to the precipitation chamber in order to avoid the danger of explosion. It was found that the tendency toward the production of harmful discharges is least if the wire electrode is negative. The shape of the electrode is highly important, and the sustaining insulators are specially formed and cemented into the tube. A ½-in. gas tube is passed through a series of cast-iron disks, between which the thin steel wires are fixed. The whole is then placed in a felt-covered tube, which constitutes the grounded electrode.

The apparatus was tested with a flow of 265,000 cu.ft. of gas per hour, two precipitation chambers 4 ft. 11 in. in height and 8 in. in diameter being used. Disks of the active electrode were 4 in. in diameter, and were covered with 16 thin piano-steel wires. The passage traversed by the gas was 12 ft. 4 in. long. The gas was exposed to the electrical discharge for 0.4 second.

After five hours' operation the tar deposited on the insulators was found to interfere with the action. For complete cleansing of the gas 0.2 kw.-hr. was required for each 265,000 cu.ft. The total cost of the apparatus was about $500. The test was made with 20,000 volts and a current of about 3 milliamperes.

The temperature of the coal gas has little influence on the operation. Tar deposited at 175 deg. F. is free from water and suitable for asphalting. It can be cleansed in a washing apparatus and the residue of naphthalene can be reclaimed by a second electric precipitation. The illuminating and heating capacity of the gas is improved if the tar is removed while hot.

Dewatering Pits for Washed Coal

THE Cambria Steel Co., of Johnstown, Penn., after much investigation of washed coal dewatering devices and methods, and 14 years of experience with dewatering pits at its Franklin washery and coke-oven plant, has adopted dewatering pits for washed coal at the Rosedale washery and coke-oven plant now under construction. The succeeding description of dewatering pits elucidates the most important features that should govern adoption.

The attractive features of dewatering pits are: (1) A drained washed coal containing 8 to 9 per cent. moisture; (2) a filtered water free from sediment, for recirculation; (3) no escape of dirty water (to pollute private and public streams) except that small amount evaporating and adhering as external moisture to the coal; (4) a rapid filtration of the water so as to gain a brimful pit of coal, without shifting the stream of water and coal from the washing machines; (5) uniformity of the drained mass of coal, in regard to fine and coarse sizes, sludge and pieces of various characteristics being evenly distributed so that a homogeneous coking coal may be gathered; (6) no mechanical power necessary to aid or hasten the dewatering of the coal; (7) permanent construction with only a minimum maintenance expense; (8) an economically operated apparatus for removing the drained coal.

The principle involved in the drainage of a pit of coal is that water moves gradually in a wavering descending motion through a mass of minute particles at rest, and is clarified during this movement. The dewatering capacity of a pit depends upon the relation between the number of square feet of filtering surface to the quantity of water delivered in a given time and the fineness of the coal.

Tests Indicate Average Filtering Capacity

Tests made at five coal washeries using dewatering pits indicate that the average filtering capacity of a pit is 32 gal. of water per hour for each square foot of filtering surface, when dewatering coal in sizes ranging from ½-in. cubes to dust, and the pit will be filled brimful of coal without temporary cessation to prevent water overflowing the pit walls. Most careful moisture determinations were also made of the drained washed coal at different times as gathered from the pits for coking after various hours of drainage, with the results shown below, the drained washed coal averaging in fineness ½-in. cubes to dust. (See Fig. 1.)

Pits 24 Ft. Deep	Average Moisture, %	Maximum Moisture, %	Minimum Moisture, %
After 24 hours' drainage	9.15	10.36	7.37
After 36 hours' drainage	9.05	10.61	7.10
After 48 hours' drainage	8.26	10.13	7.00
After 60 hours' drainage	8.05	9.74	6.84
After 72 hours' drainage	7.97	9.48	6.18

Pits 16 Ft. Deep	Average Moisture, %	Maximum Moisture, %	Minimum Moisture, %
After 12 hours' drainage	10.05	12.96	8.16
After 24 hours' drainage	8.46	9.07	8.06
After 36 hours' drainage	8.39	8.60	8.03
After 48 hours' drainage	7.90	8.31	7.76
After 60 hours' drainage	7.65	8.00	6.85
After 72 hours' drainage	7.60	7.79	6.90

The pits are formed by rectangular concrete walls of a thickness suitable to withstand the pressure when the pits are filled with coal and water. The ultimate concrete bottom is laid slightly sloping toward centrally located drains which transfer the filtered water to a pump sump for repeated use. Above the ultimate bottom, leaving an intervening space of 4 in., a filtering platform is placed. This contains small V-shaped gaps for supporting the coal and allowing the passage of the dripping filtered water onto the concrete bottom. In practice the final 8 to 12 in. in depth of coal is not drawn off but remains on the filtering platform as a permanent filter bed. This bed should be stirred up frequently, say after each third filling of the pit, by the appliance provided on the traveling coal excavator, so as to present a more nearly perfect porous bed, in order that the filtering capacity of the pit may not become diminished.

The permanency of properly designed and constructed concrete pits is unquestioned. They do not deteriorate in usefulness or value by constant usage. The only renewal necessary is the replacement of the false bottom used as a filtering platform in two to four years, according to usage. This platform is built in sections of about 4 x 6 ft., so that one or more sections may be readily replaced when necessary.

Cleaned Coal Delivered by Sluiceways

The cleaned coal and black water from the washing machines is delivered directly to the pits by means of extension gravity sluiceways swung over the top of the pit so that the latter will be uniformly filled with coal. The separation of the water from the coal requires no machinery, attendance or supplies. To save the water draining from pits when the washing machines are not in operation, concrete reservoirs of sufficient capacity are provided with drains from the pits and to a pump sump, so that all water will be saved for recirculation when the washing machines are again operated. As there are no drains leading from any part of the drainage system to sewers or ditches, there is no chance to pollute streams with water holding impurities in solution or suspension.

There are no mechanical dewatering units between the washing machines and the drainage pits. The problem of sludge and dirty water disposal is thus entirely eliminated, as all fine coal and sludge is intermixed with the drained washed coal. This method of dewatering results in a great saving of water, power, labor and upkeep over the ordinary expensive dewatering methods employing centrifugal driers or perforated bucket elevators, with sludge tanks and a multiplicity of machinery. Wherever these are in use great fields of fine coal and sludge are visible with the accompanying pollution of near-by streams.

The fines to be dealt with consist of particles capable of passing through extremely fine meshes, the greater part of them being from ⅛ in. to 1/100 in. in diameter, or say, from 64 to 10,000 to the square inch.

By an act passed by the Pennsylvania Legislature in 1907, the Water Supply Commission of the state was given jurisdiction over encroachments along the streams and the dumping of solid wastes into them. This measure provides a heavy penalty and covers all streams whose

drainage areas are over ½ square mile in extent, except the tidal portion of the Delaware River and its navigable tributaries. Ultimately this law will be universally and thoroughly enforced. In Table I is shown the number of square feet of pit filtering surface necessary, when washing coal at the rate of 200 net tons per hour, with washing machines that require varying quantities of water in order to wash one net ton of raw crushed coal.

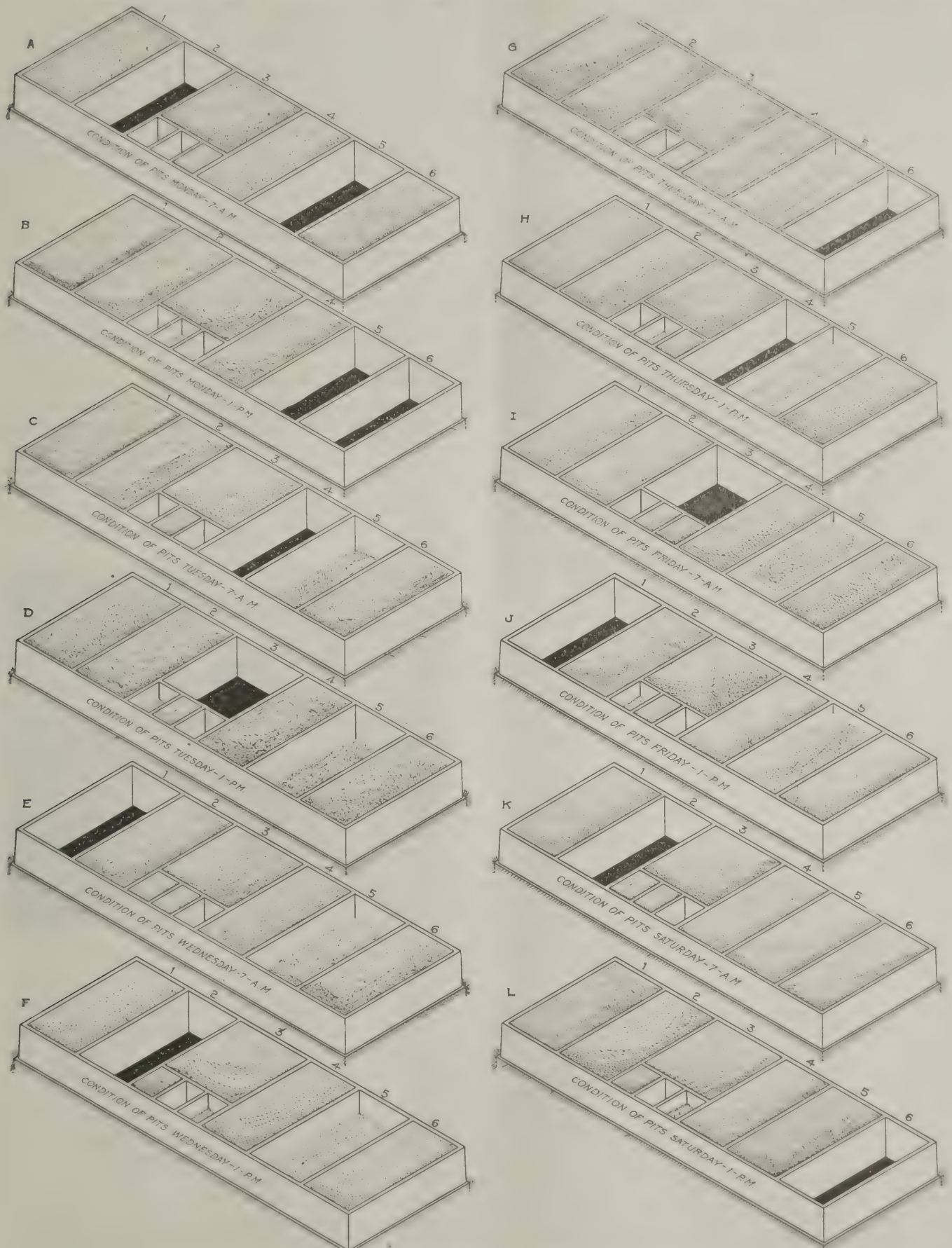


FIG. 1. ILLUSTRATING CONDITION OF WASHED COAL AND REFUSE PITS AT STATED INTERVALS

TABLE I. MOISTURE DETERMINATIONS AFTER VARIOUS HOURS OF DRAINAGE

Ratio of Water to 1 Ton of Coal	Various Quantities of Water Necessary to Wash 1 Net Ton of Crushed Raw Coal In Cu.Ft.	In Gal.	In Lb.	Net Tons of Crushed Raw Coal Washed per Hour	Square Feet of Pit Filtering Surface Necessary
1	32	240	2,000	200	1,500
1½	48	360	3,000	200	2,250
2	64	480	4,000	200	3,000
2½	80	600	5,000	200	3 750
3	96	720	6,000	200	4,500
3½	112	840	7,000	200	5,250

The ratio of water to that of coal is determined by the water requirements of the particular coal-washing machine under consideration. One washery handling 200 tons of coal per hour, adopting a specific form of

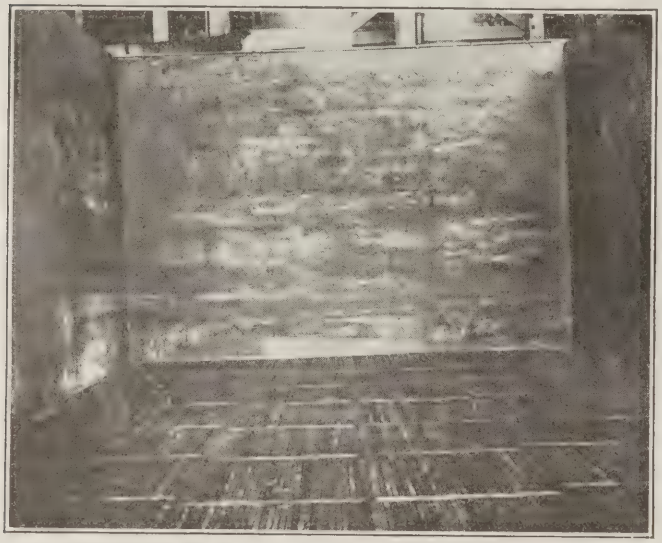


FIG. 2. DEWATERING PIT AT COAL WASHERY OF CASCADE COAL AND COKE CO., TYLER, PENN.

washing machine, may need water in the proportion of 1½ to 1 of coal, requiring only 2250 sq.ft. of pit filtering surface; while another washery handling the same tonnage per hour using another form of washing machine may need water in the proportion of 3 to 1 of coal, necessitating 4500 sq.ft. of pit filtering surface.

When considering the adoption of dewatering pits, it is important to study the water requirements of coal-washing machines and to see that a machine requiring an extravagant quantity of water is not selected, since it would demand dewatering pits of extreme and excessive dimensions. As aforementioned, the series of tests made, relating to the filtering capacity of pits, demonstrated that the drainage capacity averaged 32 gal. of filtered water discharged per hour for each square foot of filtering surface, through coal ranging from ½-in. cubes to dust.

To ascertain the floor dimensions of a pit to hold, say, 1000 net tons of drained coal, or 40,000 cu.ft., weighing on a dry basis 50 lb. per cubic foot, assuming that water will enter the pit with the coal for five consecutive hours, the coal coming at the rate of 200 tons an hour, each ton requiring 360 gal. of water for washing, the water filtering away at the rate of 32 gal. per hour for each square foot of filtering surface, the formula is as follows:

Let

a = The number of gallons of water required to wash one ton of coal;

b = Tons of coal delivered to pit per hour;

c = Gallons of water filtering away per hour, per square foot of pit surface;

x = Square feet of pit surface required.

Then $a \times b = x$.

Example—a = 360 gal. of water per ton of coal;

b = 200 tons of coal;

c = 32 gal. of water per hour per square foot of draining surface.

Then $360 \times 200 \div 32 = x$, or 2250 sq.ft. of pit floor surface required. This would be equivalent to a pit, say, 30 ft. wide by 75 ft. long.

The formula for determining the height of pit walls is as follows:

Let

d = Square feet of pit surface required;

e = Cubic feet of coal required;

x = Height of walls in feet;

$e = x$.

Example—d = 2250 sq.ft. of pit floor surface;

e = 40,000 cu.ft. of coal.

$40{,}000 \div 2250 = x$, or 17 ft. 10 in. = the height of pit walls.

To offset the 8 in. to 12 in. in depth of coal used as a filter bed and the height of filter platform above the concrete floor, about 20 in. must be added to the height of walls, to acquire a working capacity of 1000 tons of coal. This will make a pit averaging, say, 30 ft. wide, 75 ft. long and 19 ft. high above the concrete floor.

A pit to drain coal from a washery using 720 gal. or double the quantity of water assumed above as being



FIG. 3. DEWATERING PIT AT NO. 3 COLLIERY WASHERY, LACKAWANNA COAL AND COKE CO.

necessary to wash a ton of coal, would require a filtering surface of 4500 sq.ft. to receive the coal and water in five consecutive hours at the rate of 200 tons of coal per hour. This would mean a pit, say, 45 ft. wide, 100 ft. long and with a total depth of 10 feet 6 inches.

A pit this size would not be economical in ground space, construction or in handling the coal and water to and from it. Dewatering pits are not practical to operate in connection with washeries using an excessive quantity of water to wash a ton of coal.

The table showing moisture determinations after various hours of drainage indicates that after 24 hours in disturbance, additional drainage time does not reduce

the moisture content of the coal materially, the water draining off rapidly; and with the exception of a few feet at the top, no benefits of air circulation are secured to aid in reducing the moisture. The coal is so closely packed by the water action that trenches formed by slides 30 in. wide and 4 to 6 ft. deep do not cave in.

The drained coal is gathered from the pits by a crane, having a vertical and horizontal motion. This is mounted on wheels and provided with numerous buckets for excavating and elevating the coal to a belt conveying system that discharges it into larry bins for use in coking. The crane spans the pits, and its movements are guided by rails fastened to the top of the longitudinal pit walls. The elevating capacity is from 400 tons per hour up.

Referring to the illustrations, Fig. 1 indicates the condition of the washed coal and refuse pits over a six-day period. Fig. 2, which illustrates a dewatering pit at the coal washery at Tyler mine of the Cascade Coal and Coke Co., gives a good view of the filtering platform. Each pit is 30 ft. wide, 30 ft. long, 16 ft. deep, and holds 360 net tons of coal. Fig. 3, a view of the dewatering pits at the No. 3 colliery coal washery of the Lackawanna Coal and Coke Co., near Wehrum, Penn., indicates the relation betwen the dewatering pits and the crane used to reclaim the coal after drainage. Each pit is 70 ft. wide, 35 ft. long, 24 ft. deep, and holds 1500 net tons of coal. The filtering platform has been removed so as to show the concrete bottom and the drains which convey the filtered water to the pump sump for reuse.

Who's Who In Coal Mining

W. E. Deegans

Pep, punch and perseverance (not to speak of his red hair) are characteristics which have given W. E. Deegans, of Huntington, affectionately known to his friends as "Bill," his conspicuous place in the coal industry of southern West Virginia. There are few counties in that part of the state that do not have one or more companies in operation in which W. E. Deegans is interested. "Bill" Deegans has personality and magnetism, like all big and genial men. That pleasing personality, with his keen business acumen and well-balanced foresight, has enabled him to forge rapidly to the front in West Virginia's industrial life. Old man Opportunity has never managed to elude the vigilance of W. E. Deegans. When Opportunity appeared on the scene, the door was opened even before Opportunity knocked.

Only two-score years have passed since a red-headed youngster arrived with a smile in a Coal Grove, Ohio, household. When young Deegans was not attending the Lawrence County schools he was working in his father's mines. In that way he gained a pretty thorough knowledge of mining, knowledge which stood him in good stead in after years, when he began to acquire and operate coal properties.

Thurmond, in the heart of what is now the New River coal field, attracted W. E. Deegans to West Virginia before he was of age. When he was following other lines of business he ever kept one eye on the possibilities of West Virginia as a great coal-producing state, and all his surplus, when he had one, went into coal lands or was invested in coal stock. His judgment was, before long, vindicated, and in the course of a few years he found it necessary to devote his entire time to his coal properties, which have now become so numerous that they are located upon two different roads in widely scattered sections. He directs the affairs in sixteen different mining operations, some of which are: The Beckley Vein Coal Co., Cub Fork Coal Co., Deegans Eagle Coal Co., Devils Fork Coal Co., Guyan Valley Coal Co., Miller-Pocahontas Coal Co., Mullens Smokeless Coal Co., Orville Coal Co., Paragon Colliery Co., Royal



W. E. DEEGANS

Block Coal Co., Sterling Colliery Co. and the Virginian Smokeless Fuel Company.

The center of Mr. Deegans' activities are at Huntington, from which point he directs operations so far as it can be done from the office. Huntington was no doubt chosen because the Virginian, Chesapeake & Ohio and Norfolk & Western railways converge at that point, and with as many mines as he has to direct, he must have a convenient place from which to jump in any direction. It would keep any man constantly on the go, but as Bill Deegans is a veritable human dynamo, he thrives on work that would wear out any ordinary individual.

With all he has to absorb his attention, Bill Deegans nevertheless has time for his friends, and time to smile and shed happiness all around him. Busy as he is with his own affairs, he has yet found time, or made it, to engage in many war-work activities and to help in every public movement.

On the basis of four tons of bituminous coal said to be necessary on the average to produce one ton of steel products, the increased output of steel in 1916 would indicate an increased demand of 40 million tons of bituminous coal in 1916 for the steel industry.

Development Period of a Mine

By H. H. STOEK
University of Illinois, Urbana, Ill.

SYNOPSIS — *When does the operation of a mine begin? Six answers to this question are here given, and the advantages and disadvantages of each set forth. A wide diversity in opinion and practice exists, and discussion is invited.*

IN a recent article in the *Daily Digest* of the National Coal Association, W. B. Reed, accounting secretary of the association, says:

In the development of a coal mine all expenditures should be capitalized, and this course should be followed until the projected capacity of the mine is reached, the operating buildings constructed, the machinery installed, and the mine is producing, or is in a position to produce, the quantity of coal for which it was developed. During this period credit should be given to the development for the development product; that is, for the coal produced during that period.

After this point is reached and the mine settles down to a normal production, the purpose of each additional expenditure for equipment will need to be carefully weighed as to whether or not it is properly an item of expense or an additional investment of capital, a replacement of a unit worn out and demolished, or an additional unit of the same kind intended to increase production, and whether it will permanently and materially increase the output, or decrease costs; also whether it will have a salvage value because of the fact that it may be sold or transferred to another operation, when the operation for which it was purchased has been abandoned.

This, at first sight, seems very reasonable, but it by no means represents the practice of many mining companies at the present time and it may, therefore, be of interest to consider some of the methods used for determining when development charges end and when operating charges begin.

Operation Charge Should Begin Early

Accountants and writers on costkeeping generally advise that the charge for operation should begin as early as possible in the life of the operation so as not to have an unduly overloaded capital account and so that operating costs may be watched closely as soon as possible. Quite naturally the operating man tries to put into capital and overhead accounts everything possible so that his daily costs may be kept down, and he is in sympathy with anything that will apportion charges to any other account than operation and is willing to have the development charge kept open as long as possible.

To obtain uniform costs, or costs that permit a comparison to be made between different companies or different mines operating under the same company, it is not of nearly so much importance at just what point development costs cease and operating costs begin, but it is highly important for purposes of comparison that all of the companies or all of the mines should adopt the same point.

I know of the following different practices in this matter, and the advantages and disadvantages of each as I see them are given under each head noted.

1.—*Operation begins when the shaft penetrates the coal.* This is the practice of the superintendent of one division of a large coal company, but it is quite unusual and the reason for its adoption seems to have been purely a local convenience in bookkeeping in order to keep the shaft-sinking costs entirely separate from the underground operations and so that these could be definitely closed as soon as the coal was penetrated. After that time all work of opening up was kept as a distinct item and charged to operation. Whatever may be the justification in this particular instance on account of local conditions, it is not a practice that will be generally used, as it separates from the operating account a considerable expenditure that properly belongs there.

When Does Operation Really Begin?

2.—*Operation begins when the mine has reached the full daily output for which it was designed.* This is the time given by W. B. Reed in the *Daily Digest* of the National Coal Association, and while it is apparently a perfectly logical point to adopt there are arguments against it that need to be considered and are of importance. Many mines do not reach their rated capacity for many years, if ever, due to market or other conditions. Suppose, for instance, a mine is designed for an output of 5000 tons per day and all of the surface equipment needed for such an output is provided, but due to unforeseen troubles in operating, labor conditions, inadequate market, etc., it is found impossible to raise more than 4000 tons of coal per day. Such a mine under definition 2 would never be an operating unit, although it might be a regular producer of a large amount of coal and be worked at a profit.

The principle of this method is used by many companies by charging to capital account or some account such as "construction" all development charges until the mine is ready to produce the daily tonnage for which it was planned; that is, until enough entries have been driven and provision made for sufficient rooms to give the desired output if labor and trade conditions warrant it. Up to this time all the development, plant and equipment costs are charged against capital account, while all coal sold during that time is credited to that account. After the mine has been developed to the point where it can produce its rated capacity, the operating charges are begun and thereafter all expenditures are so charged unless they are intended to give a positive increase in capacity over the original plan, in which case they then become capital charges.

J. R. Findlay, in his book on "Cost of Mining," charges to capital all expenditures up to the time when the mine is producing and after that time only such expenditures are capital charges as are made to increase the capacity of the mine. This continues until the time when the mine has reached what appears to be an average production. The capital thus charged is the amount to be amortized over a reasonable period at a given interest rate. For this purpose Findlay uses a rate of 5 per cent.

3.—*Operation begins when coal is hoisted from rooms.* This method is used by a number of companies and gives a very definite point and one that marks the time when the mine is really a producing one and not merely a mine under development. It has the advantage of giving a definite point that insures uniformity among a number of mines and it is not dependent on trade, market or labor conditions.

An objection to this point is that the mine may not be self-supporting or making money for some time after this point is reached, and it is not working under normal conditions until it can be said to be self-supporting. Also during the unprofitable construction and the development period it is generally considered allowable and wise to charge interest upon the capital invested and to include this as a part of the total capital that has to be amortized. If the break between capital and operating charges is made before the mine can operate at a profit, or at least without a deficit, the interest-bearing period upon capital is shortened unduly or else there is introduced an increased difficulty in accounting.

Defines the Term "Even Break"

4.—*Operation begins when an "even break" occurs.* The term "even break" as used by a number of companies in determining this point means such a time in the operation of the mine that the selling price just equals the operating cost and there is neither profit nor loss on the operation. Such a point is, of course, indefinite and depends upon trade conditions, markets, contracts, weather and many other variables, so that it is difficult or impossible to compare conditions between a number of different companies; in other words, to adopt a common standard. Such variables will, of course, be most serious in mines operating under widely different conditions or in different localities, while for a group of mines in the same district with approximately the same equipment and operating under the same labor conditions, the difficulty of reaching a point for each mine that would be comparable for other mines is not so great.

5.—*Operation begins when the output has reached a certain percentage of the rated output of the mine.* This method is quite widely used and the percentage so far as I know varies from 50 to 66⅔ per cent. of the output. This gives a fairly definite starting point and one that is likely to be reached within a reasonable time, even though the full rated capacity may not be expected for an indefinite time in the future. It is also a point not influenced nearly so much as is the rated capacity point by market, labor and like trade conditions. The relation between this method and method No. 4—that is, the even break period or the time when the mine begins to make money—varies widely with local working conditions and depends, of course, upon the amount of invested capital, trade and labor conditions, etc.

To show the wide divergence in practice in this matter, at a number of mines that I have examined, operation accounts have been started when the mines have reached 30, 33⅓, 50, 55 and 60 per cent. respectively of their rated capacities or of the capacity subsequently obtained under full operating conditions, because rated capacity is also a somewhat indefinite point and many mines are worked to an overload and even though rated for 5000 tons, they may produce 6000 tons or more.

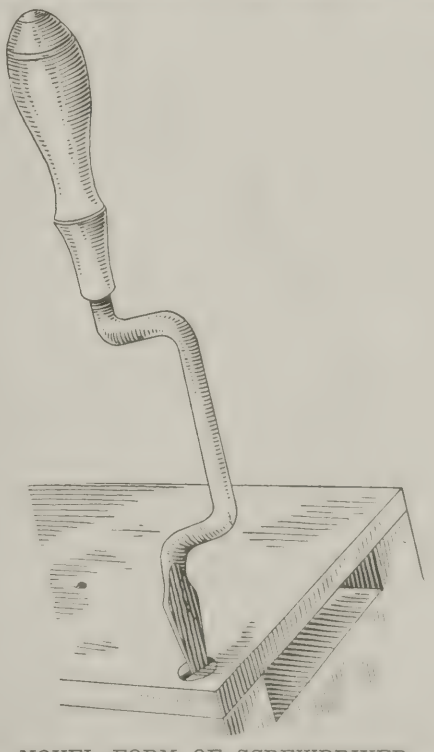
6.—*Operation begins when a certain arbitrary output per day has been reached or when the mine is prepared to produce such an arbitrary output.* In a number of cases with which I am familiar 1000 tons output has been assumed, and when this point has been reached the accounts have been changed from capital to operation, no attention being paid to the rated production capacity or whether the mine was making money or not.

This method may be fairly satisfactory where mines of approximately the same size are compared, but is not a satisfactory comparative method for mines of widely differing daily or yearly capacities.

Undoubtedly there are a number of other methods used by mining companies for separating capital from operating accounts, and I would be glad indeed to know of such and to see the reasons for their adoption stated as well as the advantages claimed for them set forth in the columns of *Coal Age*. I would also be glad to have a discussion of the methods outlined above, for although some of them may seem to be rather academic, all are at the present time being used and apparently giving satisfaction to the companies employing them.

A Crank Screwdriver

The driving home of large machine or wood screws is quite a tedious job if an ordinary screwdriver is employed. The improved screwdriver shown in the accompanying illustration will overcome any unnecessary



NOVEL FORM OF SCREWDRIVER

expenditure of energy and avoid injury to the hands, which often resuits if an ordinary screwdriver has to be used for any considerable length of time.

In operating the device illustrated, pressure is applied as usual, while the rotation of the screw, regardless of resistance, is made easy through the aid of the crank, which affords a much better leverage than the up-and-down form of screwdriver in everyday use.

Routine Determination of Specific Gravity of Coal

By ABRAHAM G. BLAKELEY
Pottsville, Penn.

SYNOPSIS — *The specific gravity of coal may be employed as a standard, more or less accurate, by which its fuel value and ash content may be judged. Difficulty may be experienced in manipulating coal crushed finer than "4-mesh," as the smaller particles tend to float in water. In such a case kerosene may be advantageously employed as the immersion medium.*

THE determination of the specific gravity of coal is of value for several reasons. The results are often utilized in calculating the quantity of coal in a given area underground. They possess utility in figuring the weights of different coals in cars or wagons, while in some cases they may help to decide whether coal came from some particular bed or from some certain mine or region. Specific gravity is a factor to be considered in the separation of coal from slate or bone or from cinder. This latter separation is of serious importance to operations recovering coal from streams.

Moreover, specific gravity results, if rightly interpreted, may be used as a rapid means of roughly judging the quality of coal from any particular mine. The specific gravity bears quite a definite relation to the ash content of coal. From any specified mine, coal samples of approximately the same ash content will have approximately the same specific gravity. Slate is heavier, or higher in specific gravity, than coal. Bone is intermediate between coal and slate in its ash content and in its specific gravity.

Ash Content and Specific Gravity

For anthracite coal, an increase of 1 per cent. in ash content will correspond to an increase in specific gravity of approximately 0.01. If a coal from a certain mine shows a specific gravity of 1.61, corresponding to 13 per cent. ash content, and a second sample from the same mine shows a specific gravity of 1.80, it may safely be assumed that the second sample will have an ash content approximately 32 per cent. Averages of hundreds of results on many different coals form the foundation on which this statement is based. Specific gravity can therefore be used as a quick means of judging the quality of a coal. Specific gravity results are not of equal utility to the consumer unless he knows from what mine or region the coal came.

Recently a sample of boiler fuel from a colliery boiler plant came in for test. There had been some complaint as to quality of the coal. The sample, after receipt at the chemical laboratory, was ground to about 10 mesh size, and a determination of specific gravity made. This was found to be 1.85 to 1.87, with an average of 1.86. Other samples of coal from this colliery had shown average results as follows:

Size of Coal	No. of Samples	Specific Gravity	Ash (Dry Basis)
Chestnut...	29	1.61	12.89
Pea.....	30	1.65	15.75
Buckwheat	30	1.67	18.20
Rice.....	29	1.75	26.24
Total and Average	118	1.67	18.27

From these results the ash corresponding to a specific gravity of 1.86 was calculated as 37.27 per cent., or approximately 37 per cent. ash.

In the meantime the boiler fuel sample was being finely ground (60 mesh or finer) for complete analysis. The ash was determined and figured to a dry coal basis. The result was 35.86 per cent., or approximately 37 per cent. ash.

Thus the specific gravity determination afforded a rough means of estimating the quality of this boiler fuel. The agreement as shown in this case, less than 1 per cent., will not always be so close. Nevertheless the specific gravity determination is certainly not without some value.

In 1909, together with my assistant at that time, Edwin M. Chance, I published a paper entitled "A Rapid Method for Determination of Specific Gravity of Coal." This method, as published in *Journal of Industrial and Engineering Chemistry*, December, 1909, is given below:

During the routine work of this laboratory it is necessary to determine specific gravity on a large number of samples of anthracite coal. As the methods available gave but little satisfaction commensurate with the time and labor entailed, we had recourse, after considerable experimentation, to the herein described procedure.

The apparatus, first of all, is simple, and may be found in almost any laboratory. The first requirement is a stout flask of about 250 cc. capacity, with a long and rather slender neck, terminating in a flaring mouth, such as the "copper determination" flask supplied by the Denver Fire Clay Co. This flask is to be marked at the base of the neck, either by a file scratch or by etching, and its volume up to this mark determined by means of a 100 cc. automatic pipette and a 100 cc. burette, graduated in 0.2 cc.

The burette should have a three-way stopcock and be connected with a reservoir either below or above the level of its top. In the former case suction is used to fill the burette, while in the latter case gravity is the means. It is better to use the elevated reservoir and gravity feed for the pipette. Of course, it is understood that a plain burette and pipette can be used, the form described merely having the advantage of rapidity.

The flask is calibrated as follows: The flask is rinsed with water, inverted, and allowed to drain for one minute; 100 cc. water is then added from the pipette, the flask is then filled to the mark from the burette. In calibrating by this method, inaccuracies in either pipette or burette do not militate against the accuracy of the specific gravity result, as the same method is pursued in the final determination.

The actual determination is carried out as follows; 100 grams of coal, previously crushed to about 4 mesh, and carefully sampled, are weighed to 0.1 gram, and placed in the flask. 100 cc. of water is run in, a 1-hole stopper fitted with bent glass tube and rubber connection is inserted in the mouth of the flask; suction is applied, and the flask is shaken, care being taken that no water is splashed into the glass tube. When air bubbles cease to be disengaged, the suction is interrupted and the stopper withdrawn. Water

is now run in from the burette till the flask is filled to the mark, care being taken to work down any coal which may have stuck in the neck.

The results may be calculated as follows:

$$\text{Specific Gravity} = \frac{100}{V_0 - V_1}$$

wherein V_0 = volume of the flask; V_1 = number of cc. water added to coal.

No calculation at all need be made if a table of reciprocals be available, as specific gravity = 100 × reciprocal of $V_0 - V_1$. As an example 100 grams coal were taken; volume of flask, $V_0 = 262$ cc.; volume of water added to coal, $V_1 = 197$ cc.

$$\text{Specific Gravity} = \frac{100}{262 - 197} = 100 \times \frac{1}{65} = 1.54$$

After making a determination the flask is emptied and rinsed, then allowed to drain for one minute, when another determination may be made.

This method is very rapid and so simple that an inexperienced operator can without difficulty make over 80 determinations per day accurate to within 0.02 unit of specific gravity. It is, of course, self-evident that this method has a wide range of applicability; the gravities of such materials as rocks, drillings, etc., may be determined with ease.

While the authors claim nothing new or radical in this process, still they submit it as a procedure by which results of moderate accuracy can be obtained with great rapidity, while the outlay for special apparatus is practically nil.

This method has been used since the date of publication and has given fairly satisfactory results. However, I have often had occasion to determine the specific gravity on samples of coal much finer than "4-mesh" size, and have in the case of coal samples of 10-mesh size or finer experienced some difficulty in obtaining reliable results. The fine coal has a great tendency to float on the surface of the water, thus obscuring the water level and making it almost impossible to judge the proper meniscus.

By a simple and inexpensive modification of the foregoing method thoroughly reliable results may be obtained on finely crushed coal. In place of water for the calibration and for the determination, ordinary kerosene or 150 deg. oil is used. The fine coal sinks readily in the oil and does not tend to obscure the meniscus. The oil after use is poured into a stock bottle or waste oil bottle and can be purified later when sufficient oil has been accumulated. Filtration through dry filter paper will remove both coal dirt and water.

After the oil is poured from the specific gravity flask, the flask is rinsed out by means of water, inverted, and drained as described previously. The little water left in the flask has no appreciable effect upon the accuracy of the results. The extra time taken in pouring the dirty oil into the stock bottle is more than offset by the time and trouble saved in reading of the meniscus and in general accuracy of results. Determinations can be duplicated readily to 0.02 unit of specific gravity.

In conclusion, I claim nothing particularly new in this method, but submit the procedure as a help to others working in similar fields of endeavor.

Coal is by far the most important of all the mineral products of the United States. Next to coal in importance is iron. Little Belgium, because of its important coal and iron deposits, has been a hive of industry, occupying a position as a manufacturing nation far beyond what one would expect from its limited area and population.—*Van Hise.*

Use and Abuse of Electric Headlights on Mining Locomotives

(*Continued from page* 1060)

to bring out clearly that no matter how good the reflector or how high the candle power of the light source, a good headlight cannot be obtained unless the light source is properly located.

In breaking a 4-amp. arc circuit a good switch must be used, one that will stand up for a long time. Fig. 24 shows a multiple break switch which meets fully the severe service incident to frequent interruptions in an arc circuit.

In Fig. 25 the switch is shown with the barrier removed and the cross bar broken away to show the connection between the adjacent switch blades *B*. This switch is of the quick-break type and has the advantage that it must be fully closed else the spring *C* will throw the handle back to the off position. When the switch is closed the bottom of the handle *D* fits in a recess in the cover at *E*, and is held there. The switch is exactly what the name implies—that is, multiple break. In ordinary knife switches the arc is broken in one place only. This multiple break switch breaks the circuit in four places.

The switch blades *B* are so shaped that at the instant of closing contact is made along the entire face of the clips *E*. Furthermore, the edge of the switch blade is bevelled so that a positive contact is insured. With this switch there is no such thing as point contact between the edge of the blade and face of the clip, but positive contact over an area greater than sufficient to carry the current. Such construction means long life to the switch parts.

This multiple break switch is a composite affair, which can be made into any one of five types by merely changing the back connections. It may be used for any of the following: Single pole, single throw (Fig. 26); single pole, double throw (Fig. 27); double pole, double throw reversing (Fig. 28); double pole, single throw (Fig. 29); double pole, double throw (Fig. 30).

These figures show the bottom of the switch with insulating cover plate removed. The various connections, as indicated above, are also shown. Connections 29 and 30 are seldom used in headlight work. However, this switch is useful wherever an ironclad, barriered switch is wanted. In every case the live line is connected to the front of the switch at *AA'*, and the headlight is connected *BB'*, *C* or *C'*, as is necessary for the connection desired.

The present balance of transportation is a great reduction in the proportion of the cars (normally) furnished for the transportation of coal. The railroads, however, are consuming their full quota of coal, so that while under favorable and natural conditions 35 tons of coal would be moved, out of each 100 tons of freight there is now being moved much less coal. The entire coal shortage is thrown upon the industries of the country and the domestic users, who, instead of having a coal supply equal to two-thirds of the total coal movement, are reduced to a small and continually diminishing ratio, and this in a time when every effort is being made to stimulate the industrial effectiveness of the nation.

Annual Meeting of the Coal Mining Institute of America

By FRANK H. KNEELAND
Associate Editor *Coal Age*

THE annual meeting of the Coal Mining Institute of America, held in the Chamber of Commerce Building and at the Fort Pitt Hotel in Pittsburgh, Penn., on Wednesday and Thursday, Dec. 4 and 5, 1918, was one of the most interesting and enjoyable that this organization has ever held. The biggest session, from the standpoint of numbers at least, was the institute dinner held in the English Room of the Fort Pitt Hotel, there being between 350 and 400 members and friends present.

The session of Wednesday morning was largely taken up with the election of officers. When the balloting was completed, it showed that the following men had been elected to the offices named: President, E. N. Zern; first, second and third vice presidents in order named, Messrs. Fohl, Maize and Arkwright; secretary-treasurer, H. D. Mason, Jr.; the executive board for the ensuing year will consist of Messrs. Affelder, Walsh, Pollock and Hanford.

After the election, the institute proceeded to the discussion of the first question in the question box. This read as follows: "What effect will the conclusion of peace negotiations have upon the labor supply in and about the coal mines?"

Without going into detail, the discussion on this question brought out the following salient features: It is believed that there will be no inrush of labor following the ratification of peace. Probably as high as 35 per cent. of mine laborers will return home. If the Central Powers have to pay large indemnities, laborers will probably attempt to leave those countries. The restriction of emigration and the indemnities will doubtless prove potent factors in the situation.

Some Actual Figures

A recent canvass of steel workers at a certain plant in Ohio showed that 25 per cent. of the laborers intended to stay in America. Another 25 per cent. anticipated returning to Europe for a short time, after which they would come back to this country. The balance, or 50 per cent., of the men canvassed intended to go to Europe and there remain permanently. In another instance, 56 men were interviewed at a coal plant. Of these, 25 expected to return to Europe. At another plant 40 men were canvassed. Ten of them, or 25 per cent, expected to return home. In another instance, of 55 miners canvassed 23, or 36 per cent., intended to return to Europe. Of 58 day hands, 28, or 48 per cent. of the total number, expected to return to Europe.

Thus, taking an average of all the foregoing figures, approximately 40 per cent. of the foreign-born laborers, or unskilled workmen, anticipate returning to the lands of their nativity. Under existing circumstances and the conditions that have prevailed throughout the world during the past five years, these men are not altogether to be blamed for their anxiety concerning the condition and state of their friends and relatives. On the other hand, with the reëstablishment of mail communications with what might properly be termed the beleaguered nations, or Central Powers of Europe, the anxiety of these men might be somewhat set at rest; and they may change their minds about returning to their native countries.

Another speaker on this subject stated that of 607 employees of one company, 87 anticipated returning to Europe temporarily, while 61 expected to go and stay. Thirty-six were doubtful as to what they would do, and 12 said they had friends who expected to come here.

It was suggested that some of this exodus of labor might be counteracted by inquiries concerning friends and relatives in Europe directed through the American Red Cross. Such inquiries might well be handled through the offices of the various coal companies.

Dare They Do It?

Still another speaker pointed out that the countries of Southern Europe are now laboring under popular and somewhat unstable government. It is doubtful if these countries could force their peoples to remain if they wish to emigrate. It was pointed out that under present conditions the various European countries will be much more careful of the restraint imposed upon their citizens than was the case before the war. Wages here are high compared with Europe, and general mining and industrial conditions are much better. These will doubtless play an important part in the labor question after the final peace ratification.

Question 2 reads as follows: "Should the drawing of mine timbers be penalized under the safety standards in computing compensation insurance rates; if so, under what conditions?" The discussion of this question was comparatively short, the principal point brought out being that mechanical means, such as chains or post pullers, should always be used in removing timbers and that this work should be done under the supervision of a competent and careful foreman or subforeman.

Question 3 was then taken up. This question reads: "To what extent can the water-gage chart be used as an index to the ventilation conditions in a mine?" The consensus of opinion brought out in this discussion seemed to indicate that while the water gage was a good general indication of ventilation conditions, in many instances at least the fluctuations of the recording pen, probably due to eddy currents in the mine passage, were so violent and frequent as to render the record of little specific application. It was pointed out, however, that these rapid and violent fluctuations might be somewhat steadied down by almost closing the connection between the recording gage and the orifice of the tube extending into the air passage. Thus, if a valve was located in this air pipe, cracking the valve instead of

opening it wide would tend to steady down the recording pen of the instrument.

The fourth question, "Has the law permitting the employment of non-certified officials in coal mines been detrimental to their (the mines) efficient and safe operation?" brought out considerable discussion, which at times waxed hot and almost acrid. It was stated that the change in the law permitting the employment of non-certified foremen had had no effect in the anthracite field. Some of the bituminous operators have taken advantage of this law and employed men who did not hold certificates. It was admitted that uncertified men were often incompetent, and that a certificate was an index but not a guarantee of competency.

One speaker stated that 28 men in one inspection district are mine foremen without certificates, and that accidents have increased in this district largely on this account. It was also brought out that due to the high wages paid to the miners and comparatively low wages paid to mine foremen, many certified men were loading coal.

One speaker brought out the point that operators are not always competent to pass upon the proper qualifications for their mine foremen, and there is legally no one to pass upon the operators' competency in this direction. One state mine inspector was emphatic in his assertions and made the statement that the operator who allows an uncertificated man in an authoritative position in his mine is a criminal.

Discussion of Question 5, "What are you doing to increase the efficiency and steady working of your employees: with what success are you meeting?" was then taken up. It seemed to be the consensus of opinion that in order to secure continuity of service from miners it was necessary to offer them certain inducements other than high wages or bonuses. In other words, an incentive to work must be given. Among the inducements that might be offered, the sale of company houses was mentioned. In some instances, such a plan worked well. One company tried it some years ago and sold about 30 houses, but this idea does not work with equal effect during good and bad times. The men regard the purchase of a house as a kind of fire insurance—that is, an insurance against getting "fired."

Full Payment Means a Long Wait

Another speaker brought out the point that it would probably be better to sell the man his plot of ground first and then build or offer to build upon it a suitable house according to the man's own plan. Many of our miners do not like the idea of paying out money, so much a month every month, for a considerable length of time and having nothing definite—that is, nothing in the form of a deed—to show for their investment until the entire amount is paid up. This plan of selling the land first and the house afterward has been tried in the anthracite regions with good success.

As another inducement for his men to stay on the job, one operator gives his store patrons a check covering the profits of the store. This is not a due-bill on the store, but a real check redeemable in real money at any bank. This has had a good effect upon the men. Probably, however, none of these expedients alone will answer the purpose, and it will doubtless be necessary, if men are to be retained in satisfied employment, to offer many other inducements than those mentioned. Among these might be noted proper living conditions, good school facilities, sanitary surroundings, etc.

Question 6 read: "Are roller-bearing wheels too delicate for mine cars?" This question brought forth some discussion. It was stated by one speaker that it was a wrong principle to put roller bearings of any kind in any car wheel proper, the best place for them being in a journal box. Another speaker, who illustrated his talk with several lantern slides, showed roller bearings that had been in use for several years without losing their efficiency. It would appear that the test of continuous use would be the best and only satisfactory answer to this question.

Alternating vs. Direct Current

Question 7 was next taken up. This question read, "Is the underground use of alternating current more hazardous than the use of direct current?" One speaker stated that in one operation several alternating-current mining machines have been successfully used for something like six years. These have given no more difficulty nor have they proved any more dangerous than the ordinary direct-current machines. Another stated that alternating current of equal voltage appeared to be safer than direct current. This is probably due to the fact that with direct current, touching one conductor is enough to give a person a shock, while with alternating current it is necessary to touch at least two.

Another speaker discussing this question stated that he had always considered 440-volt alternating current as being as dangerous as 500 volts direct current, but that he considered both of these voltages too high. In his judgment, it was unnecessary to carry the potential of underground circuits, at least those so placed that men might come in contact with them, at above 220 volts for alternating current or 250 volts for direct current. In stationary operations under ground, it is in many instances possible to carry high-tension wires properly insulated in conduits directly to the terminals of the machine. The alternating-current motor, since it is usually boxed in and has no live parts touchable by anyone if properly and permanently installed, is comparatively safe. However, high voltages underground should be avoided if possible.

The discussion narrated above carried the meeting to the close of the afternoon session. The next session was in the evening, in the English Room of the Fort Pitt Hotel, and consisted primarily of supper. After the eatables had been disposed of and cigars had been lighted, a short report of the condition of the institute was made by the retiring president, Mr. Affelder. This showed the institute in a flourishing condition, both in numbers of members and in finances.

President-elect Zern was then introduced and made a few remarks. Unfortunately, James B. Neale, production manager of the United States Fuel Administration, could not be present at the institute supper, as his presence was necessary in Washington.

Dr. Downey was then introduced and made a short talk on industrial insurance and workmen's compensation. The cost of this insurance in the bituminous region averaged about 5c. per ton, while for anthracite

it was from 8 to 10c. During the past few months, for each million tons of bituminous coal mined there have occurred three deaths, one disability and 20 to 30 compensable disabilities, or those entailing the loss of two weeks or more time. He stated that coal mining was inherently hazardous. In cigar manufacturing the hazard was represented by $0.0015, while for coal mining it was represented by $2.

Captain H. D. Trounce, of the 606th Engineers, was next introduced. Captain Trounce, at the beginning of the war, enlisted in the British Royal Engineers, and took part in the underground mining in Flanders and in the Vimy Ridge country. He vividly portrayed the excitement and danger of mining under No Man's Land.

Seward E. Button, successor to James E. Roderick, deceased, was then introduced. He read a short paper complimenting the individual members of the organization on their work during the war and pointing out the possibilities of the future. He stated that the casualties in mining during the times when every effort was being made to increase and maintain a high output were only slightly greater than those in peace times. In conclusion, Mr. Button urged the Americanizing of the foreigner. He stated that naturalization was not sufficient to make a good citizen out of the man who, for various reasons, seeks our shores and sojourns among us.

Describes Gas Investigations Work

Colonel G. A. Burrell, chief of the Research Division of the Chemical Warfare Service of the United States Army, was then introduced. Colonel Burrell has had charge of important gas investigations work for the Government, and was well qualified to speak upon his subject. He explained that before the war started, Mr. Manning, of the Bureau of Mines, had offered the War Department the facilities of the bureau so far as gas study was concerned. His offer was accepted and the present research organization is largely the outgrowth of this acceptance.

Gases used in warfare at present are of four types: Tear gas, respiratory gas, skin irritants and sneezing gases. The respiratory, or lung-attacking, gases were first used, the first ones to be employed consisting of chlorine and phosgene. These, while quite deadly in their effect if inhaled in sufficient quantities, could be easily guarded against with suitable gas masks. The most difficult gases to contend with have been the skin irritants, of which mustard gas has been the one most commonly used. Colonel Burrell explained that simultaneously with the perfection of gases had come the perfection of gas helmets. These have been developed from simple gauze bandages worn over the mouth and nose and saturated with certain chemicals to the present so-called "fighting helmet" employed by the United States troops. This helmet is so arranged that breathing in or through it is little more difficult than breathing without any mouth and nose covering. Also, the instrument is so arranged that the inhaled air, before reaching the mouth or nose, impinges upon the eyeglasses or windows in the device. This simple expedient insures clear visibility at all times.

On Thursday morning, Dec. 5, the institute reconvened in the auditorium of the Chamber of Commerce Building. Consideration of Question 8 was then taken up. This reads: "In what way can the conservation of material and supplies be best effected both inside and outside the mines?" The principal paper in this discussion was delivered by Mr. Jones, of the Du Pont company, and related to the storage and use of explosives. As this paper will appear in the Dec. 19 issue of *Coal Age*, a further discussion of it here is unnecessary.

Question 8 was the last in the question box, and after the discussion had been disposed of the institute proceeded with the presentation of four extremely interesting papers. The first of these was "The Elimination of Power Losses," by Graham Bright, engineer in charge of the Mining Division of the Westinghouse Electric and Manufacturing Co., of Pittsburgh. This paper was printed in *Coal Age*, Dec. 5, page 1021, and therefore requires no further discussion here, as it can stand on its own merits.

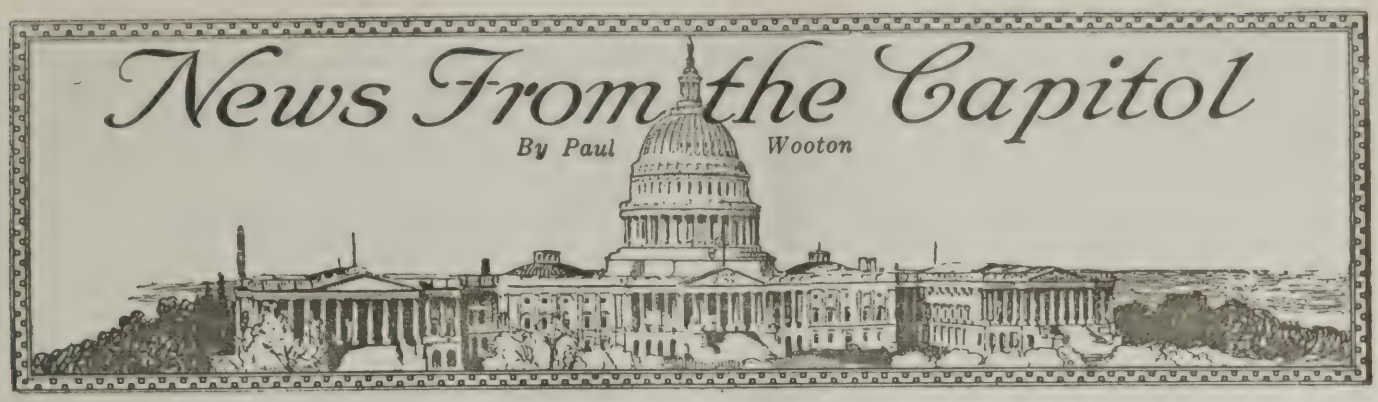
A paper entitled "Underground Coal-Loading Machinery," by E. N. Zern, was next presented. This was elaborate and full and took a considerable time to prepare. Mr Zern was at many times thoroughly flooded with questions pertinent to the use of mining machinery.

"The Use and Abuse of Headlights on Mine Locomotives," by W. K. Mackall, was presented at the afternoon session. This was profusely illustrated with lantern slides. This paper appears in the current issue, and, like the one mentioned above, can stand on its own merits. "The Preservative Treatment of Mine Timbers as a Conservation Measure" was the next paper, and was presented by Kurt C. Barth. This paper was also printed in *Coal Age* for Dec. 5, beginning on page 1025.

This completed the program for the afternoon meeting. Much interest and enthusiasm were manifested, and no one who attended the meeting could come away doubting the usefulness and efficiency of the organization. Much of the success and present strong position, both numerically and financially, of the Coal Mining Institute of America has been due to the zeal and untiring efforts of the retiring president, W. L. Affelder. The incoming president, or the one for the year 1919, is also a man of much zeal and thoroughness. If he handles the affairs of the institute as thoroughly as he handled his subject on underground coal-loading machinery, no one need worry concerning the future of the organization.

Will Maintain Prices to End of Coal Year

Announcement that the price schedule might be lifted and the zoning system discontinued on Dec. 15 brought forth such a protest that it is understood no change will be made prior to Apr. 1, the end of the coal year. It would be manifestly unfair to dealers, it is held, who have been forced to stock up with low-grade coal. If the bars are thrown down at this time, it would be next to impossible to dispose of their holdings with higher grade coals on the market. In the same way, it would be unfair to industrial consumers who had stored lower grade coal. In addition, it is believed the effect on labor would be such as to precipitate a serious situation.



Fuel Administrator Garfield Resigns

Dr. Garfield's resignation came as a surprise to the Fuel Administration, as well as to the general public. The interpretation placed upon his resignation was a surprise to Dr. Garfield himself. The facts of the matter are these: In an informal personal letter Dr. Garfield called the attention of the President to an urgent situation which had been precipitated at his college by the withdrawal of the student army training corps. He explained that the situation is such that he feels it his duty to devote a portion of his time, from now on, to the college. As the President was on the point of leaving for France, Dr. Garfield felt that it would be only proper that he place his resignation in the President's hand with the understanding that he would continue to give the Fuel Administration a portion of his time. It is understood that the President accepted the proposition exactly as stated by Dr. Garfield. The announcement, unsupported by the other facts surrounding the tender of the resignation, led to much speculation, some of it going so far as to declare that a break had occurred between the President and Dr. Garfield because Dr. Garfield did not approve of the President's trip to France. It is Dr. Garfield's intention to spend one day each week, or more if necessary, looking after Fuel Administration matters, even after he takes up anew his duties at Williams College.

Will Investigate Availability of Lignite

The bill providing for an investigation of lignite coal has been reported favorably to the House by the Committee on Mines and Mining. The committee amended the bill to exclude peat and reduced the appropriation from $150,000 to $100,000. The bill was introduced with the explanation that "the object of the investigations proposed by this bill is to demonstrate the commercial practicability of the use of our vast lignite deposits, which constitute one-third of the coal deposits of the nation, a vast volume of these deposits being upon Government land, and owned by the Government. The carbonizing of lignite has passed the laboratory stage, and the problem now to be solved is to work out the results obtained in the laboratory on a large commercial scale, so as to demonstrate its practicability from a commercial standpoint to such an extent that private enterprise and capital will undertake the development of this wonderful resource." The committee submitted a report which goes into an extensive analysis of the present lignite situation.

Relinquishes Control of Soft Coal

Requisitions made by the Fuel Administration for shipment of bituminous coal to industrial plants have been canceled. In the future all industrial users must arrange for their own supplies. Retail dealers, hospitals, schools, public utilities, the Government departments and state and municipal agencies also have been asked to look out for their own fuel. The Fuel Administration, however, will maintain a portion of its distribution bureau so as to look out for such consumers and domestic users in case of necessity.

Recent Changes in Coal Zones

The market for the high-volatile coal in the Logan and Kanawha fields has been increased by the modification of Zone M-2. The high-volatile producers in Kentucky also may sell over a larger territory by the change in Zone M-4. Zone L also has been changed so as to afford additional territory to the coal produced in the Kanawha district. The consuming district of Zone M-3 also has been enlarged to permit of wider shipments of the high-volatile coals of West Virginia and Kentucky. Similar action has been taken in Zone M-1.

Many Fuel Officials Resign

W. H. Warren, of Richmond, Va., who has been in charge of coal consumers' needs in several of the southern states for the Fuel Administration, has resigned. J. O. Knight, of Baltimore, who had charge of similar work in Pennsylvania, Maryland and Delaware, also has resigned. Alexander Yule, of St. Louis, who directed the distribution of blacksmith coal, also has returned to his personal business. The resignations were handed in because the changing conditions have so reduced the work as to make the services of these men unnecessary.

To prevent any increase in the price of gashouse coke, based on the recent anthracite advance, an order has been issued fixing the price on the basis of anthracite prices as of Oct. 1.

Coke distribution has been placed in the hands of state fuel administrators. They also may give permission to use coke as a domestic fuel in cases where they deem it necessary.

Canadian permits for imports of bituminous coal into Canada will not be required in the future, the Fuel Administration has announced. The requirements with regard to anthracite shipments remain the same.



The Red Cross seeks a 100 per cent. membership for 1919. Children and parents with one accord should enlist under the great international banner of brotherhood and service, for, by its ministry of mercy, the Red Cross will complete the victories nobly won in the foughten field. None are too young to be helping toward a better and brighter world.

EDITORIALS

Contest Between the Head and the Hand

IN THE United States, there have always been some men who, laboring with their hands, have made large earnings. Those who labor with their heads, especially those in inferior capacities, have too often been quite a little jealous of the larger incomes made by these manual laborers. "Brain labor," they assert, "should receive greater consideration." The complaint is general that "I have been 25 years acquiring my experience, and yet I only make as much as a man who works with his hands."

The grumbler overlooks the fact that the manual laborer has been getting during that time, perhaps not what we somewhat loosely term "experience," but at least adaptability to his tasks—dexterity, strength, hardiness, hardness and what not. Perhaps his growth toward greater physical development of the kind needed for his work soon reached a limit, but at least the same might be said of the brain worker. If the latter has progressed from one form of employment to another, he doubtless lost in that progress many of the peculiar adaptabilities he successively obtained. If he stayed at the same work, it is likely that his advance largely ceased after the first year of his employment. It is not clear therefore that years of experience at mental labor have any more claim than years of development at physical labor.

There are, of course, certain employments for which much mental equipment is needed and an observation extending over years—employments requiring special aptitude; yet occupying positions of that kind are often men who do not have that aptitude but claim the emoluments which commonly go with the position or are believed so to go, or which we believe should go with such a position.

To these men it seems they should be paid rather by the measure of their ambition and pretentions than for the measure of their mental attainments. A passable mechanic may have been spoiled to make an indifferent brain worker, and the product, a substitute of inferior value, proclaims its right to payment as of the material for which it is substituted.

As a matter of fact, the plodding workman who denies himself the ambitions that we all more or less have—the ambitions to exercise authority, to wear fine linen, to labor with the head instead of with the hand—is entitled to a reward for his patient plodding at unwelcome toil. His task may be one of endless uninteresting repetitions; it may be hedged around with a multitude of discomforts and dangers; it may bring little reward but money; it may promise only irregular employment; it may have to be conducted in solitude; it may involve a weary travel to work night and day; it may necessitate changes of clothing and time-consuming ablutions; it may keep a man from his family.

It is not unreasonable, therefore, to conclude that certain kinds of mere manual labor may well pay higher wages than certain kinds of brain labor, especially seeing that there are many in all walks of life who are now fitted by education for the latter.

It is often alleged that the worry of authority should be compensated as well as the labor of its exercise. But no one is paid to worry. As worry is a disease, it should rather be penalized than rewarded. Some men fag early at their work. We cannot pay them for their abnormal fatigue, and we cannot reward a man for abnormal worry.

The man who worries easily may be, it is true, a good brain worker, just as a man who is fatigued easily may be a good mechanic; but the worry, like the fatigue, cannot be made the basis of compensation. A healthy spirit would be as free of one as the other, under normal conditions, so the less said of worry the better.

Again, the economic value of the brain worker is alleged as a cause for consideration, and this may be or may not be a good argument. Twenty-five men under the direction of a foreman may do as much as fifty men without. "Clearly," says your economist, "that one man earns as much as twenty-five and is entitled to compensation accordingly." That is true if the character of the boss is the cause of the increased work; but if any one of the twenty-five other employees could qualify in a short while to do as well in the position of boss as the twenty-sixth, what becomes of the title of the foreman to the larger salary?

With so many persons supplied by the state with the first steps toward a qualification for a job of headwork, the position of the brain worker becomes less and less remunerative. More and more are willing to give $5, $10, $20 a month to be boss, and are willing to accept the worry of the task for the pleasure of the exercise of authority. It is not a man of low instinct who seeks such authority. The man may be courteous and modest enough in its exercise, but he likes the intellectual development that authority confers, and he craves something on which his mind may continually busy itself.

There are two contrary theories of wage compensation. We hold to both of them as each in its turn suits our best interest. There is the rule of the "fair" wage and that of the "economic" wage. A brain worker may save others so much labor and unpleasant toil that his work has a high economic value. It is impossible to determine just what that wage is by argument. We are forced back into the theory of the economic fatalist, that the reward of the employee is proportioned automatically to the economic value of his services, or at least tends to be so adjusted.

It is about as true as the doctrine of providential fatalism. We are now being generally taught that "divinity" does not wholly "shape our ends, rough-hew them how we will," and that we can avoid sickness by

prudence and accidents by care. So does it fare with our belief in economic fatalism. Roughly speaking, economic laws do put us in certain categories and provide what the payment shall be for certain services, inconveniences and helpful abnormalities of character, mind and skill, but there is a degree of freedom also entering in. We break away from the economic fate by individual action, and still more by concerted action. Still the economic law will on the whole determine more readily than any law of fairness the right status of an employment.

Everywhere is the force of gravity, yet there are waves in the sea. Everywhere are economic laws, yet there are men over-rewarded and men under-rewarded, and all we can say is that a fair wage based on mental premises would not be as likely to solve the problem as correctly as it will be solved by the ebb and flow of the economic tide.

Let us not be jealous of manual labor. If it be not worthy of the higher rewards it has been getting, the law of economics will correct the unfairness by a readjustment of the wage paid for the work of the brain. The readjustment, if warranted, will inevitably come, though there may be some delay before it is accomplished.

Just Enough Is Never Enough

THE BRITISH are advocating Government ownership for railroads. They say that with a national monopoly it is possible to nicely regulate means to ends so that there will be less waste of labor and material. Before the war Great Britain often had three trains running where one or two now carry all the people who desire to travel. The project all sounds unanswerable till we remember how Great Britain has tried to solve just this same problem of adjustment in the telephone service. The British Government has always had that service under its exclusive charge. It has always tried to balance means and ends, but the ends always overtook the means. There was always more business than facilities for business, more demand than supply. Britannia, telephonically, has always had a hobble skirt.

Whenever industry is asked to make its demand, before that demand is supplied, by the very nature of things the supply will lag behind the demand, and even the demand itself will lag. We have been accustomed to have corporations coaxing us to develop our business methods. Now we are likely to have Government managers requesting us to do without certain accommodations which we are anxious to receive and willing to pay for. We shall be asked to wait till there are enough persons making the demand to make the improvement 100 per cent. effective. We shall find all our privileges restricted and we shall not be allowed to complain, for to complain of the Government is to make a protest against the flag.

One of the beauties of profitable private ownership is the bounty of the accommodation it supplies. When times are normal we do not have to make reservations in advance if we desire to travel. We do not have to requisition railroad cars months in advance. But under Government ownership and that wonderful system of balancing of needs to provisions, we shall always find that there is no surplus. That which has made us wage the war successfully has been our reserve of force and material. Had we been bound, as Government regulation would have us bound today, we could not have turned ourselves in the narrow quarters of our accommodations.

Whether the Government holds on to the railroads or relinquishes them, we face an increase in the transportation charges. We wish to go back to the old day of too much railroad rather than too little railroad. We want too many cars, too many miles of track, too many trains rather than too few. The railways broke down because they were given minima instead of maxima. They will break down again, and repeatedly, if they are going to be run or regulated by a pinchbeck policy. A little extra power will do no harm.

An operator said once that he had no trouble with his engineers. He said they figured and figured and figured, and then added 10 per cent. for contingencies. Then the operator took the figures and doubled them. The result gave perfect satisfaction. What was a good rule for that operator is a good rule for the nation.

Our theoreticians at Washington are like the man who rationed his horse a little less every day till his steed was subsisting on one straw every twenty-four hours. Just when this bold investigator in the art of horse *ménage* was about to make his triumph public, the horse died. It will be the same with the iron horse.

If we regulate prices for transportation to suit certain favorable conditions, if we place them so that only the well favored prosper, we shall have no railroads. The survival of the fittest is rubbish. There are so few fittest. At best it must be the survival of the fit. But the regulators of industry in their zeal would rule out all but the fittest and the fittest cannot do all the work of the world. Some of the burden must be carried on the backs of the merely fit.

Coal in the Readjustment Period

THE coming of peace has brought with it complications no less involved than those of war. After creating an abnormal demand for the products of industry, the Government has been forced to partially liquidate its war business. As a consequence, industry is now driving about in an endeavor to readjust itself to a peace basis. In the interim the coal industry finds itself marking time.

In an effort to inject a little action into this listless atmosphere, it has been suggested that the Fuel Administration remove all restrictions on the shipment and sale of soft coal. In other words, that the trade be once more placed upon a competitive basis. If the Administration complies with this suggestion the industry will be confronted with a highly interesting situation.

Will the relinquishment of control provide an additional market for those Middle West mines now restricted in their output? What will become of the many contracts that have been entered into with the approval of the Fuel Administration and stipulating the last Government price as the ruling quotation for the life of the contract? A number of other questions present themselves, and it is evident that it will take the best brains available to answer them to the satisfaction of all the parties concerned.

DISCUSSION BY READERS

Hindrances to Coal Production

Letter No. 8—The letter on this subject that appeared in *Coal Age*, Nov. 7, p. 873, interested me greatly. I was led to think, however, that it laid too much emphasis on the matter of intemperance among the miners. There is, of course, no question but that booze plays a large part in reducing the production of coal. Often, when you ask a man why he is idle, he will tell you that he is sick; but, in fifty per cent. of the cases, investigation will show that the sickness started in some saloon, or possibly a christening, or a wedding celebration.

A volume, almost, could be written on the many different things that interfere with the efficient operation of the mine and hinder the production of coal. They are multitudinous. Some of the more important causes are the following: Bad or worn-out machinery; insufficient equipment of the kind best suited to perform the work required; bad haulage roads; poor drainage; defective ventilation in the mine; and, last but by no means least, poor living conditions for the miner and his family. All of these and many other things help to keep down the productiveness of a coal mine.

Effect of Poor or Inadequate Equipment

Experience in different mines has led me to believe that, perhaps, the greatest loss in coal production is due to worn-out machinery and antiquated methods of mining. At one mine, for instance, the coal was hauled by a gasoline motor that had performed its share of service a year or two before it fell into my hands. We would work on that motor for hours to get a day's run out of it, only to have it break down when we were in the greatest need of coal. At such times, the entire mine would stand idle, until we could get the machine into running order again. The same is true of other mine equipment, such as pumps, mining machines, and like apparatus used in the operation of a mine.

Frequently, we find mines where the seam pitches so as to cause heavy grades in the rooms, and the miner is compelled to push his cars to the face. Sometimes, it is all that he can do to get his car up the grade and in a position to load. The energy he expends in this manner should have been used in mining and loading his coal. Although operators are now waking up to many of these conditions that hinder the work and reduce the output of their mines, it is a fact that too many of such hindrances still remain.

Living Conditions Assist or Retard the Work of Getting Out Coal

Many people do not realize how large a part bad living conditions play in the production of coal. When a miner has a good cozy house to go to, after his day's work is done in the mine, it gives him an incentive to work harder, in order that he may make his little home even more comfortable. He becomes more thrifty and an increase is noticeable in his daily tonnage.

While the things I have mentioned thus far are matters that the operator must improve if he would increase the capacity of his mine, there are other things we can all do that will greatly assist in getting out more coal. The efficiency of the foreman, for example, plays no small part in making a mine produce a good tonnage. In the majority of cases, the falling off of the day's output is largely due to the mistakes of the foreman or his lack of attention to matters in his charge. Poor work performed by trackmen, timbermen and other daymen, resulting in bad haulage roads, poor drainage, bad air at the working face because of leaky doors and stoppings, make it impossible for a mine to produce to its full capacity.

A matter of greatest importance is the disposition of a foreman to ignore the little troubles of his miners, which a single word or act of his would help to overcome. An inexperienced miner will often be observed performing his work in the hardest possible manner. The helping hand of his foreman, at such times, will result in the man's getting out more coal by far than if the foreman resorted to cursing and swearing or reprimanded the fellow sharply for his ignorance. In closing, I want to say that we can all do something to increase the production of coal if we only use our heads a little more than we have been in the habit of doing heretofore.

J. H. Tipton.

Landstreet, Penn.

Calculating a Room Switch

Letter No. 1—I was glad to see the question of a correspondent, in *Coal Age*, Oct. 17, p. 756, asking for the proper dimensions of a room switch and how to ascertain the number of frog that will give the best satisfaction. To my mind, this is one of the most important features to be considered in the development of a new mine, and one that is often not given the attention it requires. Unless that is done, much trouble is bound to follow.

While it is customary for a company to have this work done by a mining engineer, it is well for every mine foreman to be able to work out such problems for himself. It will enable him to understand better when a room switch is well laid. The method of calculating the number of frog to be employed and the required dimensions of a mine switch has been fully explained at different times in *Coal Age*, and I have found that if the figures given are followed there will be no trouble.

Having selected the right frog, find the length of lead rail required by multiplying the frog number by twice the track gage, in feet. Then, find the radius of the curve by multiplying the length of lead rail by the frog number. In a long experience in laying

switches in a mine in southern Illinois where gathering motors were used, I found no trouble when using these rules.

Practically, the first question to be decided is, What frog number will best suit the conditions. In the case mentioned in this inquiry, there should be no serious trouble in laying down a switch to enter a room, which is here said to be turned with a width not exceeding 12 ft. In laying the curve beyond the frog, however, it may be necessary to crowd the rib of the room neck and widen out on the opposite side.

Practical Conditions Determine Frog Number

In deciding these questions, one must know the kind of haulage that is to be used, the weight and size of locomotive, wheelbase and size of wheel and the speed at which the cars must move. These data will greatly assist in choosing the right frog. For example, in the present instance, let us assume that a gathering motor weighing 6 or 6½ tons is to be used, and the capacity of the mine cars is 2 or 3 tons. In that case, I would select a No. 2 frog. The track gage being 42 in. (3½ ft.), the length of lead rail required is, then,

$$l = 2gn = 2 \times 3\tfrac{1}{2} \times 2 = 14 \text{ ft.}$$

The radius of the curve, in this case, is

$$R = ln = 14 \times 2 = 28 \text{ ft.}$$

I would use a latch not longer than 3½ ft. In running gathering motors and laying track after them, I have found it a good scheme to have the latch short enough that it can be kicked or moved freely between the first car and the locomotive pushing the trip. In other words, the last wheel of the rear car of the trip must have cleared the latch before the motor trucks reach it. I have often found this to be a practical point worthy of observing carefully.

Cleaton, Ky. Ostel Bullock.

Letter No. 2—Replying to the request of a correspondent who asks for the proper dimensions of a room switch, and the number of frog that will give the best satisfaction under the conditions he mentions, I am glad to give him the benefit of my own experience along this line.

Owing to the bad-roof conditions it is stated that the rooms, in the case under consideration, cannot be turned a greater width than 12 ft., and I assume that the entry is of the same width. This being the case, it will not be possible to act upon the old-time slogan of the best practical mine tracklayers, which was, "The longer the switch the better the haul," and adopt a longer switch than the space will admit.

The correspondent has failed to state the system of haulage he is to employ. However, as this is a new mine, one might assume that the intention is to use a gathering motor for collecting the cars from the rooms. It is stated that the track gage is 42 in. and the length of car 8 ft. 9 in.

For a number of years, I have been hauling coal over all kinds of track and in the use of almost every kind of haulage system, including mule, rope and motor haulage, and want to say that the old-time slogan just mentioned is a most important item in mine haulage, if one is to secure the best results. My plan is always to use as light a curve as possible, which means the lengthening out of the switch rail.

In the present instance a 12-ft. collar bar will span the mouth of the room, and this must be set so as to favor the longest curve possible on the room switch. Taking everything into consideration, let me suggest that a No. 2 frog should be used. Estimating the length of switch rail for this frog, according to the method previously described in *Coal Age*, [Vol. 10, p. 673] we find for the required length of this rail,

$$l = 2\ g\ n = 2 \times 3\tfrac{1}{2} \times 2 = 14\ ft.$$

This is the length of the lead rail reaching from the point of switch to the point of frog, using a No. 2 frog, when the track gage is 42 in. or 3½ ft.

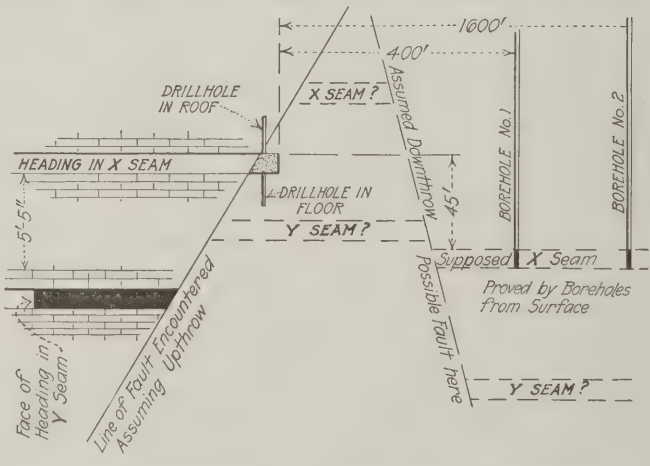
In order to bend the rails to the proper curvature, the length of the radius of the track center is calculated by multiplying the length of switch rail, as just found by the number of the frog, which gives, in this case, 2 × 14 = 28 ft. radius to the center line of the track. I shall be glad to learn of the experience of others along the same line. Claude W. Carruth.

Edwardsville, Ill.

Locating the Coal Beyond a Fault

Letter No. 2—After a careful study of the sketches showing the profile, cross-sections, plan of working and legend, submitted by "Superintendent," in his inquiry, Oct. 24, p. 797, it appears to me that he was proceeding on the right track in driving entries and prospecting the line of fault to ascertain its nature. However, it is my belief that the main headings were not driven far enough through the fault before putting the drillholes up and down in the roof and floor of the heading.

It is clear, from a study of the six cross-sections given in the inquiry, that this fault is an upthrow.



UPTHROW FAULT FOLLOWED BY A POSSIBLE DOWNTHROW

Such being the case, unless the main heading was driven sufficiently far through the fault before putting a drillhole up in the roof, the hole would only penetrate the faulted strata or dead ground, as I have shown in the accompanying figure. The hole put down in the floor of the heading was probably not drilled deep enough. Had this hole been carried a few feet deeper, it is my opinion that it would have found the Y seam, just below.

Referring, now, to the two boreholes sunk from the surface and which appeared to have penetrated the X seam, at a greater depth than was expected, so that

it was thought that the coal struck was the Y seam, it is possible that another fault exists between the one first found and the borehole 400 ft. in advance of the heading. This second fault would be a downthrow, as indicated by the dotted lines in the figure. I suggest this as a possibility, but the actual condition can only be determined by prospecting and carefully studying the strata penetrated by the boreholes. This possible position of a second fault, as shown in the figure, assumes that the first fault is an upthrow and that the coal struck by the boreholes was the X seam.

Further Prospecting Needed

Much satisfaction would have resulted by continuing No. 1 borehole, sinking it 50 ft. deeper. The information thus gained would have warranted the extra cost of drilling. In addition to sinking these holes deeper, I would push the main heading, in the Y seam, to the fault; and, at the same time, drive an uprise from the face of the right-hand main heading, in the X seam. This uprise, or slope, should follow the slip, keeping well in touch with the footwall so as not to miss finding the coal should the fault prove to be an upthrow, as I have assumed. I would also bore downward in the floor of the main heading at least 60 ft.

Should these efforts not succeed in locating the X seam beyond the fault, it will be necessary to drive an uprise on the slope, starting from the face of the heading, in the Y seam, where it reaches the fault. In closing, let me say that the two boreholes mentioned in the inquiry as driven from the surface, appear to be sunk in a valley or hollow. It is well to remember that hollows or valleys on the surface often mark a line of fault or trouble in the strata, and holes in such places may not give the best satisfaction.

Linton, Ind. W. H. Luxton.

Letter No. 3—Reading the interesting discussion that has appeared in *Coal Age*, regarding the method of locating the coal beyond a fault, reminds me of a slip that we encountered in our mine some time since, and which is very similar to the conditions described in the inquiry that started the discussion, Oct. 24, p. 797.

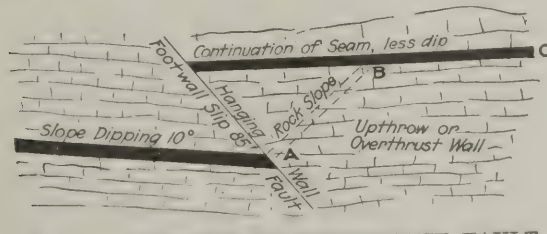


FIG. 1. SHOWING AN OVERTHRUST FAULT

In our case, however, the fault was an upthrow, while the one described in the inquiry is seemingly a downthrow.

Our mine was opened by a slope pitching 10 deg. The condition met when this slope struck the fault is illustrated in Fig. 1. Prospecting showed that the continuation of the coal seam was above. The fault was found to be one that is best described as an overthrust, the strata having been forced upward when the break occurred. The dislocation was 85 ft. measured on the fault line.

In order to continue the work of mining in the seam beyond this fault, we drove a rock slope from *A* to *B*, as shown in the figure. The seam beyond the fault had considerably less dip. An inside hoist was installed at *B*, to haul the coal from *C* to *B* and lower it from *B* to *A* through the rock slope. From the latter point it was hauled out of the mine.

Allow me to suggest, here, that from the description given in the inquiry, it appears to me that the fault

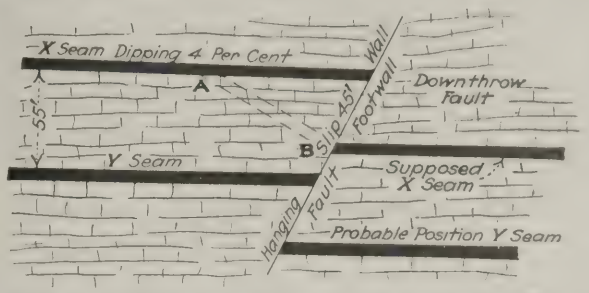


FIG. 2. ASSUMING FAULT TO BE A DOWNTHROW

mentioned is a downthrow, as shown in Fig. 2. There is little doubt, in my mind, but that the coal found in the boreholes sunk from the surface belong to the X seam. In that case, the best plan to follow would be to drive a rock slope from *A* to *B*, starting from the main heading, when the position of the seam beyond the fault has been determined. The coal from beyond the fault can then be hoisted through this rock slope and hauled out of the mine. I submit this, hoping that it may be of some assistance in solving the problem.

E. D. Reynolds, Pres.,
West Blocton, Ala. Blocton Mining Company.

Americanizing the Foreigner

Letter No. 7—It was with peculiar interest that I read the letter of "Optimist," which appeared in *Coal Age*, Aug. 29, p. 415, and has since been followed by others. Many of the statements made in these letters, however, are so wide of my own experience that I cannot resist the desire to comment on a few of them. Certainly the conditions that have led writers to look upon the situation in hand so hopefully are quite different from those it has been my fortune to meet.

In the letter to which I first referred, "Optimist" suggests: "Let the teachers be instructed by mine officials to maintain a high standard of order and cleanliness in the schools." Think of applying this remark to the conditions existing in this state, where the teachers sent by the County school board to the different coal fields throughout the county are not usually the kind of whom much can be expected in the way of setting "a high standard."

Graduates of Graded Schools Sent as Teachers

For example, among the teachers sent out last year were young girls of 18 or 19 years, graduates of graded schools only, who were frequently heard to use such expressions as "them shoes," "have saw," and many others showing a like deficiency in their knowledge of English grammar. Also, for the most part, these girls dressed slovenly and appeared to care little for the work of which they were given charge, their chief

interest being the small salary that they received monthly.

If coal operators look for improvement to come through the work of these teachers and hope that the high standard of living they set before the children will have its influence on the foreign parents and boarders in that community, I fear they will have many, many years to wait before their hopes will be realized.

It may be asked, "Cannot the operators employ a better class of teachers?" Unfortunately, the answer is, "No!" And I must add that few of the companies have any influence with the school board to induce them to send more capable teachers. The idea seems to prevail on the board that the girls sent are good enough for the children they must teach.

Arbitrary Action of County School Board Obstructs School Work

Only last winter, our general manager asked permission of the school board to reroof the school building, at the company's expense. Although the roof was in very bad condition at the time, the board denied the request, stating that a committee attended to that business and it was their duty to advertise for bids before anything could be done. The general manager, however, went ahead and had the roof repaired, and the school started in September.

But, after the school opened, it was the middle of October or the first of November before the books arrived for the use of the children. It is needless to say that, while waiting for the books, little was accomplished although the school was in session every day. There is no truant officer here, and the usual reply to the teacher's inquiry as to a child's absence is, "What's the use of his going to school, he isn't learning anything."

In this camp of 3000 inhabitants, "Optimist's" suggestion that the company doctor could assist in securing clean and sanitary conditions is likewise wide of the mark. The patients, here, will not even carry out the doctor's instructions, unless it pleases them to do so. Last fall, when there was an epidemic of smallpox on this creek, it was impossible to quarantine the people in the houses where the disease prevailed.

Betterment Work More Successful as Aim of Workers is Understood

Speaking about "uplifting" the foreign-born miner another writer, in *Coal Age*, July 25, p. 190, suggests, "Among the employees of every large coal operation there should be a set of men who would act as missionaires of patriotic zeal among the foreign workers, in and out of the mine." Let me say that, in practically every coal camp where I have been located, until lately, I have failed to find one in twenty of the foreigners that did not think that the company officials were trying to beat them.

This condition, however, has changed considerably within the past year or so. Many foreign miners are now joining our lodges, and it is not uncommon to find them playing pool with the office men and other mine officials, with whom they are becoming acquainted. Nevertheless, they still resent the efforts of anyone to uplift them, as they call it.

In contrasting the foreign-born with the American miner, reference has been made to the latter's habits of thrift. In justice to the foreigner in West Virginia, let me say that he is, as a rule, more economical and manages to save more money than the American miner. The latter has usually spent everything and has nothing to draw when payday comes around, but that is not the case with the foreign miner, who generally carries off a fat envelope. Again, it is seldom that a foreign miner leaves town without first settling up what he owes, but this cannot be said of many American miners who would leave the company in debt, if possible.

Red-Cross Chapter Organized in Camp

Of all the efforts that have been put forth in behalf of our foreign miners, probably none have been more successful than those of the Red Cross. Only last year, the wife of the general manager of our company organized an auxiliary chapter of the Red Cross Society in our capital city. A wonderful work has since been accomplished through her efforts.

At first, the women were very reticent in regard to joining, fearing that the company was trying to swindle them out of their money; but time told the story, and these women were taught to make hospital garments and to knit. The head of the chapter went to the schools and told the children that she would meet them in the church every afternoon at 4 o'clock and teach them to knit. In about five months, the children were knitting sweaters for the Red Cross, and their little sisters who were too young to attend school were learning to knit also.

As the result of this woman's work, several hundred dollars were secured in a recent Red-Cross drive; and, on Sunday, from 75 to 100 people attend the church services, instead of 10 or 15, as formerly. Recently, the miners held a festival and other entertainments, in coöperation with the office and store men and realized a good profit for the benefit of the Red-Cross fund.

Results Shown by the General Improvement

Perhaps, one of the greatest benefits resulting from the Red-Cross work, is the fact that school teachers have been secured this year who promise better than ever before. To encourage them, the general manager has given them a cottage where they can all live together. There is, now, hearty coöperation on the part of the parents to make the school year a successful one.

Another noticeable feature is the pride that the women are now taking in their dress and personal appearance. Thrift and good-will is in evidence everywhere. The children are buying War-Saving and Thrift Stamps, as well as the grown-ups. The miners are more industrious and compartively few are leaving the camp. A short time ago a miner asked me to lend him a novel, and when he returned it he asked for another. A year ago that miner would not have read a book if I had given him one; much less would he have come to me to borrow one.

Last spring the company installed shower baths in the electric shop, and the miners were privileged to use them, for a small monthly fee. These baths are now a real pleasure to the men and there is a notice-

able improvement in their appearance and dress. Also, the company has furnished and equipped a children's playground, in front of the company store. This has been a source of pleasure to the children of the camp, and the evening usually finds many grown-up people participating in the fun. It is my belief that the Red-Cross and the war work deserve a large portion of the credit of Americanizing the foreigner in this district.

A READER.

Huntington, W. Va.

Justice to the Miner

Letter No. 9—Following the discussion in regard to justice to the miner, I notice that many persons are loud in their praises and comment freely on the conditions existing in miners' homes and in the camps; but little is said to inform the public on conditions under which many miners work in the mine.

The remark is often made, "Oh, yes, ——— Camp is a fine place in which to live; but I wouldn't work in the mine there, because I can make more money at the place over the hill. Over there, they pay the same price for loading coal in a 12-ft. seam as they pay here, where the seam is only 5 ft. thick and the miner is compelled to brush roof and move rock, with no compensation for the extra work he performs. Over there, the men do not have to push their cars in and out of the rooms; but, what is even more, the treatment they all receive from the mine foreman goes far to make them like the place."

ATTITUDE OF THE COLORADO FUEL AND IRON CO.

Such remarks as those just quoted show the great difference in mines operating in the same district, but under different management. I was glad to read the letter of E. H. Weitzel, manager Colorado Fuel and Iron Co., which appeared in *Coal Age*, Oct. 17, p. 753, pointing out the privileges the miners of that company enjoy, in spending their spare moments in profitable reading, bowling, or playing pool and billiards in the miners' club house operated by the Y. M. C. A.

However, it goes without saying that those miners could not profit by the opportunities afforded them if it were not for the good wages they are able to earn, under the company's management. The miner pays 50c. a month for his membership in the Y. M. C. A., and the same amount for the use of the bath house, to say nothing of the extra expense for ice cream, "near beer," pool and billiards, etc., for which the charges are the same as asked elsewhere.

The miners of the Colorado Fuel and Iron Co. are proud of their club house, and their wives and children go to church and school better dressed, since the saloons were moved off the premises. It can be truthfully said that if the company never did another thing to improve the conditions surrounding their miners, they deserve the highest praise for that one act. The driving out of the saloon from the camp has largely increased the purchase of Liberty Bonds and War-Savings and Thrift Stamps, by the miners. I would to God that the saloon had been made to go long years before.

Another great step forward was the acceptance, a few years ago, by this company, of the Rockefeller Industrial Representation Plan. Personally, I consider this the greatest plan ever devised, in respect to the relations of labor, capital and the public. It is only through such a plan that the coal miner will ever get justice of the kind and quality that he deserves. The plan is in keeping with the great principles of democracy, for which the world has been fighting, today. It guarantees to the individual the right to life, liberty and happiness.

The plan combats the principles of labor leaders, who believe that it is possible for miners to get justice only through lockouts, suspensions and strikes. It teaches the broad principle that if a miner is willing to give his employer all that the latter can rightfully expect, he must not be compelled to demand more for himself, by reason of a pledged allegiance to his fellow workers, who may claim that he should receive more.

In accepting the Rockefeller Industrial Plan, the company are paying their miners, today, more wages than ever before. But, this is not all; they are pledged to pay the same wages that may be paid to any miners in the same competitive field. It is not strange that the miners working for this company appear to be enjoying life.

PRACTICAL OPERATION OF THE ROCKEFELLER INDUSTRIAL PLAN IN COAL MINING

Almost without exception, the miners of the Colorado Fuel and Iron Co. are working steady, have plenty to eat, wear fine clothes, and live in beautiful homes, with pleasant and sanitary surroundings. In fact, they have everything that is worth while. That is the kind and quality of justice one wants to see the miner receive. Under the Rockefeller plan, he is guaranteed the full freedom of a personal manhood, and the same is accorded to womanhood. There is the right to enjoy and develop every opportunity, personal traits of character, freedom of speech and the education of their children.

Such privileges Americanize the foreigner rapidly. All have the freedom to go where they please and to spend their money when, where and as they wish, the only requirement being that they shall obey the laws, rules and regulations of the company, which are common to every well-regulated mining camp in this country. There is guaranteed to every man the right to perform his work unmolested by any individual or set of individuals whose purpose may be to create trouble, strife and discontent.

The influences that have surrounded the miner, through his allegiance to labor organizations, are the evidences of the power of the almighty dollar. Take away the salaries of labor leaders and labor unions would cease to exist. Instead, miners would be organized under a plan similar to that to which I have alluded.

The Rockefeller plan has shown to the world that capital and labor are mutually dependent on each other. The one cannot exist without the other. Their interests are common. When the operator and the miner, representing capital and labor, respectively, clasp hands and are willing to work for higher standards of living, involving their economic, social and spiritual welfare, then justice to the miner will be a reality and justice to the operator will, likewise, be assured.

Farr, Colo. JUSTICE.

INQUIRIES OF GENERAL INTEREST

Direct-Connected and Geared Hoisting Engines

We are hoisting cars at our slope with a 22 x 30-in. first-motion engine. With a steam pressure of 100 lb. per sq. in., the engine makes 50 r.p.m. and hoists the cars at the rate of 1000 ft. per minute.

It is now proposed to change this engine over to a shaft and put in its place a 16 x 24-in. second-motion engine, which is geared $2\frac{1}{2}$: 1 and runs at a speed of 125 r.p.m. I want to ask what effect the gearing has on the horsepower of an engine. Kindly explain the rule for calculating the horsepower of an engine and state how one can determine whether a certain size of geared engine will pull a certain load at a certain speed.

Greensburg, Penn. MINE ENGINEER.

From the data given, it is impossible to determine whether the geared engine will perform the same work as the larger first-motion engine now doing service at the slope, and which it is desired to use at the shaft opening.

The horsepower developed in an engine cylinder is equal to the total pressure of steam acting on the piston multiplied by the piston speed and divided by 33,000. To find the total pressure on the piston it is necessary to multiply the area of the cylinder by the mean effective steam pressure, which must either be taken from the engine card or calculated from the cutoff of the engine. Assuming an initial pressure in the cylinder of 100 lb. per sq.in. and a $\frac{3}{4}$ cutoff, the mean effective pressure in a steam cylinder, at sea level, will be practically 80 lb. per square inch.

The diameter of the cylinder of the first-motion engine, in this case, is 22 in. and its stroke 30 in. ($2\frac{1}{2}$ ft.). The area of a 22-in. cylinder is $0.7854 \times 22^2 =$ say 380 sq.in. The total average pressure of the cylinder throughout the stroke is therefore $80 \times 380 = 30{,}400$ lb. At a speed of 50 r.p.m., the engine makes 100 strokes per minute and has a piston speed of $100 \times 2\frac{1}{2} = 250$ ft. per min. The efficiency of a good direct-connected slide-valve engine can be taken as 85 or 90 per cent. The estimated horsepower exerted by this engine is therefore

$$H = \frac{0.85 \times 30{,}400 \times 250}{33{,}000} = \text{say } 200 \text{ hp.}$$

The smaller geared engine mentioned has a 16-in. cylinder and a 24-in. (2-ft.) stroke and, running at a speed of 125 r.p.m., makes 250 strokes per minute. The area of the cylinder is $0.7854 \times 16^2 =$ say 201 sq.in. Assuming the same mean effective pressure in the cylinder as before, the total average pressure on the piston is $80 \times 201 = 16{,}080$ lb. For a 2-ft. stroke the piston speed is $2 \times 250 = 500$ ft. per minute. The efficiency of a geared engine will be somewhat less than that of a direct-connected engine when operating under the same conditions and may be assumed, in this case, as 80 per cent. The horsepower developed by this geared engine is therefore

$$H = \frac{0.80 \times 16{,}080 \times 500}{33{,}000} = \text{say } 200 \text{ hp.}$$

These calculations show that the two engines have practically the same power. The fact that an engine is geared does not affect its power, except to slightly reduce the efficiency of the engine. No data are given to enable one to determine the speed of winding on the slope, which is stated at 1000 ft. per minute.

Waterproofing Cement Work

I want to ask a question regarding the effect of surface drainage on the concrete floor of a building. The floor is 42 ft. long and 24 ft. wide, and the concrete is 5 in. thick without any reinforcement. Although this floor is sunk 2 ft. below the surface of the ground, no provision is made for drainage. The foundation walls are 8 in. thick, and have no reinforcement.

At the side of the building and 25 ft. distant is a roadway that is being graded 24 in. deep and 25 ft. wide, the excavation being filled in with cinders. I want to ask if the surface drainage would have any effect to lift or break the concrete floor in the building. The concrete is a 1:2:4 mixture of good cement, sand and limestone rock broken to pass through a 1-in. mesh. One pound of waterproofing is added to each concrete mixture.

Staunton, Ill. A. C. G.

The real meaning of this inquiry is not clear. When laying a concrete floor in a basement, or at a lower level than the surface of the ground, provision should always be made for drainage. The concrete should be laid on 10 or 12 in. of well-rammed cinders, beneath which tile drain should be laid to carry off any water that may accumulate.

There is no need of any reinforcement in such a concrete floor. In the case mentioned, there would be no tendency of surface water to lift the concrete, if suitable provision is made against the action of frost. The outer walls of the building should be suitably reinforced. This inquiry, however, suggests the importance of waterproofing all cement work, which is always porous and absorbs water with the result that the concrete is disintegrated and weakened continually by the dissolving action of the water and by frost.

The waterproofing of cement structures has been carefully investigated by engineers, who have found that the most effective method is to impregnate the concrete mixture with oil whereby the absorption of water is prevented and the life of the concrete preserved. The application of gasoline in which from 5 to 10 per cent. of paraffin wax has been dissolved is recommended. The fluid can be applied to a concrete surface by a brush or sprayed over it with a handpump.

EXAMINATION QUESTIONS

Mine Examiners' Examination, Springfield, Ill., 1918

(Selected Questions)

Ques.—What should be the quantity of air at the downcast, to ventilate a mine employing 675 men and 22 mules?

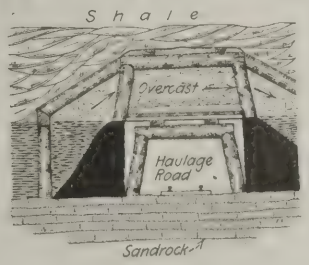
Ans.—Assuming that this mine generates no gas and allowing 100 cu.ft. per minute for each man and 500 cu.ft. per minute for each mule, employed in the mine, the total quantity of air in circulation should be $675 \times 100 + 22 \times 500 = 78{,}500$ cu.ft. per minute.

Ques.—What is a door, stopping, brattice and overcast and what is each used for?

Ans.—A "door," in a mine, is a swinging partition placed in an entry or passageway, to deflect the air current into a crossheading or room. A "stopping" is a solid wall or partition built in a heading, crosscut or other passage to prevent the flow of air through such opening. A "brattice" is a partition built in an airway and consists of boards or canvas nailed to a line of posts set in the passage. Its purpose is to conduct the air current forward to the face and cause it to return on the other side of the brattice. The term "brattice" is sometimes incorrectly applied to a stopping.

An "overcast" is an air bridge built over a haulage road or other passageway, for the purpose of conducting a current of air across such entry or roadway. An overcast built at the mouth of a pair of cross-entries makes it possible to ventilate those entries without the use of a door, which is a particular advantage in the ventilation of a mine.

Ques.—Make a sketch showing how you would construct an overcast. How much air would pass through the same, it being 6 ft. high and 8 ft. wide, and the velocity being 600 ft. per min.?



Ans.—The accompanying figure shows a common form of overcast or air bridge built over a haulage road. Taking the dimensions of the overcast as given, its sectional area is $6 \times 8 = 48$ sq.ft. The velocity of the air current being 600 ft. per min., the volume of air passing is $600 \times 48 = 28{,}800$ cu.ft. per min.

Ques.—Is there a limit to the splitting of the air current?

Ans.—Yes, when an air current is divided too often, the velocity of the air is so reduced that it will not sweep away the gases lodged in the cavities of the roof and other void places in the mines. In order to move these gases, and drive them out of their lodging places, the air current must have the velocity required to effect that purpose. Methane or marsh gas lodged at the face of a pitch or in a cavity of the roof; and carbon dioxide or blackdamp, at the face of a dip, or in a swag or other low place, are difficult to move and require a considerable velocity of the air current.

Under ordinary mining conditions, the velocity of the air passing the working faces should not fall below 4 ft. a sec., and where gas is generated in the mine, the velocity should be from 4 to 6 ft. a sec., depending on the quantity of gas given off at the face. Therefore, in answer to the question asked, the limit to splitting may be said to be reached when the velocity of the air current at the working face in any district falls below the amounts just stated.

Ques.—What is a water gage, anemometer, safety lamp and barometer?

Ans.—A water gage is a device for measuring the difference of pressure between the intake and return airways in mines. It consists of a glass tube bent in the shape of the letter U. Both ends of the tube are open, one end being extended and bent at right angles so that it can be inserted through a hole in the partition dividing the two airways. When in position for use one end of the tube is open to the greater pressure of the intake airway while the other end is open to that of the return air. The difference of pressure, or the pressure causing the circulation inby of the point of observation, is then measured by the difference of the water level in the two tubes. One inch of water column indicates a pressure of 5.2 lb. per sq.ft. of sectional area in the airway.

An anemometer is an instrument used to measure the velocity of the air current in an airway. It consists of a vane having inclined blades so that the passing air rotates the vane. The instrument is so calibrated that one revolution of the vane corresponds to a velocity of 1 ft. per min. of the air current. In use, the instrument is exposed to the air current for one or more minutes, as timed by the watch, and the number of revolutions of the vane is read from the dial on the instrument.

A safety lamp, in mining practice, is a lamp in which the flame is inclosed in a chimney of glass and wire gauze, in such a manner that it is isolated from the outside atmosphere, which is fed into the lamp through gauge-protected openings, while the burnt air and gases pass out through the top of the gauze chimney.

The barometer is an instrument for measuring the atmospheric pressure. The mercurial barometer consists of a glass tube about 3 ft. in length, closed at one end and filled with mercury. When the tube is then inverted and the open end submerged in a vessel of mercury, the mercury column in the tube falls to a height corresponding to the pressure of the atmosphere acting on the surface of the mercury in the vessel below. Since 1 cu.in. of mercury weighs, practically, $\frac{1}{2}$ lb., a mercury column 30 in. in height corresponds to an atmospheric pressure of $30 \times \frac{1}{2} = 15$ lb. per sq. in.

COAL AND COKE NEWS

Harrisburg, Penn.

Anthracite production is falling below last year's output, and it is understood that the Fuel Administration is on the verge of sending one of its headquarters men to the hard coal region to establish an office here and take steps to stimulate mining, if possible. The region will probably be districted, each district to be assigned its quota of hard coal production, honors to be publicly awarded those districts which measure up to the standards fixed. It is learned unofficially that James B. Neale will be sent to the region. His headquarters will be either at Pottsville or Hazleton.

December has not brought the customary suspension of river coal-dredging operations on the Susquehanna and even on the Swatara, the Wiconisco and other streams in the anthracite field which carry down the small coal from the mines. Men and dredges are at work getting out the fine coal which is proving such an important addition to the supply of coal for industries and even for homes. As far down as Middletown dredges are working, and some of the boats will be kept at the harvest until the cold weather makes work on the streams hazardous. There have been more dredges and flats working this year than ever known before.

The Bureau of the Scranton Board of Trade has finally accepted the mine-cave proposal made by the coal companies operating in Scranton and Dunmore, but no agreement has been reached on the appointment of the three commissioners who will have charge of the work to see that the coal companies and the city carry out their part of the mine-cave agreement. The Scranton Surface Protective Association will ignore the mine-cave proposal entered into by the Board of Trade and the coal companies, and devote its energies to securing legislation at the coming session of that body.

Uniontown, Penn.

After having dropped steadily from 750,000 tons for the week ended Oct. 12 to 523,721 tons for the week ended Nov. 23, production of coal in the Connellsville region attained an output of 574,729 tons for the week ended Nov. 30. There is now every indication that influenza has done its worst damage in this region, but several weeks will be required before its effects entirely disappear.

A gratifying increase of 36,242 tons was shown in the shipments of byproduct coal in the weekly review of the fuel administration. Plants have been hard pressed during the last two weeks and have been clamoring insistently for coal. Coke output is placed at 255,127 tons, an increase of 15,177 over that of last week. The byproduct coal shipments for the week were 182,038 tons.

The Fuel Administration has discontinued the practice of commandeering coke tonnage, notice having been received by producers to the effect that they were at once more at liberty to dispose of their product to the best advantage. That phase of fuel administration activities in the Connellsville region since last March has been handled by C. E. Lenhart, district representative. The discontinuance of commandeering of coke will not have any effect upon prices. Neither is it believed will any disturbance in market conditions result. The demand for coke is still marked and is growing stronger. The decrease in production due to influenza and other causes will also react to stiffen the market and further increase the demand.

Charleston, W. Va.

New outbreaks of influenza in various parts of the Fairmont district are restricting the output of coal. There has been and is now no paucity of cars furnished the mines. During most of the week ending Nov. 30 the daily supply of cars averaged in the neighborhood of 1500, and few mines were closed down. Prompt deliveries of empties have also been of material benefit to the mines. The demand for Fairmont coal is far from being moribund.

Steady increases mark the mining operations in the Logan district, the latest report showing a total tonnage of 216,336, which represents 83 per cent. of the full time capacity, the production loss thus being only 17 per cent., 9.36 per cent. of which was due to labor shortage as against 14.60 per cent. for the previous week. The increase amounted to about 8000 tons. Car shortage about doubled, but caused a tonnage loss of only 4275 tons.

Although output in the Kanawha district is from 50,000 to 70,000 tons lower than the record production, still the mines are producing as much coal as could reasonably be expected. Virtually all coal produced has a market, and orders are sufficient to insure continued production at the present or a higher rate. There has been noticeable increase in the demand for Kanawha coal, Kanawha & Michigan mines being zoned out of certain Western territory in which there is a call for their coal. Exporters of coal from the Kanawha district, while experiencing no difficulty in securing orders, are having trouble in securing boats.

As has been the case all along—even during the war—labor leaders in the New River district, or rather a few of them, cause a good deal of unrest among miners which reacts on operations. Aside from that operators of the New River district are satisfied with conditions existing at present and believe prospects for an enlarged business are excellent. A decrease of 13,000 gross tons during the last week of November as compared with the previous week was due to the observance of Thanksgiving. The output for the week ending Nov. 23 was 247,000 gross tons and for the following week 233,193 gross tons.

Production in the Pocahontas and Tug River district is now nearly up to the high point reached during the progress of the war. Latest figures show the output to have jumped from 415,000 to 428,000 tons. More man power is now available. No surplus of the coal mined is accumulating in the Pocahontas region, there being a ready demand for all Pocahontas coal produced. Production of coke amounted to 50,495 tons.

With 24 mines in the Kanawha district not reporting, the total output for the week ending Nov. 30 was 151,764 tons. On its face that would indicate a loss of 6000 tons, but it is believed that if the mines out had reported there would have been an increase. Such tonnage loss as there was due to a labor shortage and to the Thanksgiving holiday, 1299 hours being recorded as the time lost through labor shortage. Cars furnished were sufficient to meet all requirements.

Victoria, B. C.

A blowout of coal and gas occurred recently at No. 1 East Mine, Coal Creek, Crowsnest Pass Collieries, Ltd. All men were withdrawn safely. This incident, taking place with the single-shift system in operation, is taken by those who have contended that the change would bring no improvement in conditions in respect of safety, as confirmation of their stand. Shortly before the happening mentioned above a fire threatened No. 1 South Mine, Coal Creek. It was confined, however, to a crosscut, being got under control before much damage had been done.

It is reported that coal output for British Columbia during the month of November is expected to show a decline in comparison with that of October, which was 217,482 tons. Both the Canadian Western Fuel Co. and the Canadian Collieries (D), Ltd., the largest producers of Vancouver Island, were seriously hampered by illness in the course of the past thirty-odd days. At one time there were as many as 600 of the employees of the Canadian Collieries away from work for periods of varying length. The same condition prevailed in the Nicola-Princeton and the Crowsnest Pass fields, so that it is felt that the figures which shortly will come to hand cannot be expected to be as satisfactory as hoped for. It is gratifying, however, to be able to report that normal conditions have returned and the collieries are producing at the same average pace as in October and previous months. December, therefore, should see between 200,000 and 250,000 tons of coal produced in the Province.

PENNSYLVANIA

Anthracite

Scranton—What threatened for a while to be a most disastrous fire broke out on Dec. 3 in the carpenter shop of the Mt. Pleasant colliery of the Scranton Coal Co. The structure was leveled to the ground and much of the machinery has been ruined. The shop was situated only a few feet from the boiler house and about 150 feet from the breaker, which for awhile seemed to be in imminent danger of destruction.

Shenandoah—On Nov. 30 a fire which threatened the valuable breaker and other outside buildings, destroyed the large boiler house of the Kehley Run colliery. The buildings were only saved by the heroic work of the volunteers. If the fire had succeeded in reaching the breaker and the other buildings 1200 men and boys would have been thrown idle. The daily production of the colliery is 2000 tons.

Wilkes-Barre—Lehigh Valley Coal Co. monthly employees will get $10 to $20 more under the announcement made of a wage raise to the persons not benefited by the recent agreement with the miners. Other coal companies will also advance their men.

Kingston—Miners employed at the No. 5 mine of the Delaware & Hudson Coal Co., at Larksville, went out on strike Nov. 30. They allege discrimination. About 500 men and boys are affected.

Price Hill—Production at the Price Hill plant of the Price Hill Colliery Co. has been materially increased by the installation of electrical machinery. The main entry has been relayed with heavy steel. A number of new houses have been built and others are under way. H. H. Pinkey is the superintendent at this plant.

Bituminous

Burgettstown—Roberts & Schaefer Co. have been awarded a contract for a Marcus screen to be installed in the new tipple at the Patterson mine of the Burgettstown Coal Co.

Uniontown—Fire of unknown origin destroyed the boiler house of the Brownsville Coal Co. on Nov. 30, causing a loss of $10,000. Forty men at the boiler house were thrown out of employment.

Pittsburgh—The Clinton Block Coal Co. is proceeding with the construction work in connection with a stripping mine at Imperial, and has contracted with the Roberts & Schaefer Co. for the installation of dump house, retarding conveyor, and tipple, which will include a Marcus picking table screen.

Clearfield—Herman Carlotti, a member of the executive board of district No. 2, United Mine Workers, who was appointed to look into the charges of profiteering at Wishaw, Jefferson County, during the epidemic of influenza at that place, has completed his investigation and will lay his findings before the next meeting of the executive committee at Clearfield. It is said that some of the physicians charge the miners as high as $20 for administering the preventive injection to a family of four, and that there are numerous instances of exorbitant charges for services rendered mine workers and their families.

WEST VIRGINIA

Macdonald—Provision has been made by the New River Co., managed by S. A. Scott, for enlarged power facilities. A stone power house is being constructed for its Cranberry plant. The company has also built at its Sprague plant a brick and concrete substation building which will house 2-kw. motor generator sets.

Lorentz—Electrical equipment will be installed by the Florence Coal Co. at its mines here with a view to increasing the tonnage of the plant. The company has erected a large number of houses for miners.

Charleston—The Big Bottom Coal Co., under the management of J. S. Cheyney, has begun to ship coal from its new operation on Campbell's Creek in the Kanawha field.

Cannelton—A shaft mine in the Eagle seam will be operated by the Cannelton Coal and Coke Co., of which F. O. Harris is general manager. The company is now engaged in sinking a shaft.

Coalwood—Construction work on the new Marcus tipple of the Carter Coal Co., at Olga mines, will proceed at an early date. The engineers, Roberts & Schaefer Co., have been given instructions to proceed with the installation of the tipple.

Macdonald—The Meadow Fork Fuel Co. is putting up a number of new houses at its Weeklow plant. The company has purchased and installed new equipment and is opening another drift mine. Operations had been suspended for about ten days owing to the prevalence of influenza. The Meadow Fork company is under the management of J. R. Charlton, of Macdonald.

ILLINOIS

Witt—The two large mines here operating under the receivership of T. C. Keller, of Chicago, have been closed down indefinitely and all tools and other material removed. The cause assigned is no market in which to sell the coal.

Herrin—The Chicago, Wilmington & Franklin Coal Co. is going to increase the daily output of its mine here from 2300 to 3000 tons. Methods to be employed are perfecting the roadway, timbering main haulage and putting in new rail bonds. Two General Electric motors are to be installed and six Jeffrey breast machines.

Johnson City—The Williamson County Coal Co. is making extensions to its plant. Two boilers and one 150-kw. generator have been installed, also two 7½-ton Goodman motors, four Goodman breast machines and 150 mine cars. The company has also built a new concrete machine shop and blacksmith shop combined. The cement gun is being used and is proving satisfactory.

MICHIGAN

Albion—The mine strike at the Albion coal mine is still unsettled at this writing. The men will not return to work until all their demands are met. The operators say they are in no hurry to come to terms. There is little demand for coal.

COLORADO

Pueblo—The Colorado Fuel and Iron Co. has contracted with the Roberts & Schaefer Co. for the installation of a Marcus tipple and rescreening plant, to be installed at the new Crested Butte operations.

Foreign News

Vancouver, B. C.—Replying to the suggestion recently made by the Vancouver city council that the Government should appoint a fuel controller for the province so that such municipalities as wished could license fuel dealers and have some supervision over them, Premier John Oliver has replied that the Government is preparing to name a fuel controller for British Columbia.

Munich—Bavaria is so short of industrial coal, according to latest advices received, that factories are closing daily and all may be compelled to shut down within a few weeks. This would add thousands of men without work to the large number of demobilized troops. The country is also short of food. The coal shortage is due to the French occupation of the Saar district. The entire Bohemian district is closed, and Silesia is unproductive owing to Polish troubles and disturbed transportation caused by the German retreat. There had been an almost rainless season, which rendered the water-power system useless and compelled the use of coal for the generating of electricity.

Victoria, B. C.—Chiefly because of the illness among miners, the dealers in the various cities of British Columbia state that they have not been able to obtain all the coal ordered during November, which has given rise to rumors of a fuel shortage. It just happened that difficulties at the collieries and the heaviest demand of the domestic trade synchronized, which situation is responsible for what uneasiness has been manifested by the general public. The operators point out that there is no danger of a famine and no reason for fear that any households will have to go cold. Coal, however, is retailing now at the highest figure since the exploitation of the Vancouver Island fields. Lump coal brings $10 a ton; nut, $9.75, and slack, $6.50. These prices at a point 80 miles from the mine are considered excessive by the consumers, but the operators and dealers point out that costs have doubled and that these quotations have been authorized by the fuel control department, which is an indication that they are justified by the conditions.

Personals

John R. Porter has been promoted from the position of superintendent of the Macdonald mines of the New River Co., to be assistant to General Manager S. A. Scott.

John Jones, of Plymouth, Penn., has been promoted to the position of superintendent of the mines of the West End Coal Co. Mr. Jones started his mining career as a breaker boy.

R. B. Isner, Elkins, W. Va., connected with the West Virginia Coal and Coke Co., has been appointed district representative of the Fairmont-Clarksburg district, effective Dec. 1, succeeding D. R. Lawson.

W. B. Plank, mining engineer of the United States Bureau of Mines, has been placed in charge of Bureau work in Alabama. He will have his headquarters at the Bureau's station at West End, Birmingham.

Rush Miller, superintendent of mines 36, 47 and 82, of the Consolidation Coal Co., has resigned. He will be succeeded by F. K. Day, who is now assistant production manager of the Fairmont district for the Federal Fuel Administration.

John Whitehead has been appointed superintendent of the Star Coal and Coke Co. at Red Star, W. Va., succeeding **J. M. Black**. Mr. Whitehead, until the present time, has been the superintendent of the Harvey and Prudence mines of the New River Company.

J. K. Mahaffey, who has been representing the Edison Storage Battery Co. in Washington in connection with government business, has been appointed as district sales manager of the Pittsburgh district. Mr. Mahaffey has been in the employ of the Edison Storage Battery Co. since 1916.

L. E. Schumacher, who for the past eight years has been chief inspector of the Westinghouse Electric and Manufacturing Co., at East Pittsburgh, Penn., has been promoted to works manager of the Krantz Manufacturing Co. of Brooklyn, N. Y., the latest subsidiary of the former company.

William Barrack, for a number of years superintendent of the New River-Pocahontas Coal Co.'s operations at Berwind, W. Va., has resigned to accept a similar position as superintendent of the Tidewater and King Coal companies at Vivian, these companies having been taken over, it is understood, by the Houston Collieries.

W. Guy Srodes, of Bellaire, Ohio, has resigned his position as assistant general manager of the George M. Jones interests (comprising the Ohio Collieries Co. in the Hocking Valley district and the Cambria Colliery Co. in eastern Ohio) effective Dec. 15, to accept the position of general superintendent of the Diamond Coal and Coke Co., at Pittsburgh, Penn.

Joseph E. McGowan, of Brooklyn, N. Y., has been elected a member of the Maryland Coal Co. of Maryland, and the Maryland Coal Co. of West Virginia, to succeed the late Howard S. Dickson. Mr. McGowan is secretary and treasurer of these two companies and of the Simpson Creek Coal Co., of which he is also a member of the board of directors, and of the Maryland Clay Products Co.

Bertram Smith, for the past three years district sales manager of the Detroit district of the Edison Storage Battery Co., has been appointed assistant general sales manager, with headquarters at the main office, Orange, N. J. Mr. Smith is known throughout the trade as one of the "old-timers" in the storage-battery business, having been active in the sale of lead batteries for many years before the advent of the alkaline storage batteries.

Obituary

Edwin L. Wade, traffic manager of the Carnegie Coal Co., Pittsburgh, Penn., died on Nov. 21, at his home in Midway, aged 26 years.

Harry Creighton, superintendent of the Maynard coal mines at Rutland, near Gallipolis, Ohio, was accidently killed on Nov. 25. Mr. Creighton was in his 49th year.

Clem Heck, one of the best known coal salesmen in Ohio and the Middle West, died at his home in this city recently from influenza. He spent a large portion of his time during the past year in Columbus and central Ohio, where he represented the M. A. Hanna Company.

A. J. Hill, a pioneer geologist and railway construction engineer of Canada, died on Nov. 26 at New Westminster, B. C. Early in his career Mr. Hill carried out a geological survey of the eastern Cape Breton coalfields, afterward embodied with the plans of the Dominion Geological Survey and published by order of the Government.

Anson S. Pollock, aged 33, well known mining engineer, died at his home in Monongahela City, Penn., on Nov. 9. Death was due to pneumonia following influenza. Mr. Pollock was superintendent for the Union Coal and Coke Co., and for several years had been mining engineer for the Pittsburgh-Buffalo Co. in Pittsburgh. He is survived by his widow and three small children, also by his father, James Pollock, superintendent of mines at Antrim, Penn.; two brothers, A. W. Pollock, manager of mines at Ramaye, W. Va., and James A. Pollock, of Harrisburg, Penn.; and four sisters.

Industrial News

Denver, Colo.—Effective Nov. 15, J. F. Emmert has been appointed sales manager of the Colony Coal Co., with coal mines at Dines, Wyo., and the Colorado and Utah Coal Co., with mines in Routt County, Colorado. Mr. Emmert will maintain offices in the First National Bank Building, Denver.

Toledo, Ohio—While the lake season is not yet over for the year 1918, still it is almost closed and records show a very prosperous season. The Hocking Valley docks loaded 5,132,482 tons up to Nov. 30, and it was estimated that there was about 30,000 tons yet to handle. The docks of that road loaded 4,830,000 tons during the entire season of 1917. The Toledo & Ohio Central docks ceased loading almost a week ago and the records show that 2,178,888 tons were loaded during the season as compared with 2,434,338 tons in 1917.

Philadelphia, Penn.—In order to relieve congestion on the lines of the Philadelphia & Reading Ry., the Government authorities have devised the plan of having that road turn over a heavy tonnage of bituminous coal to the Pennsylvania R.R. at Henderson Station, on the Chester Valley Branch. The Reading carries a heavy bituminous tonnage to tide at New York, but traffic has become so congested over the lines leading to that port that the present arrangement has been devised, the Pennsylvania R.R. turning the coal back to the Reading at Woodbourne, N. J., from which point the regular delivery is made.

Winnipeg, Man.—Four coal companies of Edmonton, Alta.—the Great West, Twin City, Edmonton Collieries and Humberstone Coal Co.—have become associated for the purpose of selling coal in Manitoba. They have incorporated under the name of the Alberta Coal Mines, Ltd., and established a yard in Winnipeg to handle their business. They have lately been shipping ten carloads per week, but are still lacking orders to keep them in full operation.

New York, N. Y.—Deprived of the right to do business by Fuel Administrator Garfield since June 19, the Penn Fuel Co. announced on Dec. 3 that its license had been restored upon the recommendation of the Department of Justice that no case had been found against it. It had been charged that the company had sold coal unsuited for use in the war zone for ships plying between the United States and neutral countries.

New York, N. Y.—In his annual report to the association on Monday, Dec. 9, Arthur F. Rice, Commissioner of the Coal Merchants' Association of New York, says that whatever may be said of other lines of business, the fact remains that Federal supervision of the coal trade has been the best thing that could have happened. The Government found a vital industry largely ignorant of the simplest principles of bookkeeping, and forced it to discover what those principles are; it discouraged unreasoning competition as disastrous to both buyer and the seller; it legislated into existence a "reasonable profit," which in many instances replaced a serious loss; and, by assuming the responsibility of making prices, it removed from the public mind the long existent suspicion that the retail coal business is a well-organized system of piracy. Incidentally, too, Mr. Rice says, it started a few concerns of questionable reputation along the straight and narrow path, by making it unsafe for them to continue in certain practices which had been highly detrimental to the retail dealers. Government control, Mr. Rice says, has given the dealers better business methods, removed public prejudice, and put a premium upon honesty; important changes, which naturally, could not be brought about in a short time without inflicting some inconvenience upon the dealers.

MARKET DEPARTMENT

Weekly Review

Bituminous Production Enough To Take Care of Current Needs—Many Mines Closed Down for Lack of Orders — Shortage of Gas Coals in Evidence—Anthracite Situation Shows Improvement

PRODUCTION of bituminous coal is ample for current requirements. Market conditions are not such as to favor full-time operations at many mines, and in fact the number of mines forced to close down because of no market is growing larger daily. This condition applies to mines in Illinois and other sections of the Middle West. Operators in the Standard field of Illinois are kept working only to satisfy the demand for railroad coal, though even the calls from this quarter are not what they should be. A number of cases are reported of operators in this field who are selling coal practically at the cost of production in order to get rid of their unbilled fuel.

In general, the possibility of any improvement in the bituminous market later on is restricted to special grades and to consumers who had been denied the use of coal while the country was at war. The southern Illinois field hopes for no relief until cold weather sets in, as almost every mine in the region has a surplus of coal on hand. Were it not for the railroad business, many more operations would have to close down on account of no orders.

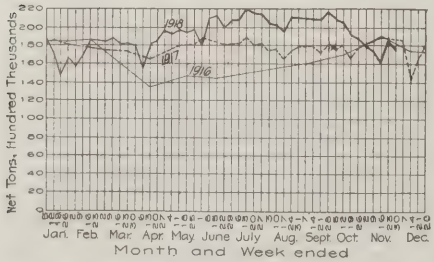
Bituminous steam coals are plentiful. High-volatile coals, on the other hand, have shown such a falling off in production that gas companies which depend largely on this quality of coal are barely able to get enough to keep operating. The railroads, also, are making heavy drafts on these coals, and one of the results is the shortage for malleable iron plants and other industries requiring long-flame coals for special purposes. Several requisitions from Washington in favor of those using gas coals had to be disregarded. In spite of the great surplus of the ordinary steam grades of bituminous, there are plants shutting down for lack of gas coal.

Prices of bituminous are holding up pretty well at Government figures, though reductions are reported in a few quarters. In the endeavor to dispose of some of their stock retailers in St. Louis cut the price from 50c. to 75c. per ton, but the public evinced no great anxiety to buy. The same condition is true of the country generally. Buyers are waiting for a much greater drop in price and are consuming the coal they have accumulated. It is possible that a demand may come later on from buyers who will be anxious to get coals of better quality to use with the inferior fuel now piled in their bins.

Broken and pea make up the bulk of current shipments of anthracite, although egg has come up strongly during the past week, especially at the New York piers. Stove and chestnut, the two sizes most largely used by domestic consumers, are moving heavily on special requisitions through the Fuel Administration, and the lack of these sizes for ordinary distribution is still a great embarrassment to shippers and retailers. It is to be hoped that predictions of an easier supply later will be borne out by increased shipments in January, if not earlier. The fine weather we have been having has helped the domestic situation immeasurably.

WEEKLY COAL PRODUCTION

The improvement in bituminous production which occurred during the week of Nov. 23 failed to continue through the week of Nov. 30, the observance of Thanksgiving Day being the limiting factor. Preliminary estimates place production for the week of Nov. 30 at 9,710,000 net tons, a decrease compared with the week preceding of 1,280,000 net tons, or 11.7 per cent. Compared with the corresponding week of 1917, the decrease during the current week is estimated at 855,000 net tons, or 8 per cent. The average daily production per working day during the week of Nov. 30 (five and a half days), is estimated at 1,765,000 net tons as compared with 1,832,000 net tons during the week preceding and 1,921,000 net tons during Thanksgiving week of last year. The daily average for the coal year to date is estimated at 1,951,000 net tons as against the daily average of a similar period of 1917 of 1,765,000 net tons. The total production for the coal year to date is now estimated at 409,754,000 net tons as against 370,564,000 net tons during the same eight months of 1917.



The observance of Thanksgiving Day on Nov. 28 also caused a decrease of production of anthracite, estimates placing production during the week Nov. 30 at 1,613,000 net tons, as against 1,778,000 net tons during the week of Nov. 23 and as compared with 1,675,000 net tons during the week of Nov. 30, 1917. The daily average per working day during the current week is estimated at 293,000 net tons as compared with 324,000 net tons for the coal year to date and 331,000 net tons during a similar period of last year. For the coal year to date total production is estimated at 66,971,000 net tons and falls below the 1917 production by 1,648,000 net tons, or 2.5 per cent.

Reports from the carriers during the week ended Nov. 30 compared with the week preceding show a decrease in shipments from all districts with the exception of southwest Virginia. Compared with the corresponding week of 1917 the current week's shipments also fell below in all districts with the exception of Cumberland-Piedmont and Somerset, Fairmont and southwest Virginia district. For the coal year to date all districts still continue to report shipments in excess of last year.

Even though the lake season officially closed on Nov. 23, bituminous coal dumped at lower lake ports during the week ended Nov. 30 amounts to 239,891 net tons, bringing the total for the lake season, including vessel fuel, to 29, 289, 903 net tons.

Shipments of bituminous coal to New England during the week Nov. 30 amounting to 359,705 net tons and fell below the week of Nov. 23 by 52,671 net tons, or 13 per cent. Rail receipts through the gateways decreased approximately 10 per cent. and tidewater shipments a like amount. Northern harbors for the week report improvement while shipments from Hampton Roads decreased approximately 26 per cent.

Considerable falling off also occurred in Tidewater shipments during the week of Nov. 30, estimates placing the tonnage loaded at 648,455 net tons as compared with 753,843 net tons during the week preceding, or a decrease of 14 per cent. Baltimore was the lone harbor to report improvement during the week, while shipments from New York and Philadelphia decreased approximately 68,000 net tons, or 17 per cent., and from Hampton Roads, 47,000 net tons, or approximately 15 per cent.

The production of beehive coke in the United States during the week ended Nov. 30 is estimated at 522,000 net tons as compared with 521,000 net tons during the week ended Nov. 23 and 637,000 net tons during the correspondent week of 1917. The daily average during the current week is estimated at 87,000 net tons as compared with 106,000 net tons during the week of Nov. 30 of last year. The production during the past two weeks was the lowest reported since January of this year and is considerably lower than the weekly production of byproduct coke which is now averaging approximately 580,000 net tons per week. The operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania report production of beehive coke at 291,972 net tons and the operation of their plants at 65.6 per cent. In these districts improvements occurred during the week in labor conditions. The same operators produced 160,500 net tons of coal.

The production of byproduct coke during the week of Nov. 30 is estimated at 572,494 net tons as compared with 574,847 net tons during the week preceding. During the current week the plants of the country were operated at 88 per cent of their full time and during the week preceding at 88.4 per cent. While repairs to plants remained the limiting factor, loss of full time attributed to no market increased during the week from 0.8 per cent to 1.8 per cent., such losses being reported by operators in two states, Massachusetts and Pennsylvania. A decrease in production occurred during the week ended Nov. 30 in Illinois, Indiana, Minnesota, Tennessee and West Virginia. In all states with the exception of Minnesota this decrease is attributed to repairs to plants, while in Minnesota other causes brought about the decline. No market losses in Massachusetts amounted to 37.3 per cent. of full time, and were

but slightly lower than those reported during the week preceding, while in Pennsylvania loss of time attributed to no market was offset by repaired plants. Improvement in operating conditions also occurred during the current week in Kentucky and Maryland. Pennsylvania operators alone now report loss of time on account of shortage of byproduct coal.

BUSINESS OPINIONS

Marshall Field & Co.—Current wholesale distribution of dry goods is running about the same as for the corresponding week of 1917. Road sales for immediate delivery were even while sales for future delivery were not so heavy compared with same week last year. Not quite so many customers were in the house. Retailers report an excellent holiday business. Collections continue good.

American Wool and Cotton Reporter—There is no doubt of a sufficient supply of wool, although the grade may not always be exactly what particular manufacturers may desire. The supply can under no circumstances become less than needed, unless the Government prevents anything like resumption of normal conditions in the raw wool trade. No anxiety is exhibited by the South with the recent decline of the price of cotton. They are not pushing their cotton on the market at all. Southern planters and owners of the staple are holding their cotton until they get what they want.

Bradstreet's—Uncertainty, savored, however, with optimism, accompanied by a manifestly slower gait in actual movements and additional cancellations of war orders, epitimizes trade conditions. Groping for tangible tendencies, speculating as to the course of prices, shifting from war to peace work and year-end stock-taking occupy most attention in the larger lines. Underneath the pause, preparations to send salesmen on the road after the turn of the year are going on. Immediate demand, light as it is, overshadows buying for future account, thus indicating a disposition to await developments while covering current needs.

Dry Goods Economist—The principal activity of the week in retail dry goods and department stores has been centered upon the sale of holiday goods, and of needed cold weather wear. The stores in all principal centers have been thronged with customers, and sales have reached high averages. In view of the large volume of business being done, wholesalers and manufacturers have looked for liberal orders and reorders on goods needed for consumption in the near future. Instead, however, a feeling of conservatism has made itself felt in an unmistakable degree. Heads of departments in retail stores are anxious to dispose of goods purchased at high prices, and are not inclined to increase their holdings, because of a feeling that before additional goods are needed prices may undergo a revision downward.

Atlantic Seaboard

BOSTON

Market extremely dull. Inquiry all-rail confined to a few railroads and special requirements. No demand for steamers. Obscure prospect coastwise for Hampton Road shippers. Quiet market over New York piers. Improved demand for bunker coals. District representatives notified to cancel all requisitions in favor of industrials. Receipts continue to sag. High volatile grades again in short supply. Possibility of improved market later is restricted to requirements not able to stock during early fall, or those desiring better grades. Anthracite receipts fall off slightly. Shortage of stove and chestnut continues. Criticism of New England Fuel Administration for method of financing "free coal." Rumor that anthracite section will cease functioning during January. Mr. Storrow refuses Boston City Council demand for data as to retail profits.

Bituminous—The first week of the absence of local regulation was almost colorless. Except for a few forced sales of water-borne coal at rehandling points there have been no developments as to price and the market continues extremely dull. Empty coal cars are still accumulating and very light movement is the rule. Reserve supplies are far beyond normal and there is every inducement to use up the coal on hand before making further purchases. Not only is it higher in price than buyers expect to pay next season, but its nondescript character, in most instances, and the prospect if not the actual presence of fire in storage piles are important considerations in the fuel department of practically every industry in this territory. There is almost no spot market either all-rail or by water, and that shipper is fortunate who is still able to get shipments accepted even when in fulfillment of contract.

All-rail inquiry is confined closely to certain of the railroads, and to special requirements where arrangements were not made earlier. All the railroads are carrying liberal reserve stocks, but apparently on the part of some there is still a disposition to take rail coal at the present fixed price for a while longer rather than pick up coal from storage. A lot of the fuel in stock was accumulated on high prices from steamers where demurrage charges had accrued, and almost it would be supposed that such reserves would be worked off rather than to have purchases made under present conditions. On the other hand, rail coal cannot be had, even today, just for the asking. Influenza is still a factor in the region and there are enough local differences over the wage scale, etc., to make more than a few operators decline even the meager orders now being offered them. The railroads nearer the mines are also taking coal in greater quantities and the decreased volume to New England is not wholly due to lack of market.

Inquiry for coal over the New York piers is equally dull. Even coals from Pools 10 and 11 are not an easy sale for shipment along the Sound. Pool 10 was recently included among the grades suitable for bunkering purposes and it is expected that increased sailings overseas from New York will stimulate demand for the better coals. While just at this time there are very few ships to bunker, and the market is dull in consequence, the trade is confident this will improve. Indeed there are signs of this already, and when output is more nearly on a normal basis a much heavier movement to the piers will be looked for.

The Greensburg district, as well as other regions where the high volatile grades originate, has shown such a notable falling off in production that New England gas companies, for instance, are barely able to get supply enough for current operation. The railroads, also, are making heavy drafts on the current output of these coals and one of the results is the shortage for malleable iron plants and others requiring long flame coals for special purposes. Several requisitions from Washington in favor of industries of this kind have had to be disregarded, and today, in this territory, in spite of the great surplus in every direction of ordinary steam grades there are plants shutting down for lack of gas coal.

In general, therefore, the possibility of any improved market later is restricted to special grades and for requirements where there was less opportunity during August and September to accumulate coal. It is possible that there will also be inquiry later from buyers who will be anxious to get the coals of better quality to help use the inferior fuel that is now piled high in their bins.

Anthracite—The movement of domestic sizes through the gateways has again fallen off slightly. The daily average for November was 333 cars, but the first few days of December saw this figure reduced to only a little over 300 cars. Broken and pea still ke up the bulk of current shipments, both water and rail, although egg has come up strongly the last few days, particularly at the New York piers. Stove and chestnut are moving heavily on special requisitions ough the **Fuel Administration** and the lack of them for ordinary distribution is still a great embarrassment to shippers and retailers. As between different communities there has been great inequality of distribution if the two sizes most largely used, and it is to be hoped that predictions of an easier supply later will be borne out by increased shipments in January, if not earlier.

Mr. Storrow is being commended for his strong stand in answer to the demand of a committee of the Boston City Council for complete data with respect to the net profit of each Boston retail dealer on each ton sold. Mr. Storrow refused to give such information, on the ground that if it came to him it would be received by him as a Federal officer and one in no wise subject to the direction of the Boston City Cohncil. The fact that Mr. Storrow is a member of the Boston City Council lent some spice to the controversy.

NEW YORK

Demand for anthracite stove and chestnut continues to absorb shipments. Pea and the smaller coals plentiful. Shipments to this market far below requirements. Production hindered by lack of labor. Bituminous in good demand. Commercial coal supplies kept down by bunker requirements.

Anthracite—Increased receipts for the local trade and the continuation of favorable weather have put the anthracite market on a better footing. Dealers have not been urged to make deliveries and they have had a reasonable breathing spell. At the same time consumers have been permitted to go into the middle of December without scarcely touching their winter supply. While there are many who believe there is going to be a lack of domestic coals here all winter, those who are in a position to know do not expect any such conditions as existed last winter to arise this season. They do not look for any surplus of egg, stove or chestnut, but on the other hand do not look for any extreme shortage of these sizes.

With the demand in the Northwest taken care of and the shipments to these points practically stopped, more coal should come to eastern points.

In keeping with the past few weeks the cry is for egg, stove and chestnut sizes, but it appears there is less of these coals in the dealers' yards than for many months back. Broken and pea are in better supply, but the latter, which was plentiful a few weeks ago, is tightening. Consumers who are short of their usual quantity of the larger coals are being induced to take to burning pea, with the result that it is scarcer.

So far New York, with the exception of a few days, has not felt the effects of the winter and consequently comparatively little of its winter suppir of coal has been burned. Nearly every householder has plenty of coal on hand to last him for several weeks, and meantime, with western shipments curtailed and the situation in other sections of the country back from the seaboard in good shape, shipments to tidewater which were neglected earlier in the season will be increased and more coal will be rushed into this market.

State Fuel Administrator Cooke has announced some slight changes in the allotments of anthracite to various towns throughout the state, and has placed embargoes on shipments to numerous places.

The demand for No. 1 buckwheat has caused a tightening in that size and has caused a shortage in supply. Two of the selling agencies have announced an advance of 40c. per ton in their price for this size and a similar advance has been made by some individuals. So far no change in prices has been forthcoming from the large producers. No change in prices as to rice and barley have been announced, which sizes remain plentiful.

With encouraging reports from certain sections of the coal fields, showing better production, the dumpings at the local docks for the week ending Dec. 6 amounted to 6127 cars, as compared with 4869 cars the previous week.

In the northern coal fields producers report that influenza seems to have taken a fresh hold, and many new cases have been reported. In the southern fields conditions are slightly better.

Current quotations, per gross tons, f.o.b., Tidewater, at the lower ports are as follows:

	Circular	Individual		Circular	Individual
Broken	$7.80	$8.55	Buck	$5.10	$5.90
Egg	7.70	8.45	Rice	4.65	5.10
Stove	7.95	8 70	Barley	4.15	4.30
Chestnut	8.05	8.80	Boiler	4.60	
Pea	6.55	7.30			

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates. Prices for buckwheat, rice, barley and boiler are not fixed by the Government.

Bituminous—The general situation here shows a slight improvement. Commercial coals are not so much in evidence, due in a great measure to the inclusion of Pools 4 and 10 into the bunker class.

Production figures are showing a steady increase, with a corresponding falling off in demand by large consumers. Shipments to this port for the week ending Nov. 16, while showing a decrease of 184 cars from the figures of the preceding week, were sufficient to take care of current requirements inasmuch as the demand from New England water points has nearly ended for the season. This week will practically see the end of shipments of so-called "Storrow" coal from this port, and it is expected that all accounts for this coal will be closed within a few weeks.

There was an improvement shown in the local dumpings for the week ending Dec. 6, when 6450 cars were handled as against 6127 cars the previous week, an increase of 323 cars.

With the cancellation by the Fuel Administration of all requisitions for bituminous coal to industrial plants such industries will now be forced into the market for their supply, and shippers will have a better opportunity to dispose of their surplus as they see fit. This demand will not, however, be the means of forcing

a cut in prices unless weather conditions are such as to keep down consumption and thus create a long market. Producers do not anticipate any such conditions with the winter just starting, and a labor shortage.

The anticipated removal of price restrictions on bituminous which was to have become effective Dec. 15 is not expected to materialize. It was said among the trade that the latest information was that the Fuel Administration wiuld continue to have supervision over the industry until Apr. 1 at least, and that there would be no changes in prices. This was welcome news to many of the trade, who believe that the removal of restrictions at this time would not be beneficial.

Current quotations, based in Government prices at the mines, net ton f.o.b., tidewater at the lower ports, are as follows:

	Mine Gross	F.o.b. N. Y. Gross
Central Pennsylvania:		
Mine-Run, prepared or slack	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of Mine	3.08	5.23
Prepared	3.36	5.51
Slack	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite conditions unsatisfactory. Conflicting instructions annoy. No delivery of entire orders prior to Jan. 1. Stove and nut still short, but improvement shown. Dealers' needs overstated? Speculating on future trade. Some salesmen out. Labor situation improved. Steam demand fair. Bituminous firmer. Good coals in strong demand. Tide business active.

Anthracite—Another week of most unsatisfactory business conditions in both branches of the trade is to be recorded. There are many cases where the relationship between the shipper and retailer is becoming strained, to put it mildly. The officials of the state and city fuel administrations are showing unmistakable signs of tiring of their positions, and it is understood there has been much friction of late with various interests. The sales agents in their efforts to pacify disgruntled buyers show a strong inclination to criticize the distribution.

Stove and chestnut are as scarce as ever, and the demand for these sizes increase each day. The largest shipping company is now making substantial daily consignments here, but as this trade has been almost neglected for six weeks it will be some time before any great improvement will show in the general condition. After unusual efforts and much pressure from their trade another company has just arranged to make up some of its deficiency in tonnage. The suburban dealers in the extreme northwestern section of the city have been the greatest sufferers, but they will undoubtedly receive attention this week. The trade in Germantown and Chestnut Hill, where the homes are much larger and the required tonnage much heavier, is also in urgent need and we expect soon to see some concerted action from them.

Notwithstanding the cry for coal from all directions it is apparent the opinion is growing that the trade will not require the heavy consignments they now claim are necessary. The unusually mild weather of fall and early winter saved thousands of tons and helped in the economy of coal that all consumers seem to be practicing.

We frequently hear the prospects of spring business discussed, for there are some in the trade who predict the present market will collapse in March. Yet there are others who state that the people have had it drilled into them so thoroughly to buy early, that those with the money will surely continue the practice of taking in their coal supply as soon as they can get it.

In speaking of the spring business, much conjecture is expressed as to the prices, and there are some who predict that the public will not buy coal next spring for the following winter's consumption, if only the usual reduction from the present high rates is offered. While such talk may be premature, it shows that both the shippers and the larger dealers are already looking ahead. As a matter of fact quite a few of the companies are now sending their salesmen out on the street. This is not because they have any coal to offer, but inasmuch as some of the former office workers are being released from the army, these concerns are taking advantage of the opportunity to let their salesmen go over their territories to get in closer touch with conditions, with future business in view.

Judging from the fact that during the recent scarcity of coal a number of dealers laid off help, we are inclined to believe the labor situation is much easier. Some months ago, whether yards were bare of coal or not, no retailer was willing to risk losing a yard man or driver by suspending him. In fact we know many who paid full wages when men failed to report for work for a day or two.

Pea coal seems to be fairly easy in most sections, but the dealers expect their rather small stocks to disappear with the first snow. As one dealer expresses it, his pea coal buyers are never heard from until the snow flies.

In the steam trade buckwheat is fairly strong, and rice is causing little concern. Barley is in bad shape and a great deal of it is being sent into the storage yards, while culm is practically unsalable.

Judging from the way all dealers pay their bills the retailers cannot be in the desperate shape they would like their shippers to believe. It would appear that the business was now on at least a 75 per cent. cash basis, and the advantages of this plan are so apparent that no one wants to go back to the old system of long credits and cut prices.

The agitation as to the retail prices has about subsided, and the public seem to have taken in good faith the statement of the fuel officials in regard to the reasons for the increase. Privately the dealers still feel they should be allowed some extra compensation, but this seems unlikely and it is believed the fuel administration will endeavor to hold them off until spring and then the market prices will be in effect with the retirement of the administration.

The prices per gross ton c.o.d. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.25	Buckwheat	$3.40	$4.45
Egg	4.80	6.15	Rice	2.90	3.80
Stove	5.05	6.40	Boiler	2.70	3.70
Nut	5.15	6.50	Barley	2.40	3.30
Pea	3.75	5.00	Culm	1.25	2.15

Bituminous—The market has grown appreciably stronger, particularly in high-volatile coals. There is an active demand for about all the coal that reaches here. The wagon-mine operators are still handicapped by the lack of box-car equipment. At Tide the demand for coal continues most active. It is generally agreed that the market is assuming a better tone, but there are some consumers who are actually refusing coal. These are the very large plants, many of which have been on Government work, and during the transition to normal activities they are cutting down their coal receipts, owing to heavy stocks already held by them.

There is a constant rumor that the fuel administration will relinquish all control of the bituminous situation by the first of the year. While no one anticipates any particular unsettling of trade, there is quite a good deal of speculation as to what the market will settle down to as to prices.

BALTIMORE

Bituminous situation remains easy, with demand comparatively light. More and more offers of fuel. Hard coal situation unsatisfactory and local fuel administration officials appeal for popular sizes.

Bituminous—Supplies of bituminous here seem to be adequate for the time being, and, as business firms have been taught not to stock up for months in advance, the demand that comes forward is apparently not urgent in most cases, industries being content to replenish when stocks run down. Purchasers are growing a little more discriminating, but this is met by the fact that a better grade of coal is also running, even though best fuels still remain under Government direction. Considerable quantities of good gas coal are now coming through, also, in connection with pier loadings. In a very short time also it is expected that a big jump will be noted in export movement of coal, and the trade as a whole is expecting that this will prove one means of preventing any big drop in price under competition.

Anthracite—The Maryland Fuel Administrator and members of his Baltimore City Committee have made an appeal by personal visit to the anthracite distributing committee in Philadelphia for relief of the situation in Baltimore. Not only is the total movement claimed to be below needs, but the fact that stove and nut sizes are not often included in the tonnage to a city that is made up in unusual amount of small homes is causing worry. Egg coal is not much used in many homes here that are now without coal. The zone rule against Sunbury was lifted and some stove coal of that quality has come through, but not enough to affect the general situation. This coal has always retailed here at 25c. above the schedule for white ash, and while the local administration has not allowed it placed on the formal schedule the majority of dealers here, to receive any Sunbury, are selling at the old advance over circular price for white ash. It is claimed that breakage makes this necessary.

Lake Markets

PITTSBURGH

Production increasing slowly. Market still firm for standard grades.

Coal production in the Pittsburgh district is increasing, but only very slowly. The influenza has been on the wane, so far as concerns news cases, but men are a long time returning to work and operators are encouraging them to make sure they are entirely recovered before they resume work. Car supply has improved and is almost entirely satisfactory.

Under instructions from the Federal Fuel Administration the local distributor is now taking care only of railroads and public utilities generally, ordinary private consumers being left to shift for themselves. This reduces the distribution control to about 45 per cent. of the total.

Consumers are showing no disposition to stock coal, even if afforded the opportunity, except the byproduct coke producers, and they will stock only their favorite grades, which are still difficult to secure. Much byproduct coke is being made with less admixture of Connellsville coal than is desired.

The Pittsburgh district coal market shows no signs of weakness as regards standard grades, and operators insist that the market is going to hold when price control is taken off. While there were intimations that the control would be taken off about Dec. 15, it is now far from certain that this will be done, by reason of the curtailment in output that has occurred. Wagon mines are still operating, but their production is off somewhat and it is doubtful whether many will operate clear through the winter. The market is quotable at Government limits as formerly, but brokers can rarely secure a commission from buyers in addition, Government prices being: Slack, $2.10; mine-run, $2.35; slack, $2.70; per net ton at mine, Pittsburgh district.

TORONTO

Shipments of anthracite light. Only grate and buckwheat procurable. Bituminous market quiet, owing to closing of munition plants. Labor shortage relieved. Fuel controller urges use of substitutes for hard coal.

Receipts of anthracite continue light and are practically confined to grate and buckwheat, local deliveries being restricted to these grades. With the closing down of many munition plants the general labor shortage has been greatly relieved, and coal dealers have now all the labor they need. The market for bituminous continues very quiet, owing to the lessened industrial demand, and dealers do not anticipate any change for the better until the munition manufacturers have reverted to, or engaged in, other branches of production, as most of them are preparing to do.

R. Home Smith, Provincial Fuel Controller, has issued another warning to the public, pointing out that the Province will be faced with a serious shortage before spring, as the cut in the supply will be considerably more than the 20 per cent. reduction in the allotment made by the United States Fuel Administration. In the distribution domestic users will be given the preference. Bituminous coal and wood must be substituted for anthracite in all buildings having furnaces in which they can be used, and owners of office buildings, apartment houses, warehouses and factories are required to sell their anthracite on hand and divert shipments not already received.

BUFFALO

Asking what the throwing off of restrictions will do for the bituminous trade, opinions differ. Trade dull. No anthracite increase. All going to lakes yet.

The surplus here of bituminous coal is still reported to be as large as ever, so that if production has suffered considerably the consumer is not disturbed by it. The general idea is that not only will the thin-vein Allegheny Valley coal lose its extra price, but that all other bituminous will have to come down also, for there is a large amount of Ohio coal to be disposed of in this market. It is not yet allowed to go east of Buffalo, but will soon

go free again. This market knows the coal and is ready to handle it once more.

Buffalo has suffered severely from the late shortage, as it did not control enough coal to meet the needs of the shippers here. Now, however, the conditions are changed and more coal is to be had than can be sold. On this account the jobbers are coming back to business again, though they find it poor.

Anthracite—The clamor for coal increases as the weather grows colder. From the reports one would think that nobody had any. Some of the distributors have the idea that the supply that has come in lately has not kept up with the consumption. The weather has done well by the trade of late, as not in a long time has there been so warm a fall. The best that the distributors can do now is to meet the most urgent cases till the supply increases after the lakes close.

CLEVELAND

Demand for No. 8 coal to mix with lower-grade fuel has come in surprising volume from consuming districts heretofore denied No. 8 coal under the zone system. This has offset to a great extent an otherwise narrowing market. Production again is severely feeling effects of influenza.

Bituminous—With zone barriers gradualy being broken down and the outlet for No. 8 coal broadened, a surprising demand has arisen in districts amply stocked with coal from other producing sections. Especially is this true of Michigan, which has absorbed a considerable amount of Indiana and Illinois coal. Regular No. 8 buyers intend mixing their preferred supplies with the coal forced upon them by the zoning system. This outlet has come just at the time steam-coal consumers in northern Ohio have entirely left the market and the lake season has practically come to an end.

Accordingly, with production badly off on account of influenza, demand for standard No. 8 coal is keeping right on the heels of the supply, and prices have held surprisingly firm. On this point operators and the local fuel administration officials are agreed. Very little regular No. 8 coal can be purchased below the Government prices, it is asserted, though stripping coal can be had at virtually the buyer's price. Concessions of 70c. on this coal to $1 are of frequent occurrence, but the takers are few. The railroads are again evidencing a desire to obtain a general reduction in the price of their fuel, but operators are not disposed to accommodate them.

Requests for cancellations of contracts have been more numerous. In the majority of cases they have been refused. Where an operator could divert the coal and the interest seeking cancellation is a friend, it has been done. But outside of contracts, practically no coal is moving into northern Ohio plants. This is more because of a desire to deplete stockpiles than a depression in production. The change from a war to a peace footing is being made quite painlessly in this district, due mainly to the large automobile and automobile parts industries, and the turn of the year undoubtedly will find steam coal again moving in fair volume. Recurrence of cold weather has stimulated domestic demand somewhat. Much coal is believed being lost in stockpile fires.

Anthracite — Receipts have increased slightly, while 2500 tons held by a factory in Cleveland for Government war work have been released. This has thrown more anthracite on the market, but it is not a drop in the bucket compared with what could be disposed of.

Lake Trade—Five cargoes of bituminous for Milwaukee have been loaded at Lake Erie ports and these, it is believed, will wind up the Great Lakes bituminous season. Anthracite will be loaded at Buffalo so long as the carriers are operated. The rate from Buffalo to Lake Michigan has been advanced to $1.

DETROIT

Steam plants and retail dealers, with an oversupply of coal, present a serious hindrance to normal business in bituminous. Anthracite continues short in supply.

Bituminous—Too much bituminous coal in yards of retail dealers and in the stockpiles of steam plants in and around Detroit is reflected in a greatly reduced volume of business for wholesalers and jobbers in the Detroit market. Both classes of buyers apparently took alarm at the predictions of impending coal shortage that were circulated a few weeks ago. Their efforts to guard against shortage seem to have produced an indiscriminate scramble for stock, in many cases, with the result that buyers took anything and everything offered.

Because of this haste, the retailers now find their yards congested with bituminous coal, much of which is mine-run and other forms of stock that the household consumers object to taking; while the steam plants are experiencing annoyance with coal of an inferior quality that was bought to fill out reserves when the more desirable stock from West Virginia and Ohio mines was withheld by the Fuel Administration's modified zone regulations.

Some of the retailers are endeavoring to dispose of excess stocks through sale to departments of the municipal government. The municipal purchasing agent informs them, however, that the price at which they offer coal to the city is about $1 a ton higher than he can buy bituminous coal elsewhere. There is said to be a possibility of the dealers being asked to submit bids for part of the city's supply.

Lake Trade—Shippers in Buffalo are still loading anthracite for movement up the lakes, and within the last few days have succeeded in chartering a dozen or more vessels. The carrying charge on coal from Buffalo to Milwaukee has been raised to $1 a ton, whil $1.15 a ton has been offered on cargoes to be taken from Buffalo to the head of Lake Superior.

COLUMBUS

The coal trade in Ohio is still rather weak, especially in the steam grades. Domestic business is slow because of unfavorable weather conditions. Producing and shipping interests are playing a waiting game.

The coal industry in Ohio is still rather quiet in all respects. There is a plentiful supply of all grades, but more especially mine-run and screenings. The demand is curtailed by the stoppage of hostilities and also because of the continued warm weather, which has not stimulated the domestic trade. The tone of the trade is not good and coal men are at a loss to judge the future. But it is generally conceded that there will be a better demand for all grades after the first of the year.

The steam trade is quiet to the extreme. Buying on the part of steam users is at a minimum because of rather large stocks in reserve and also because of uncertainty in the future. The Michigan market is closed temporarily because of the reserves of Indiana and Illinois coal. Steam users generally are loath to increase stocks under present conditions and are following the policy of using up what they have on hand. Railroads are very slow in taking tonnage and that has been one of the big departments of the trade for some time. The readjustment program is not yet mapped out and uncertainty pervades the market on all sides.

Domestic trade is slow, as retailers have ample stocks for the present. They have not yet been favored by cold weather and consequently have not been able to move any stocks. There is some demand for the so-called fancy grades, but dealers have little available storage space. Domestic prices are still firm at Government levels as it is realized that any reduction will not stimulate trade under present conditions. The differential between thick and thin vein Hocking has disappeared. Pocahontas is not yet on the market, but some is expected soon. New River and splints are coming in to a certain extent. The change in zones is expected to bring all former varieties that sold in Ohio.

Production has been reduced because of a lull in the demand and also because of the prevalence of the influenza epidemic. The output in the eastern Ohio field shows a reduction to about 40 per cent. of normal. In the Hocking Valley and Pomeroy Bend the output is about 40 per cent. and possibly less. Crooksville and Cambridge fields show up with about the same percentage.

CINCINNATI

The market is quiet, uncertainty regarding industrial prospects hampering demand. Supplies on hand are better than usual.

The process of changing from a war to a peace basis is proving so complicated, as far as the numerous industries in this section are concerned, that it has produced almost a complete standstill in some lines, and is affecting others hardly less. The cessation of manufacturing for war purposes has of course been complete, and while the Government may make adjustments to prevent losses among concerns which had contracts for the production of supplies, the supplies themselves will not be made except in a few instances. The result is that as peace business has not yet had time to make itself felt in the shape of definite orders, and as many plants must undergo some changes in order to turn them back to ordinary business, there is a considerable degree of industrial idleness, which is being reflected in an unusually small demand for fuel, considering the season. For the same reason, manufacturers are reluctant to commit themselves to contracts for fuel as long as they are uncertain as to what their requirements are going to be, and this uncertainty will persist until a change in the industrial situation has time to take place. The extent to which fuel has been stored by consumers of all classes has also undoubtedly had a strong influence on the situation, as domestic consumers are taken care of by storage to an unprecedented extent, while many manufacturers, who expected to operate on a war basis all winter, made correspondingly large preparations for the fuel supplies, including special provisions for yard storage. Production is not on a large scale, as operators see no reason to push things under the circumstances.

LOUISVILLE

Some small demand for better grades of domestic. Steam generally dull, with screenings in better demand than mine-run. Considerable effort shown to cancel contracts.

Reports from producers, jobbers and retailers this week are generally unsatisfactory. The market is weak, and the unscrupulous small operators, jobbers and retailers are cutting prices considerably under the Government price quotations. Many of them are virtually forced to do so in order to keep going. With no demand to speak of for better grade coals, and low grade coals not wanted, the situation is serious. Many retailers have heavy holdings of low grade coals, mine-run, etc., which were purchased on the strength of efforts made by the Fuel Administration, and in some cases these coals are expected to be hard to sell at anything like a fair price, considering the fact that prices are being cut on the low grades, and some of the retailers with high priced low grade coals on hand will have to sell at much lower than expected figures.

As a result of a smaller demand for coal in the Pittsburgh field, West Virginia and Pittsburgh bituminous coals are moving into the Cincinnati and Kentucky districts more freely; and indications are that a good boating stage will bring out a lot of river coal. However, the markets as far south as Cairo are well taken care of, excepting a few river towns which depend on river coal. However, if the packages and tows can be secured, there may be a fair southern market for it. However, western Kentucky is paying more and more attention to river shipments to the South, but is short of barges and boats to handle it. It is reported that some high-grade West Virginia coal has been moving into the Cincinnati market, and selling at prices under some of the eastern Kentucky coals during the week, this showing how hard set the big companies are for business.

Cancellations have been coming rapidly, and many operators have received numerous hold orders. However, on most of these hold orders, if not claused in the contracts, operators are going right ahead and shipping, and if necessary expect to go into the courts to hold the contract makers, who are using numerous methods of getting out. One of the chief methods is to declare the coal to be of a grade under that purchased, and due to the fact that fast mining methods have reduced quality, it will in many cases be a hard matter for the operator to prove that the coal isn't under grade.

BIRMINGHAM

Inquiry for steam coal much improved, and buyers active. Domestic demand still strong. Receipts of both grades inadequate to meet requirements. Influenza again prevalent and badly crippling production.

Improvement in the demand for steam coal in this market has been very marked during the past week, and consumers have been active in an effort to purchase the needed fuel. Furnace companies, oil mills and other large users have been buying up all the free coal available, while the railroads have been endeavoring to accumulate some surplus for the approaching holidays, some lines being short on current requirements. The activity in the trade is attributable to some extent to the desire to stock coal to tide over the idle period around Christmas, but brokers and sales managers are of the opinion that there will be a satisfactory demand for coal at least through the winter months. At present there is no accumulation of coal in this district and it appears that normal production will not be reached again in the near future.

Domestic consumers are buying freely—that is, as freely as the receipts will permit. Much more coal is needed by dealers than they are able to obtain. The stocks on hand are very small and any number of yards depend entirely on shipments received periodically, the coal being sent out direct from the car to the customer.

Coke

CONNELLSVILLE

Coke production increasing slowly. Furnaces less insistent for deliveries. Discussion of contracts for next year. Inspection system established. Less screening of old dumps. Market still firm.

Coke production in the Connellsville region is increasing slowly. Since the termination of the war men have shown less disposition to work and operators are not urging them. Influenza is on the wane, but men are expected to be fully recovered before they resume work. The shortage of coke has resulted in a few furnaces being banked in the past three weeks and others slowing down, but the blast furnaces are making no very strenuous efforts to secure full supplies of coke and operators are probably taking their cue that market prospects will be helped by curtailed operations.

There is practically a deadlock between coke producers and the furnacemen as to contracts for 1919. Some contracts were put through before the end of the war, the terms of which are not definitely known. Sellers claim that the contracts provide that in case of discontinuance of Government prices the last Government price shall rule, while buyers claim the contracts call for settlement, in that event, at open market prices ruling. Each party endeavors to give the impression that the bulk of the contracting has been done, on the terms he mentions, obviously with the idea of inducing the making of other contracts on those terms.

Furnacemen who have been much annoyed at the quality of coke they have been receiving during the war have caused the institution of a new system whereby there will be inspectors at ovens, representing the buyer, who will pass upon all coke before it is shipped. The furnaces are anxious for improved quality first and a lower market next, but are not particularly anxious to see a lower market at once, as that would have an unfavorable sentimental influence upon pig iron prices, which the furnaces wish to maintain as long as possible after Government control formally disappears Dec. 31. There are no market offerings to speak of, except limited quantities of foundry coke, and the market is quotable steady at the Government limits; Furnace, $6; foundry, 72-hour selected, $7; crushed, over 3-in., $7.30, per net ton at ovens. Demand for screenings from old dumps, which were limited to $5.50 for sizes over ¾-in., has become very small, and some cut prices have been made, but contractors generally are disposed to quiet the business rather than make any large concession.

The "Courier" reports coke production in the Connellsville and Lower Connellsville region in the week ended Nov. 30 at 256,715 tons, an increase of 14,610 tons, and raw coal shipments at 192,038 tons, an increase of 26,242 tons.

Buffalo—Scarcity of men in the coke districts has stiffened the market for high grades, so that the furnaces are finding it hard to get what they need. Buffalo furnaces that depend on byproduct coke have had to go into the open market for a great part of their stock. The supply ought to increase soon, but at present the demand for foundry and furnace grades is such that the prices would double but for the Government restriction. Fuel coke is easy where it has to compete with bituminous, but very strong if it has to do with anthracite substitution. Iron ore by lake is about all in for the season, the amount received for the week being only 99,688 tons.

Middle Western

GENERAL REVIEW

News that Fuel Administration is to relinquish all control of soft coal causes consternation. Little change booked for in market conditions before Jan. 1.

The latest information from Washington indicates that there has been an increase of 12 per cent. over the tonnage produced for the week previous. This, in a way, is hard to understand, because operators and sales agents both are having great difficulty in moving the coal produced for the present market, which is very weak.

Mr. Garfield's interview with the press on Saturday afternoon, in which interview he stated that he had under advisement a plan for abolishing all zones and restrictions on bituminous coal, as well as all price regulations, has caused a furore in the Mid-West market. If Mr. Garfield should take the steps which he is considering, it would lead to the greatest confusion and disorganization throughout this whole district.

The first thing to happen would be that operators with mines in West Virginia and southeastern Kentucky, would immediately get a lot of Chicago business, as there has always been a considerable tonnage of Eastern coal used in this city, but as soon as the war began, these firms were forced to use Illinois and Indiana products. If Eastern coal comes into the market, it will, of course, drive out coal produced in our own territory, and will tend to depress the market still further.

Rumors continue to come into Chicago to the effect that large storage piles, scattered throughout Michigan, Illinois, Indiana, Wisconsin and Iowa, are being consumed with reasonable rapidity, and that two or three weeks' cold weather will mark a great reduction in these storage piles. This, of course, is encouraging, because as soon as the average factory has used up some of its surplus, it will once more come into the market for further purchases.

CHICAGO

Steam coal market is weak and domestic demand is nil. Not much change in anthracite. Plenty of hard coal in dealers' bins, but red tape holds up deliveries.

The steam coal market in this city is weak, and conditions do not differ to any material extent from the general situation throughout the Middle West. Coal is to be had at a decided discount, and, as has been the case right through the season, the only coals that have been strong at Government price current at time of shipment are the high-grade fuels from the Indiana fourth vein district and parts of the southern Illinois field.

The domestic trade continues to be stagnant; this in spite of the fact that we have had, within the last week or so, some reasonably cold weather. It is a common sight, on a cold morning, to see regular processions of coal wagons leaving the retailers' yards, and it is a curious thing to note that the retailer has not come in the market to buy coal to replace the coal sold The reason is perhaps that he is waiting to see whether the zones will really be lifted, in order that, if this proves to be the case, he will be in a position to fill his bins with high-grade Eastern fuels.

The anthracite situation is not much changed. The dealers apparently have plenty of anthracite in their bins, but are prohibited from delivering it by a mass of rules and regulations promulgated by the State Fuel Administration.

MILWAUKEE

Coal market unusually tranquil for the season. Shortage of anthracite the main feature. Stocks of bituminous heavier than last year.

An announcement by State Fuel Administrator Fitzgerald that the amount of anthracite needed to make up the allotment of Wisconsin and other Northwestern states is ready for shipment, has served to encourage dealers who have not as yet been able to get the 80 per cent. of their normal supply allowed by the fuel administration. Those who have received their share have been shut off from anthracite supplies since Dec. 1. However, there are only a few days of lake navigation left, and it may be that cold weather will halt the coal on its way up the lakes. It is understood that five vessels, whose capacity aggregates about 40,000 tons, have been chartered to bring this late supply of coal to market, at a freight rate of $1 per ton. Should Lake Superior become closed the coal will be brought to Lake Michigan ports and sent out by rail. Plans for stimulating distribution in this way have been perfected.

The November movement of bituminous coal was the lightest of any month since navigation opened in spring. The receipts aggregate 251,754 tons. Hard coal receipts were more satisfactory, the record being 115,879 tons, or the largest since August, when 119,293 tons were received. With December to hear from, cargo receipts of anthracite sum up 675,843 tons and of bituminous 3,402,883 tons.

The docks are loaded with bituminous coal, with a quiet market for the same. The hue and cry about coal shortage induced many consumers to stock up with rail coal from Illinois and elsewhere, and this measure of preparedness is reflected in the market conditions of the present. Consumers have been supplied with anthracite in a partial way, but unless there is a reasonably substantial increase in receipts before navigation closes, many will be forced to purchase higher-rail coal.

ST. LOUIS

St. Louis presents the worst demoralized coal market that has been experienced in three years. There is a surplus of all coal, with no market at all to absorb it, either steam or domestic. Plenty of equipment, transportation good and prices cut.

The condition of the St. Louis coal market is worse than it has been at any other time in the past three years, everything considered. The weather continues unusually mild and more so perhaps than it has been in any other season for several years. The dealers in St. Louis have about 80,000 tons of coal in storage. The Polar Wave Ice and Fuel Co. has 30,000 tons, and Schroeter Brothers have 15,000 tons. The balance is scattered. In addition to that it is estimated that there is about an additional 100,000 to 150,000 tons in storage by manufacturing plants. Efforts to use up this storage coal have almost entirely shut off mine shipments.

Retail dealers have begun cutting their retail prices. One dealer had his prices cut for a couple of weeks, but another retailer, a subsidiary of the Taylor Coal Co., of Chicago, began cutting the Carterville coal 50c. a ton. The result is that the entire trade cut the price anywhere from 50c. to 75c. a ton, and even at that no coal is moving. A general wave of dissatisfaction has taken possession of the public, and there is considerable criticism because they were induced to put their coal in early at a high price and now there is plenty of coal at a much lower price.

The Standard field is almost shut off on commercial shipments. A good tonnage of railroad coal continues to move out, but this is not what it should be, though it is the only thing that is keeping the mines in the Standard district working. Some mines have had the same coal unbilled now for two weeks. This coal is selling in the St. Louis market at from $1.75 for 2-in. lump up to $2 for 6-in., with nut and egg at about the same price and screenings at from $1.35 to $1.50, with mine-run at $1.65 to $1.70. The operators in this district contend that it costs them between $1.50 and $1.75 to produce coal, so it is a case of where they are down to selling coal at the cost of production or less.

The Mt. Olive field presents a somewhat better condition, although that coal has to some extent been cut to $2.40 and some coal with the Mt. Olive classification in St. Louis is selling as low as $2.25 for the screened domestic sizes. A fairly good railroad tonnage from this field continues to move out and in addition there is a fair demand from the north for coal of this quality, but the mines here are idle on account of no orders and there is considerable unbilled coal.

In the Carterville district of Williamson and Franklin County, as well as in the Duquoin field, there is a surplus of coal at practically all mines, and were it not for the railroad business in these districts the mines would have to shut down on account of no orders. As it is, some mines have unbilled coal right along. Car supply is good and transportation shows a setback the past week or so.

The coals from these fields are holding up fairly well, but they can be purchased as low as $2.40 for the screened sizes, and screenings are a little weak. Very little demand for mine run.

It is a weather proposition from now on. Unless seasonable weather comes a further demoralization of the entire southern Illinois coal business is a certainty.

SEATTLE

Fuel restrictions to be practiced during the winter owing to falling off in production. Thorough investigation made of state coals.

Fuel restrictions will be continued this winter notwithstanding the signing of the peace armistice, according to the state fuel administrator, who states that a falling off in production has made the restrictions necessary and a need to continue the fuel administration office.

The Federal Fuel Administrator for the state, W. W. Miller, is now holding conferences with committees he appointed earlier in the year relative to a series of experiments with Washington coal to find the widest possible use of all grades, and to provide for their utilization in the best way to obtain the greatest saving in consumption and cost. Studies have been made at the mines and in the laboratories, and an interesting report is in the course of preparation by the fuel administration.

During the epidemic of influenza it is now estimated that the output of coal mines in the state fell 60 per cent. for a period of a little more than three weeks, and even yet the mines are not producing what they did previous to the visitation of the sickness.

CURRENT PRICES—MATERIALS & SUPPLIES

IRON AND STEEL

PIG IRON—Quotations (compiled by The Matthew Addy Co.), are f.o.b. cities named, unless noted otherwise.

	Current	One Month Ago
CINCINNATI		
No. 2 Southern	$37.60	$37.60
Northern Basic	34.80	34.80
Southern Ohio No. 2	35.80	35.80
NEW YORK, Tidewater delivery		
Penna. 2X	39.55	39.15
Virginia No. 2	41.70	41.70
Southern No. 2	41.70	41.70
BIRMINGHAM		
No. 2 Foundry	34.00	34.00
PHILADELPHIA		
Eastern Pa. 2X	39.15*	39.15*
Virginia No. 2	40.50†	40.50†
Basic	36.90*	36.90*
Grey Forge	36.90*	36.90*
Bessemer	39.10*	39.10*
CHICAGO		
No. 2 Foundry Local	34.50	34.50
No. 2 Foundry Southern	39.00	39.00
PITTSBURGH, including freight charge from the Valley		
No. 2 Foundry Valley	35.40	35.40
Basic	34.40	34.40
Bessemer	36.60	36.60

*F.o.b. furnace. †Delivered

STRUCTURAL MATERIAL—The following are the base prices, f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

	Mill Pittsburgh	New York Current	New York One Year Ago	St. Louis	Chicago
Beams, 3 to 15 in.	$3.00	$4.27	$5.25	$4.27	$4.27
Channels, 3 to 15 in.	3.00	4.27	5.25	4.27	4.27
Angles, 3 to 6 in., ¼ in. thick.	3.00	4.27	5.25	4.27	4.27
Tees, 3 in. and larger	3.05	4.27	5.30	4.27	4.27
Plates	3.225	4.77	10.00	4.52	4.52

BAR IRON—Prices in cents per pound at cities named are as follows:

Pittsburgh	St. Louis	Denver	Birmingham
3.50	4.50	4.85	4.47

NAILS—Prices per keg from warehouse in cities named:

	Mill Pittsburgh	St. Louis	Denver	Chicago	Birmingham	San Francisco	Dallas
Wire	$3.50	$4.37	$5.11	$4.32	$4.75	$5.35	$4.75
Cut	4.00	6.50	5.61	4.47	.....	5.75	.....

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh	Cincinnati	Chicago	St. Louis	San Francisco	Birmingham	Denver
Standard railroad spikes ⅝-in. and larger	$3.90	$6.00	$4.50	$5.30	$6.70	$6.00	$5.55
Track bolts	4.90	8.90	5.50	Prem.	8.00	8.00	6.55
Standard section angle bars	3.25	....	4.45	Prem.	5.15	....	4.95

COLD DRAWN STEEL SHAFTING—From warehouse to consumers requiring fair-sized lots, the following discounts hold:

Cincinnati	Cleveland	Chicago	St. Louis	Denver	Birmingham
17½%	List	+10%	+15%	+30%	+30%

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill Pittsburgh	Cincinnati	Chicago	St. Louis	Denver	Birmingham
Straight	$6.25	$7.25	$6.50	$6.25	$8.00	$7.25
Assorted	6.40	7.75	6.50–7.00	6.40	8.25	7.50

Cincinnati—Horseshoe nails sell for $4.50 to $5 per 25-lb. box.

CAST-IRON PIPE—The following are prices per net ton for carload lots:

	New York Current	New York One Month Ago	New York One Year Ago	Chicago	St. Louis	San Francisco
4 in.	$70.70	$70.70	$59.50	$69.80	$63.00	$85.50
6 in. and over	67.70	67.70	56.50	66.80	60.00	82.50

Gas pipe and 16-ft. lengths are $1 per ton extra.

STEEL RAILS—The following quotations are per ton f.o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

	Pittsburgh Current	Pittsburgh One Year Ago	Chicago Current	Chicago One Year Ago
Standard Bessemer rails	$57.00	$38.00	$67.00	$38.00
Standard openhearth rails	55.00	40.00	65.00	40.00
Light rails, 8 to 10 lb.	*3.135 (100 lb.)	43.50	*3.135 (100 lb.)	43.50
Light rails, 12 to 14 lb.	*3.09 (100 lb.)	49.00	*3.09 (100 lb.)	49.00
Light rails, 25 to 45 lb.	*3.00 (100 lb.)	30.00	*3.00 (100 lb.)	30.00

* Government price per 100 lb.

OLD MATERIAL—The prices following are per gross ton paid to dealers and producers in New York. In Chicago and St. Louis the quotations are per net ton and cover delivery at the buyer's works, including freight transfer charges:

	New York	Chicago	St. Louis
No. 1 railroad wrought	$30.50	$26.50	$33.00
Stove plate	22.00	23.00	25.50
No. 1 machinery cast	33.00	26.00	20.50
Machine shop turnings	16.00	13.50	18.50
Cast borings	16.00	13.50	18.50
Railroad malleable cast	30.00	29.00	32.00

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Cincinnati	Birmingham	St. Louis	Denver
$0.12	$0.16½	$0.18	$0.19	$0.18½

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis	Birmingham
Solid	16c.	16c.	15c.
Hollow	24c.	...	...

PIPE—The following discounts are for carload lots f.o.b. Pittsburgh; basing card of Nov. 6, 1917, for steel pipe and for iron pipe:

BUTT WELD

Inches	Steel Black	Steel Galvanized	Inches	Iron Black	Iron Galvanized
⅛, ¼ and ⅜	44%	17%	⅜ to 1½	33%	17%
½	48%	33⅓%			
¾ to 3	51%	37½%			

LAP WELD

2	44%	31½%	2	26%	12%
2½ to 6	47%	34½%	2½ to 4	28%	15%
			4½ to 6	28%	15%

BUTT WELD, EXTRA STRONG PLAIN ENDS

⅛, ¼ and ⅜	40%	22½%	⅜ to 1½	33%	18%
½	45%	36½%			
¾ to 1½	49%	36½%			

LAP WELD, EXTRA STRONG PLAIN ENDS

2	42%	30½%	2	27%	14%
2½ to 4	45%	33½%	2½ to 4	29%	17%
4½ to 6	44%	32½%	4½ to 6	28%	16%

From warehouses at the places named the following discounts hold for steel pipe:

	Black New York	Black Chicago	Black St. Louis
¾ to 3 in. butt welded	40%	41.1%	40%
3½ to 6 in. lap welded	36%	37.1%	36%

	Galvanized New York	Galvanized Chicago	Galvanized St. Louis
¾ to 3 in. butt welded	28%	26.1%	27%
3½ to 6 in. butt welded	25	23.1%	24%

Malleable fittings. Class B and C, from New York stock sell at list + 15%. Cast iron, standard sizes, 5% off.

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York and St. Louis
Galvanized iron rigging	+20%
Galvanized cast steel rigging	List
Bright plain rigging	30%
Bright cast steel	17½%
Bright iron and iron tiller	5%

STEEL SHEETS—The following are the prices in cents per pound from jobbers' warehouse at the cities named:

	Pittsburgh Mill, in Carloads	New York Current	New York One Month Ago	New York One Year Ago	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago
*No. 28 black	5.00	6.52	6.495	9.50	6.42	8.50	6.52	9.25
*No. 26 black	4.90	6.40	6.395	9.40	6.32	8.40	6.42	9.15
*Nos. 22 and 24 black	4.85	6.37	6.345	9.35	6.27	8.35	6.37	9.10
Nos. 18 and 20 black	4.80	6.32	6.295	9.30	6.22	8.30	6.32	9.05
No. 16 blue annealed	4.45	5.72	5.695	10.20	5.62	8.70	5.72	9.70
No. 14 blue annealed	4.35	5.62	5.595	10.10	5.52	8.60	5.62	9.60
No. 10 blue annealed	4.25	5.42	5.495	10.00	5.42	8.50	5.52	9.50
*No. 28 galvanized	6.25	7.77	7.745	11.00	7.67	10.00	7.77	10.50
*No. 26 galvanized	5.95	7.47	7.445	10.70	7.37	9.70	7.32	10.20
No. 24 galvanized	5.80	7.32	7.295	10.55	7.22	9.55	7.47	10.05

* For painted corrugated sheets add 30c. per 100 lb. for 25 to 28 gage; 25c. for 19 to 24 gages; for galvanized corrugated sheets add 5c., all gages.

SHOP SUPPLIES

NUTS—From warehouse at the places named, on fair sized orders, the following amount is deducted from list:

	New York Current	New York One Year Ago	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago
Hot pressed square	$0.80	List	$1.25	$1.30	$0.98	$2.00
Hot pressed hexagon	.80	List	1.05	1.30	.78	2.00
Cold punched square	2.50*	List	.75	List	1.00	1.50
Cold punched hexagon	2.50*	List	.75	List	1.00	1.50

* List plus.

Semi-finished nuts sell at the following discounts from list price:

	Current	One Year Ago
New York	40—10%	50%
Chicago	50%	45%
Cleveland	50—10%	50%

MACHINE BOLTS—Warehouse discounts in the following cities:

	New York	Cleveland	Chicago
⅜ by 4 in. and smaller	40—10%	40—10%	37%
Larger and longer up to 1 in. by 30 in.	20—5%	20—5%	25—5%

WASHERS—From warehouses at the places named the following amount is deducted from list price:

For wrought-iron washers:
New York.....$2.00 Cleveland.....List Chicago.....$2.50

For cast-iron washers the base price per 100 lb. is as follows:
New York.....$6.00 Cleveland.....$4.25 Chicago.....$4.50

RIVETS—The following quotations are allowed for fair sized orders from warehouse:

	New York	Cleveland	Chicago
Steel ½ and smaller	40%	45—5%	40%
Tinned	30%	45—5%	40%

Boiler, ¾, ⅞, 1 in. diameter by 2 in. to 5 in. sell as follows per 100 lb.:
New York..$5.675 Cleveland...$5.15 Chicago....$5.67 Pittsburgh...$4.65

Structural, same sizes:
New York..$5.775 Cleveland...$5.25 Chicago....$5.77 Pittsburgh...$4.75

CONSTRUCTION MATERIALS

LINSEED OIL—These prices are per gallon:

	New York		Cleveland		Chicago	
	Current	One Year Ago	Current	One Year Ago	Current	One Year Ago
Raw in barrel	$1.59	$1.25	$1.90	$1.25	$1.77	$1.22
5-gal. cans	1.84	1.35	2.00	1.40	1.97	1.32

* Nominal.

WHITE AND RED LEAD in 500-lb. lots sell as follows in cents per pound:

	Red				White	
	Current		1 Year Ago		Current	1 Year Ago
	Dry	In Oil	Dry	In Oil	Dry and In Oil	Dry and In Oil
100-lb. keg	14.00	14.50	12.25	12.50	14.00	12.50
25 and 50-lb. kegs	14.25	14.75	12.50	12.75	14.25	12.75
12½-lb. keg	14.50	15.00	12.75	13.00	14.50	13.00
5-lb. cans	.....	.....	14.25	14.00	16.00	14.50
1-lb. cans	.....	.....	14.25	14.50	17.00	14.50

COMMON BRICK—The prices per 1000 in cargo or carload lots are as follows:

Cincinnati	$16.75	Birmingham	$15.00
St. Louis, salmon	12.00	Denver	12.00

PREPARED ROOFINGS—Standard grade rubbered surface, complete with nails and cement, costs per square as follows in New York, St. Louis, Chicago and San Francisco.

	1-Ply		2-Ply		3-Ply	
	C.l.	L.C.l.	C.l.	L.C.l.	C.l.	L.C.l.
No. 1 grade	$1.45	$1.70	$1.85	$2.10	$2.25	$2.50
No. 2 grade	1.30	1.55	1.65	1.90	2.00	2.25

Asbestos asphalt saturated felt (14 lb. per square) costs $5.35 per 100 lb.

Slate-surfaced roofing (red and green) in rolls of 108 sq.ft. costs per $2.40 roll in carload lots and $2.65 for smaller quantities.

Shingles, red and green slate finish cost $5.75 per square in carloads, $6.75 in smaller quantities, in Philadelphia.

ROOFING MATERIALS—Prices per ton f.o.b. New York or Chicago:

	Carload Lots	Less than Carload Lots
Tarfelt (14 lb. per square of 100 sq.ft.)	$64.00	$65.00
Tar pitch (in 400-lb. bbl.)	21.00	22.00
Asphalt pitch (in barrels)	40.00	45.50
Asphalt felt	72.50	77.00

HOLLOW TILE—Price per block in carload lots for hollow building tile:

	4x12x12	8x12x12	12x12x12
St. Paul	$0.056	$0.11	$0.162
Cincinnati	.086	.165	.218
Seattle	.09	.175	.30
Los Angeles	.0668	.12	.20
New Orleans	.14	.20	.29
Pittsburgh	.....	.14	...

LUMBER—Price of yellow pine per M in carload lots:

	1-in. Rough 10 In. x 16 Ft.	2-In. T. and G. 10 In. x 16 Ft.	8 x 8 In. x 20 Ft.
St. Louis	$39.00	$34.00	$36.00
Birmingham	33.00	33.00	28.50
Denver	43.25	35.00	43.00
Cincinnati	43.00	42.00	37.00

EXPLOSIVES—Price per pound of dynamite in small lots and price per 25-lb. keg for black powder:

	Low Freezing	Gelatin			Black
	20%	40%	60%	80%	Powder
New York	.....	0.31½	$0.38½	.....	$2.50
Boston	$0.25½	.28¼	.35½	$0.42½	2.50
Cincinnati	.19½	.23¼	.29¼	.....	2.45
Kansas City	.21½	.27¼	.34¼	.44½	2.55
New Orleans	.21½	.28½	.35½	.45½	2.70
Seattle	.....	.25½	.32½	.....	.....
Chicago	.19¾	.23¾	.34	.44	2.45
St. Paul	.20	.27½	.34½	.....	2.55
St. Louis	.20	.27½	.34½	.44¼	2.15
Denver	.18¾	.26	.33	.43	2.50
Dallas	.25	.33½	.40	.50	.....

MISCELLANEOUS

GREASES—Prices are as follows in the following cities in cents per pound for barrel lots

	Cincinnati	St. Louis	Birmingham	Denver
Cup	7.2—8.2	6.9	8½	14½
Fiber or sponge	7.2—8.2	13	8½	18
Transmission	7.2—8.2	13	0	20
Axle	4.6—4.9	3.9	3¾	5¼
Gear	4.9—7.1	9.5	8	9
Car journal	4.9	4.5	5	8

BABBITT METAL—Warehouse prices in cents per pound:

	New York		Cleveland		Chicago	
	Current	One Year Ago	Current	One Year Ago	Current	One Year Ago
Best grade	95.00	70.00	83.00	80.00	96.00	70.00
Commercial	45.00	40.00	23.00	21.00	25.00	25.00

HOSE—Following are prices of various classes of hose:

	Fire
	50-Ft. Lengths
Underwriters' 2½-in.	85c. per ft.
Common, 2½-in.	25%

	Air		
	First Grade	Second Grade	Third Grade
¼-in. per ft.	$0.65	$0.40	$0.30

Steam—Discounts from list
First grade.....15% Second grade.....25% Third grade.....33⅓%

LEATHER BELTING—Present discounts from list in cities named:

	Medium Grade	Heavy Grade
St. Louis	30–50%	35%
Denver	35–5%	40%
Birmingham	35%	40%
Chicago	45%	35%
Cincinnati	40–10%	30%

RAWHIDE LACING—25% off list.

PACKING—Prices per pound:

Rubber and duck for low-pressure steam	$0.99
Asbestos for high-pressure steam	1.76
Duck and rubber for piston packing	1.10
Flax, regular	.99
Flax, waterproofed	1.21
Compressed asbestos sheet	1.10
Wire insertion asbestos sheet	1.30
Rubber sheet	.66
Rubber sheet, wire insertion	.99
Rubber sheet, duck insertion	.55
Rubber sheet, cloth insertion	.25
Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes	1.21
Asbestos wick, ½- and 1-lb. balls	.75

MANILA ROPE—For rope smaller than ⅝-in. the price is ½ to 2c. extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: ⅛-in., 8 ft.; ¼-in., 6; ⅜-in., 4½; ½ in., 3½; ⅝-in., 2 ft. 10 in.; ¾-in., 2 ft. 4 in. Following is price per pound for ⅝-in. and larger, in 1200-ft. coils:

Boston	$0.34	Birmingham	$0.39
New York	.36	Denver	.36
Cincinnati	.33½	Kansas City	.34½
Chicago	.33	Seattle	.33
St. Paul	.34	St. Louis	.33½
San Francisco	.32	Los Angeles	.34

PIPE AND BOILER COVERING—Below are discounts and part of standard lists:

PIPE COVERING		BLOCKS AND SHEETS	
Pipe Size	Standard List Per Lin. Ft.	Thickness	Price per Sq.Ft.
1-in.	$0.27	½-in.	$0.27
2-in.	.36	1 -in.	.30
6-in.	.80	1½-in.	.45
4-in.	.60	2 -in.	.60
3-in.	.45	2½-in.	.75
8-in.	1.10	3 -in.	.90
10-in.	1.30	3½-in.	1.05
85% magnesia high pressure			List
or low-pressure heating and return lines			4-ply..... 58% off 3-ply..... 60% off 2-ply..... 62% off

WIRING SUPPLIES—New York prices for tape and solder are as follows:

Friction tape, ½ lb. rolls	48c. per lb.
Rubber tape, ½-lb. rolls	60c. per lb.
Wire solder, 50-lb. spools	46c. per lb.
Soldering paste, 2-oz. cans	$1.20 per doz.

COPPER WIRE—Prices per 1000 ft. for rubber-covered wire in following cities:

	Denver			St. Louis			Birmingham		
No.	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex
14	$17.00	$21.00	$39.40	$12.50	$16.00	$30.50	$13.00	$17.40	$36.80
10	25.65	28.90	64.75	27.20	31.00	69.00	21.40	24.40	42.75
8	36.45	40.25	88.45	38.00	42.00	78.00	42.35	44.35	.....
6	57.40	61.70	.....	.....	65.00	130.00	64.60	74.60	.....
4	83.40	88.70	.....	.....	93.00	.....	101.75	106.05	.....
2	126.60	132.80	.....	.....	140.00	.....	151.50	163.00	.....
1	164.15	172.40	.....	.....	182.00	.....	201.00	208.50	.....
0	206.80	206.80	.....	.....	242.00	.....	276.00	285.00	.....
00	278.80	278.80	.....	.....	290.00	.....	317.00	330.00	.....
000	341.65	341.65	.....	.....	360.00	.....	417.00	428.50	.....
0000	417.05	417.05	.....	.....	435.00	.....	516.00	516.00	.....

FREIGHT RATES—On finished steel products in the Pittsburgh district including plates, structural shapes, merchant steel, bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished), chains, etc., the following freight rates per 100 lb. are effective:

Boston	$0.30	New Orleans	$0.38½
Buffalo	.17	New York	.27
Chicago	.27	Philadelphia	.24½
Cincinnati	.23	St. Louis	.24
Cleveland	.17	St. Paul	.49½
Denver	.99	Pacific Coast (all rail)	1.25*
Kansas City	.59		

Note—Add 3% transportation tax. * Minimum carload, 80,000 lb.

COAL AGE

Volume 14 New York, December 19, 1918 Number 25

[Members of fighting regiments from the United States who came from the anthracite coal regions were overjoyed at the news that they were shortly to be returned to private life and their former occupations.—NEWS ITEM.]

Back to the Mines!

Written expressly for COAL AGE

BY RUFUS T. STROHM

The fightin's done an' the last big shell's
  Gone screamin' acrost the hill,
An' but for the doughboy's joyful yells
  The world 'ud be mighty still;
The boche is groggy, believe me, bo,
  An' he's tickled to quit, be gee!
There's nothin' doin' out here, an' so
  It's back to the mines for me!

I've dug my last six feet of trench
  An' I've throwed away my spade,
An' I give my shoulder an orful wrench
  When I heaved my last grenade.
I kin can this twaddle of "parley-voo"
  An' cut out the fool "wee, wee,"
For now that there ain't no job to do
  It's back to the mines for me!

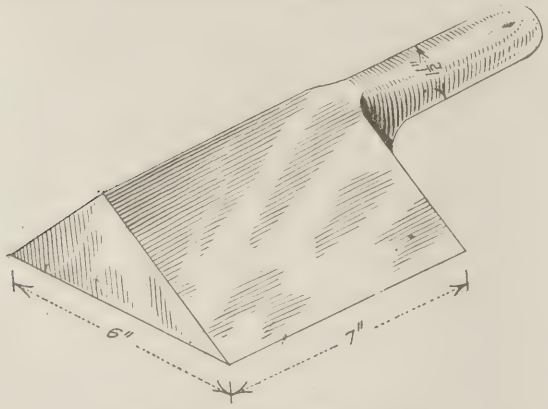
No more I'll stan' on the firin' step
  A-waitin' to draw a sight
On some poor Fritzie that ain't got hep
  To the way us Yankees fight;
An' my score'll stop where it is just now,
  At a measly twenty-three;
The sport's called off, an' I reckon how
  It's back to the mines for me!

There ain't no sense in my loafin' round
  Eatin' three square meals a day,
When there's tons of coal hidin' underground
  An' the winter's on the way;
So I kinda think that I'll hit the trail
  For the lan' of the brave an' free,
An' grab my pick an' my ol' tin pail—
  It's back to the mines for me!

IDEAS AND SUGGESTIONS

Simple Car Chock

A type of car chock not mentioned in the article on chocks in *Coal Age* of Nov. 28, p. 973, is shown in the accompanying illustration. This chock, which is used mostly at shaft bottoms and similar places, is triangular in cross-section, 5 to 6 in. wide and about 2½ in. thick. One end is formed into a handhold, or handle. This



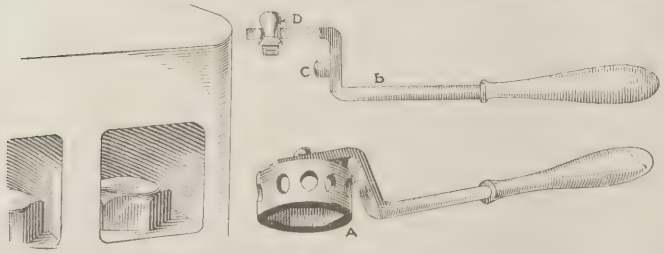
EASILY MADE CAR CHOCK

chock may be shaped easily with an ax and serves its purpose admirably. In use it is ordinarily placed in front of the second wheel of the car, as in this position it has less tendency to push the car sidewise or off the track. It may be easily knocked from its place either by the foot, by a sharp blow from another chock or from a heavy stick.

Ratchet Wrench for Close Quarters

By A. J. Lucas
Ozone Park, N. Y.

The repairman in and about the mine is often confronted with the task of loosening or taking up nuts located in such narrow openings as shown in the accompanying illustration; it is almost inaccessible with a wrench of any ordinary type. To overcome this dif-



DETAILS OF A RATCHET WRENCH

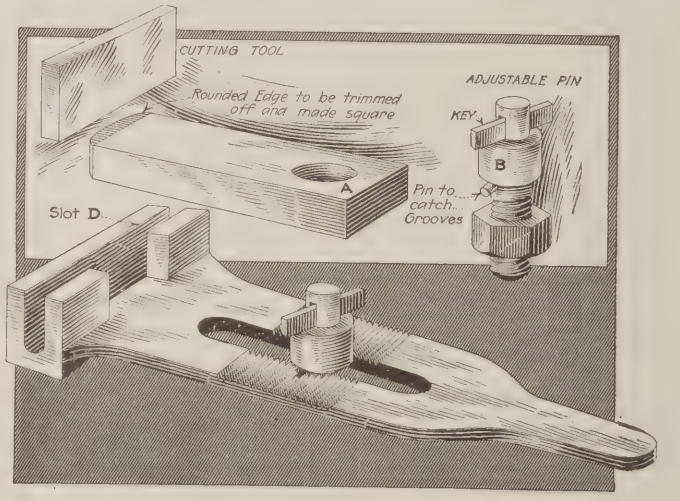
ficulty I made the ratchet wrench shown to the right in the illustration. The hexagon part *A* of the wrench is made by forging a piece of suitable steel pipe around the nut and drilling holes on its circumference. The handle *B* is provided with a pin *C*, which fits the holes in the wrench body. It is fastened to the upper part of the wrench by means of the formed pin *D*. The operation of this wrench is self-explanatory.

Squaring Crusher Hammer Ends

By J. W. Bailey
St. Louis, Mo.

L. W. Tabor, machine shop foreman at the coke plant of the Laclede Gas Light Co., of St. Louis, reports that he was confronted with a troublesome proposition in the shape of keeping the steel hammers of the coal crushers sharp and square edged. He solved his difficulty in the manner here described.

These hammers when new are about 14 in. long, 6 in. wide and 1 in. in thickness, and number considerably over 100 to a set. Use wears the ends round and of little service, making it necessary to trim the worn ends quite often. One set trimmed in the ordinary way by the shop blacksmith required several days' time, considerable coke and an additional blacksmith to attend to the regular requirements of the shop.



DEVICE USED TO KEEP HAMMERS IN CONDITION

To eliminate the excessive use of coke and conserve on fuel in heating the hammers, Mr. Tabor devised a gas furnace that would heat just enough of the ends to be practical and accommodate six hammers at one time.

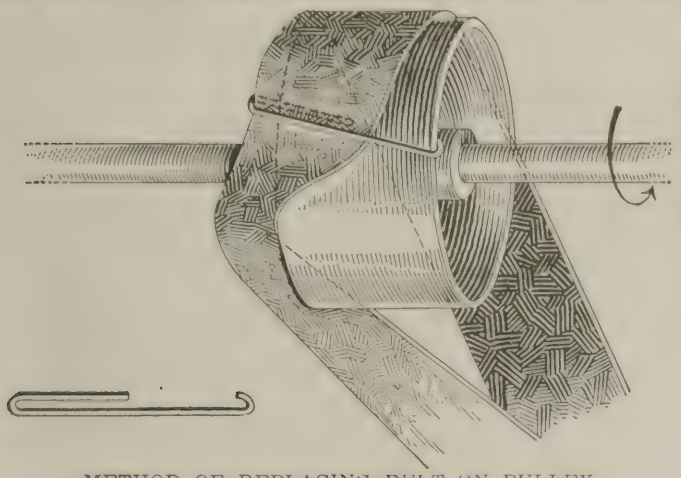
Then he constructed the device shown in the accompanying illustration, which facilitated the work and enabled the blacksmith to finish an entire set in a few hours. This in turn eliminated the hire of an extra man in times when men are scarce.

This jig measures about 36 in. over all. The pin *B* is set on a grooved surface so as to gage the proper length. The hammer when heated is placed with the hole *A* over the pin *B*. The key is then placed in the pin *B* to hold the hammer firm. The cutting tool is then set in the slot *D* over the rounded and heated portion of the hammer, and a steam hammer is brought to bear on the cutting tool, finishing the operation. This device insures a perfect edge on all hammers as well as uniform lengths. About a quarter of an inch is taken off at each trimming.

Putting on Heavy Belts

The accompanying illustration shows a simple device for putting on heavy belts when it is necessary to shut down in order to do so, and where a rope is usually employed for the purpose.

Take a piece of a $\frac{5}{16}$ or $\frac{3}{8}$ in. round iron and bend it as shown in the small sketch. Hook the short end over



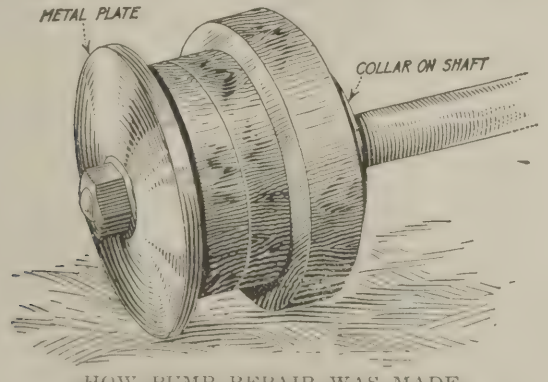
METHOD OF REPLACING BELT ON PULLEY

the edge of the rim of the pulley and the long end under the belt, as indicated. Start the engine slowly, and when the belt is on it is not necessary to stop, as is the case when a rope is used, because the short end of the hook will always straighten out and disengage itself. It is a good plan to use a bar of as light iron as will answer the purpose, since it will straighten out and free itself with less stress on the belt.

Emergency Pump Repair

By S. D. Hainley
Osceola Mills, Penn.

One Saturday morning, on going to an electrically driven pump that handled the water from an important section of the mine, I found that the machine was not working properly. The water at this time was already above the rails, so that the section could not be operated that day. Taking the pump apart, it was found that the metal portion of the piston had been practically



HOW PUMP REPAIR WAS MADE

eaten up by the acid of the water. A new piston and a piston rod were at once ordered. These were promised to arrive on the following Monday morning.

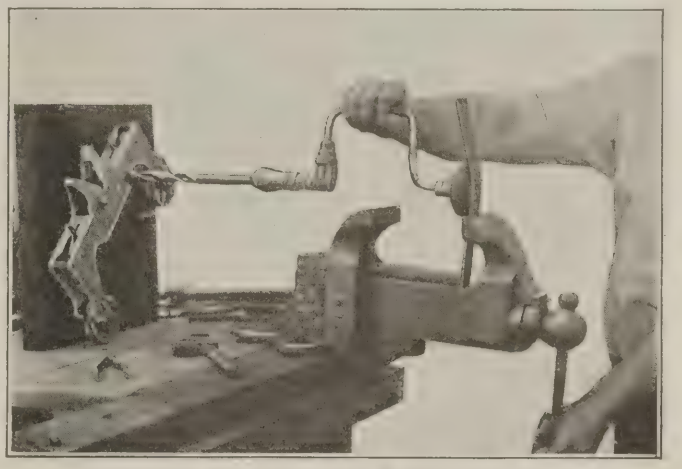
Monday morning came, but no piston arrived. Tuesday and Wednesday rolled around, and still no piston. All this time the water was rising. Something had to be done, or at least attempted. Accordingly I got a piece of 2-in. oak plank and sawed out a circular section $\frac{1}{4}$ in. less in diameter than the bore of the pump cylinder. The edge of this was then cut away to a depth sufficient to take $\frac{3}{8}$-in. packing and for a length of 1 in. A piece of 1-in. oak board was now procured, sawed to this same diameter and attached to the piece of 2-in. plank.

As the available length on the piston stem or rod was not sufficient to accommodate another 1-in. piece, a metal plate was used. This was made slightly smaller than the bore of the pump and was held in place by the regular piston nut.

When this improvised piston was fitted with packing and put in place it gave as good satisfaction as had the regular piston. In fact, this device gave excellent service until the acid ate up the iron plate and permitted the packing to come off. When I asked the superintendent to have another plate made he immediately suggested that I make a wooden one!

Drilling with the Vise

The rig shown in the accompanying illustration will often solve difficult problems, such as drilling large holes in metal, when a drilling machine is not available. Such circumstances often arise in connection with the work



METHOD OF DRILLING WITH THE VISE

of the repairman. A ratchet brace is used for the movement of the drill, while the feed is obtained by means of the vise, which is equipped in the manner shown. An angle-plate or any suitable object can be employed for the proper location and backing for the piece to be drilled.

The relatives and friends of men imprisoned in a mine in case of an explosion or other accident are most vitally concerned in the recovery work and the public in general is much interested in the probable loss of life and the efforts made for promptly exploring the mine in order to rescue the living and to recover the dead. A local official of the mine should be designated by the manager or the superintendent to take charge of an information bureau in a building somewhat removed from the mine entrance. This official from time to time should give out, for the benefit of the entombed men's families and the public, definite information concerning the progress of the rescue and recovery work.—*Rescue and Recovery Operations in Mines.*

Plant of the Williams Pocahontas Coal Co.

By GEORGE S. JAXON
Philadelphia, Penn.



FIG. 1. GENERAL OUTSIDE VIEW OF THE WILLIAMS POCAHONTAS COAL CO.'S PLANT

THE present-day demands that the entire output of a coal mine be properly cleaned and sized in order to conform to the exacting requirements of its customers brings to the attention of the industry certain sizing plants which are worthy of mention. One of these is the modern wood-construction coal tipple of the Williams Pocahontas Coal Co., at War, McDowell County, West Virginia, on the Dry Fork branch of the Norfolk & Western R. R. The operation is known as the Howard mine and is comparatively young, having started shipping coal in May, 1916. The workings are in the "War Creek seam," which varies in thickness from 66 to 72 inches. A general outside view of the plant is shown in Fig. 1.

At the commencement of mining operations, coal from the working face was brought out in mine cars constructed of wood. From these it was dumped into an inclined wood storage chute, built on practically the same slope as that of the mountain profile. At the lower end of this chute gates were installed for drawing out quantities of coal and depositing them in a mine car which was drawn back and forth over a wooden trestle by a mule, and delivered to a dump hopper over the railroad car, which was located at approximately 160 ft. from the discharge gates of the storage hopper.

This crude method of loading straight run-of-mine coal, as shown in Fig. 2, in no way satisfied the officers of the coal company. The result was that around Christmas, 1916, designs for a new modern equipment were being considered. In March, 1917, Frank W. Truscott, the president of the company, signed a contract for a sizing and cleaning plant of such proportions as to properly handle a capacity of 150 tons of run-of-mine coal per hour, and prepare it in four different sizes, the three larger of which would be hand-picked. The different grades were based upon the following percentages: Lump, 25 per cent.; egg, 18 per cent.; nut, 17 per cent.; slack, 40 per cent. Total, 100 per cent.

The system of mining followed at this operation is that known as the "wall-and-pillar." Electrical mining machines are employed. The following is an illustrated description of the equipment that was chosen as the one being the most suitable to fulfill the requirements.

A trip of mine cars which are of about two tons capacity each are hauled by electric motor and spotted adjacent to the scalehouse. The cars are then cut loose from the motor and one at a time delivered to a Phillips crossover dump, after each car has been properly weighed on a platform scale. The dump empties each car as received into a substantial wood-frame hopper of about five tons capacity. This is lined with $\frac{3}{16}$-in. steel plates, the lining being held in place by means of countersunk bolts.

Attached to the bottom of this hopper is a reciprocating plate feeder which delivers the coal in a measured quantity to the trough of the lower strand of a re-

tarding conveyor. The crank of this feeder is so designed that the stroke may be easily and quickly changed to suit the capacity requirements. This feeder receives its mechanical power through spur gearing and chain drives from the take-up shaft of the conveyor.

The retarding conveyor here employed without question has been carefully designed and built for heavy service. Its speed of travel is 80 ft. per minute and it has an entire length of 255 ft. from center of head sprocket to center of tail sprocket. Of this length, 105 ft. is on an incline of 20 deg., while the remainder at the discharge end is horizontal. The inclined and horizontal sections are connected with a 75-ft. radius curve. This machine is employed for transporting the coal from the feeder to the shaking screens. The flights are made of ¼-in. steel plates and measure 10 in. deep by 30 in. long. They are rigidly attached at intervals of 36 in. to a double strand of 18 in. pitch-steel strap-bushed roller chain. The side bars of this chain are constructed of 2½ x ⅜-in. flats, the joints being ¾-in. riveted steel pins provided with bushings and encircled with 3¼-in. straight-face solid cast-iron rollers, which travel on both the carrying and return runs along steel bar trackage secured to the wooden frame by means of countersunk bolts.

At the lower end of the conveyor a large rack-and-pinion discharge gate is introduced for the purpose of permitting the discharge of run-of-mine coal direct to a 36-in. picking table 20 ft. long from center to center of sprockets. The coal is cleaned on this table prior to delivery to the railroad cars, but this

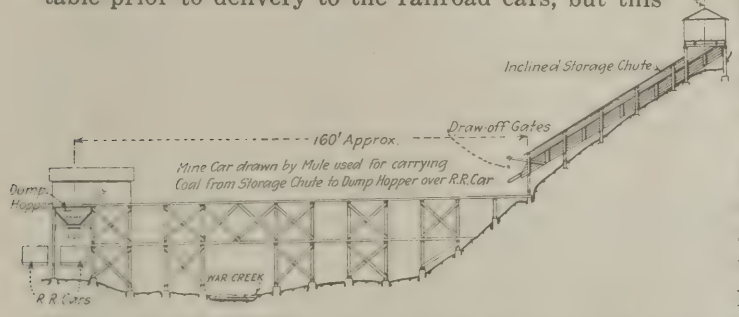


FIG. 2. CRUDE METHOD OF LOADING RUN-OF-MINE COAL

part of the equipment is only used in case of emergency when, for some reason, portions of the tipple equipment may be out of commission.

Fig. 3 shows the emergency run-of-mine table and the pickers at work. This table is constructed of $\frac{3}{16}$-in. steel pans of 9-in. pitch attached to a double strand of roller chain which travels at a speed of 50 ft. per minute. The extreme lower end of the retarding conveyor is the



FIG. 3. VIEW OF PICKERS AT WORK ON EMERGENCY RUN-OF-MINE TABLE



FIG. 4. VIEW OF THE SHAKER SCREENS

regular discharge point, where the coal is delivered without drop onto a steel chute which in turn delivers it to the sizing shaking screens.

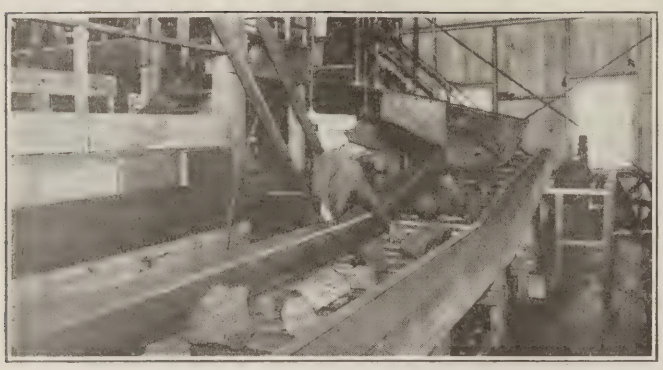
The screening unit is composed of an upper and a lower screen, both being of the hanger-rod type. Each screen has a width of 60 in. and a length of approximately 25 ft. Each is moved back and forth at a speed of 100 shakes per minute.

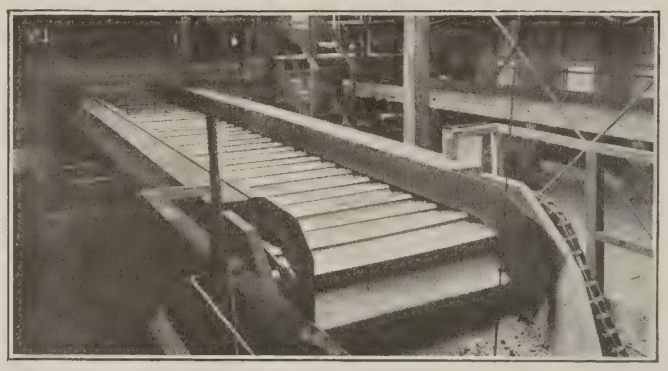
The upper screen is utilized for separating slack and nut coal from the lump and egg, this separation being accomplished by means of slotted lip screen plates. This screen is so designed that the slack is delivered to the slack hopper directly below, while the nut coal may be delivered to the nut coal picking table, or by means of a fly valve in the lower deck of the screen it may be delivered and mixed with the slack in the hopper mentioned above.

The lower screen is equipped with the same type of slotted lip screen plates as mentioned above and also bar screens, and is used for removing or separating the egg size from the lump. The slotted lip screen plate is used when preparing 4-in. egg, and the bar screen when preparing 8-in. egg, the latter size being known as 8-in. run-of-mine. A veil plate is used for covering the 8-in. bar screen when this size of product is not being prepared.

These screens are shown in Fig. 4 and are operated by means of an eccentric shaft of ample proportions to oscillate them easily at the speed mentioned. They are connected to this shaft by ball-and-socket eccentric rods, which insure perfect alignment in operation. A successful shaking screen unit depends largely upon being carefully balanced. In the designing of these screens considerable study was given to attain this end.

The cleaning operation of the three sizes of coal—lump, egg and nut—is carried on in the following manner: Each size is automatically discharged onto a slow-moving overlapping corrugated apron picking table. The lump table shown in Fig. 5 is 36 in. wide and 66 ft. long, but has 30 ft. of its length mounted within a structural steel boom, for the purpose of delivering the lump coal without breakage to the railroad cars. The apron is constructed of a continuous section of $\frac{3}{16}$-in. steel pans, or flights, mounted on a double strand of 9 in. pitch steel roller chain with ¾-in. steel riveted pins at the joints. Rollers of 3¼ in. diameter encircle a case-hardened steel bushing, which in turn encircles the





FIGS. 5 AND 6. VIEWS OF LUMP, EGG AND NUT PICKING TABLES

joint pins. This table travels on flat steel bar track mounted on wooden framework along the horizontal picking section.

The egg and nut tables, as shown in Fig. 6, are similar to each other and are 48 in. wide and 32 ft. long each from center of head sprockets to center of foot sprockets. Both of these tables are horizontal and are constructed of the same kind of chain as that employed in the lump table, the only difference being that the steel corrugated flights have greater width to accommodate the smaller sizes of coal, which demand a thinner layer on the table for picking purposes.

These tables have no loading booms attached directly to them, but at the head end a discharge chute is introduced for the purpose of receiving the coal and delivering it to a special Link-Belt loading boom chute. The discharge chutes are provided with flygates made of perforated metal, the intention of these being to rescreen the coal as it is discharged from the picking table and so take out the fines which have been unavoidably made by the pickers on the table. These are deposited in the cross mixing conveyor, which is located directly below. By lifting the perforated-metal hinged flygates in these chutes all coal passing over the picking tables may be delivered to the cross conveyor for mixing purposes, or to the domestic coal bin as the case may demand.

Fig. 7 shows all three loading booms quite clearly. The lump boom being part of the lump table, as before mentioned, needs no explanation. It will be noticed that the booms which are utilized for egg and nut are of a distinct and separate type from those usually seen and are an entirely new feature in loading-boom design. These booms have proved themselves successful and have been used to good advantage in several other operations. They are of the drag scraper type and are constructed of a single strand of malleable iron H class chain, the carrying or top strand of which travels on the inside of a $\frac{3}{16}$-in. steel trough, with flared sides to prevent the crowding of coal en route, the chain and trough being supported on main channel members.

These units are each 27 ft. centers of head and foot



FIG. 7. INTERIOR VIEW OF TIPPLE, SHOWING THE THREE LOADING BOOMS IN USE AT PLANT

sprockets and hinged at the upper or foot end, where they receive the coal from the picking-table discharge chutes. The lower, or return, strand runs back on angle guides and is protected along the bottom by means of a plain steel plate which insures no obstructions to encounter the obstacles on the railroad cars, such as brake wheels, etc.

The booms are counterbalanced by means of steel ropes and cast-iron counterweights, while the raising and lowering is performed by means of a simple friction hoist. These hoists are located above the driving ends of the picking tables and are operated by means of a line shaft upon which are mounted paper friction pinions which supply the power for hoisting. By the easy manipulation of a hand lever the operator may either raise or lower the booms at will. This type of friction hoist has given excellent results at several other operations and has undoubtedly been a big step in the direction of simplicity in design of hoisting mechanism for use with loading booms.

The cross mixing conveyor it utilized for several purposes: First, for delivering the fine coal screenings from the picking tables to an auxiliary slack bin located adjacent to the slack railroad track; second, for delivering egg and nut coal to a domestic bin; third, for delivering refuse from the picking tables to the rock bin; fourth, for conveying hand-picked lumps from the egg table to the lump table.

This conveyor is so designed so as to receive in its lower strand from the discharge chutes at the end of the picking tables the following: Egg and nut for the domestic coal bin, the rescreenings from the picking tables and the refuse for the refuse or rock bin, while the upper strand performs the duty of carrying the above-mentioned hand-picked lumps. This machine is constructed of 6-in. pitch, double-strand, steel-strap, link chain with crossbars at 24-in. intervals. The chain travels in a $\frac{3}{16}$-in. steel trough upon a steel bar wearing track, the trough being equipped with a rack and pinion valve over the auxiliary slack bin for the purpose of discharging the fine coal rescreenings from the tables. The valve has three positions: No. 1, wide open to discharge fine screenings; No. 2, a perforated section which takes out fine coal when conveying domestic coal, which insures the delivery of clean egg and nut to the domestic bin; No. 3, a plain blank section which closes up the valve opening and makes a continuous trough when conveying refuse to the rock bin.

The entire plant is operated by means of three-phase, 60-cycle, 440-volt alternating-current motors manufactured by the General Electric Co. These are complete with starting compensators, circuit breakers, no-voltage release and overload relays. One 75-hp. motor is used for driving the reciprocating feeder, retarding conveyor, shaking screens, emergency run-of-mine picking table and cross mixing conveyor, while a 15-hp. motor is employed for driving the lump, egg and nut picking tables, along with the loading booms and friction hoists. All driving gears and parts are properly protected with steel-plate guards and all walkways and stairs are provided with double wooden hand railings.

The tipple building is of longleaf yellow pine construction, properly dressed and thoroughly and substantially braced with steel rods. Considerable thought was given to the lighting and ventilating of this building, the result being that an abundance of windows and skylights are introduced to enable the thorough cleaning of the coal. Fig. 8 shows a general outline drawing of the entire equipment. "Car retarders" are used to facilitate the moving and spotting of railroad cars under the tipple building. Throughout the entire plant it is evident that considerable thought and study have been exercised in even the smallest details, mechanical devices having been properly installed to avoid unnecessary labor in the performance of sizing, cleaning and loading operations. The entire equipment was designed, fabricated and erected complete by the Link-Belt Co., of Philadelphia, Chicago and Indianapolis.

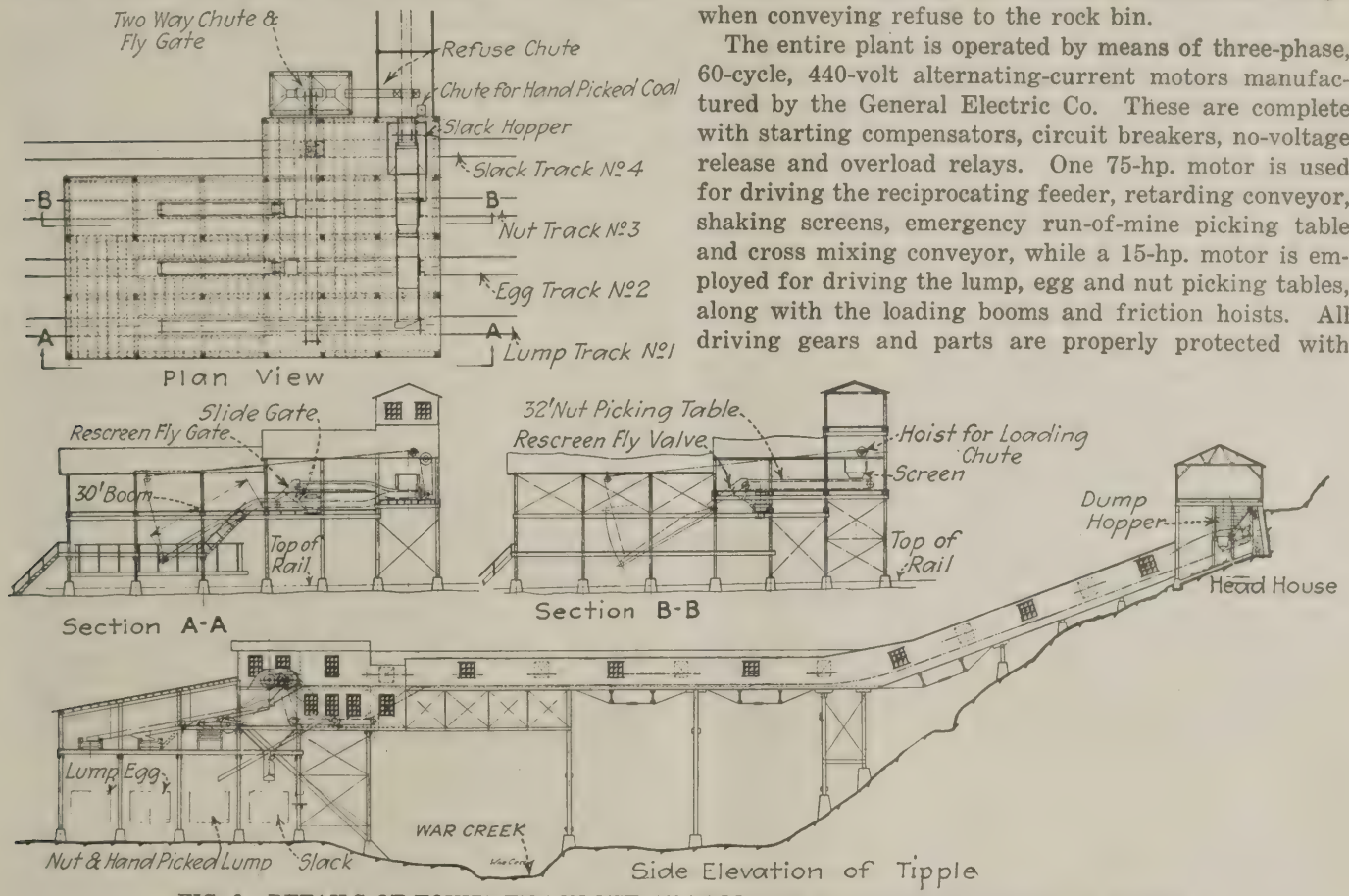


FIG. 8. DETAILS OF EQUIPMENT IN USE AT WILLIAMS POCAHONTAS COAL CO.'S PLANT

Conservation of Explosives*

By S. C. JONES
Greensburg, Penn.

SYNOPSIS — *Much powder and other explosives are destroyed or rendered useless annually through careless or improper storage. The proper placing of the hole in the face and the proper loading and tamping of the charge have much to do with the effectiveness of the shot or the amount of coal brought down per pound of explosive employed.*

ABNORMAL conditions have existed both inside and outside the mines during the time this nation has played such an important part in the world war now drawing to a close. During this period extreme methods have been applied, the prime object in view being to attain maximum production. Slowly but surely a reaction has set in, and changed conditions must inevitably be faced. Explosives being my specialty, I will try to explain briefly some matters that may help to eliminate unnecessary waste and aid in the conservation of explosive materials.

There can be little question that both miners and shotfirers have been, and still are, using excessive amounts of explosives in blasting coal. If this is doubted, let a comparison be made between the present and past cost of explosives per ton of coal mined.

Conditions brought about by the war were responsible for the enactment of the present explosive law in the State of Pennsylvania. This law not only lays down certain regulations, and prescribes who shall handle and dispose of explosives, but it has proved to be the means of conserving and saving explosives, as well as promoting certain safety features.

Under the old regime every little store that wished to do so could handle explosives. Miners bought in any quantity, and of any kind, from 20 per cent. to 60 per cent. dynamite, and from the lowest to the highest grade of permissibles. They took these into the mines without regulation. Tons and tons of these explosives have been wasted because they were stored in mines for long periods and subjected to dampness. Another plan followed in many places was for the men to take their explosives home and store them in some outbuilding or in the cellar. Here again they were exposed to dampness and poor storage conditions.

The law mentioned above has brought about an entire change. It stipulates that all explosives must be stored safely, protected from theft and handled only by responsible persons. It has been my unpleasant duty to destroy tons and tons of explosives rendered unfit for use through bad storage and improper handling. Storage conditions have been and still are bad in many places, and this has caused and still is causing much waste.

Not long ago I visited a plant where the explosives are stored in an underground magazine, the floor of which is 8 ft. below the surface, with no visible means of drainage or ventilation. I also visited another place that was in such a dilapidated condition that one could have shot a cannon ball clear through the building from side to side without touching a timber. I could cite case after case where similar conditions exist. I would suggest that every operator look well into his storage conditions along lines recommended by the manufacturers of explosives, as well as the present law, in order to conserve and save this material.





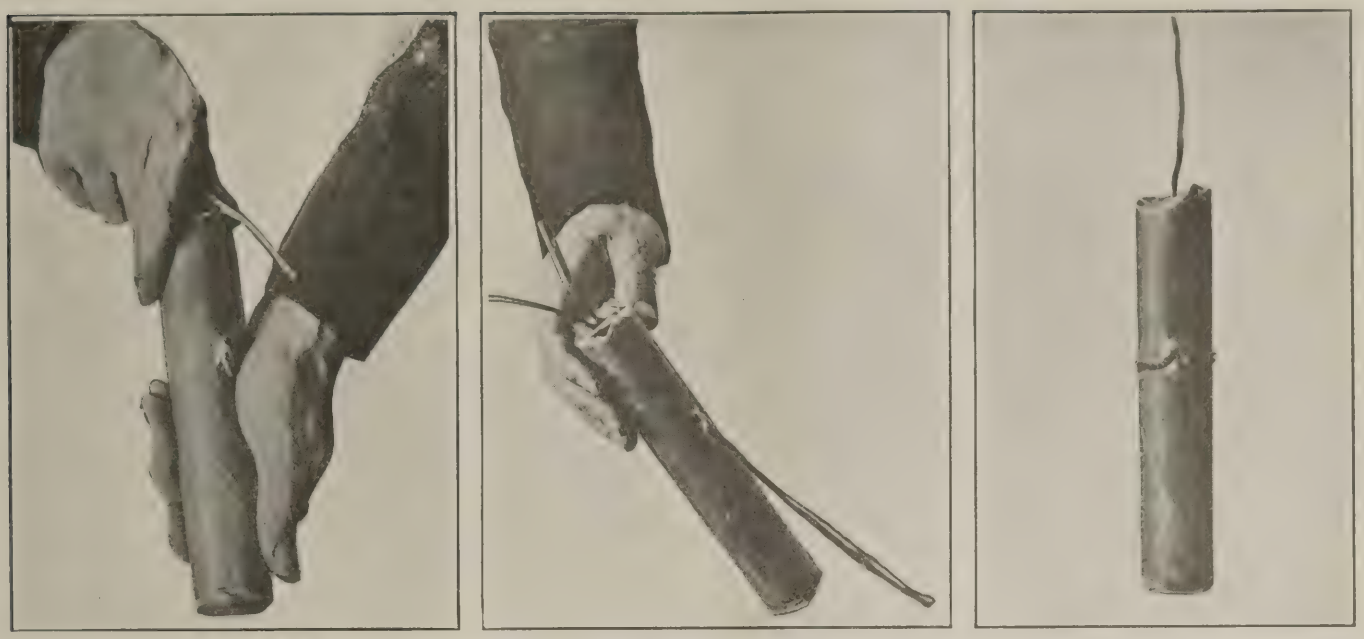
FIGS. 1 AND 2. TYPES OF POWDER MAGAZINES THAT LEAVE MUCH ROOM FOR IMPROVEMENT

Fig. 1 shows a bad storage condition. It will be noticed that there is no chance for drainage, except by digging a long deep ditch, since the floor of the magazine is below the surface of the ground. The surrounding country shows that the magazine is so placed that water or dampness will injure or spoil its contents.

Fig. 2 shows a magazine which is much better, and will meet the necessary requirements of protecting the material stored. Fig. 6 shows an ideal magazine, well built, and with good ventilation and drainage. Fig. 7 shows a portable magazine which will meet all the necessary requirements and protect the explosives contained in it. It can be bought at a small cost, and if kept clean and painted will protect and preserve the explosives in proper condition.

The proper placing of shotholes as to depth and posi-

*Part of discussion on means of conserving mining materials, before the Coal Mining Institute of America, annual meeting, Pittsburgh, Penn., Dec. 5, 1918.



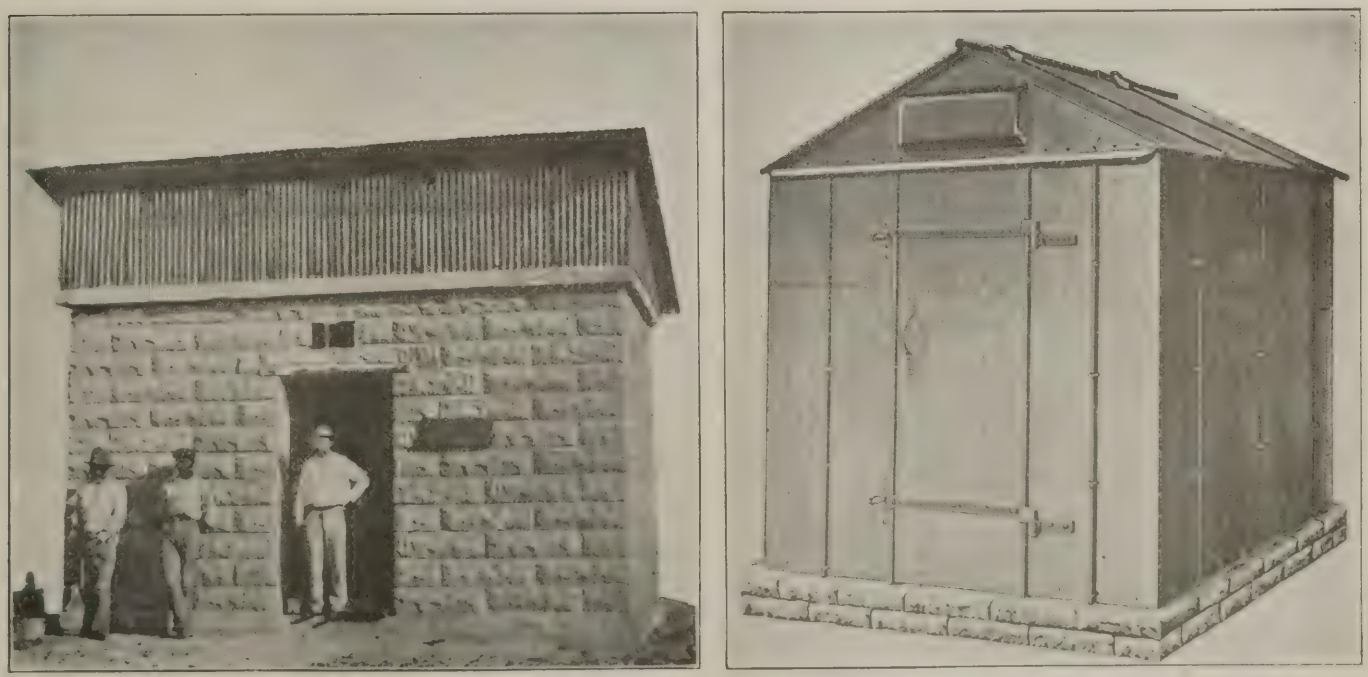
FIGS. 3, 4 AND 5. ILLUSTRATING THE PROPER METHOD OF PRIMING A CARTRIDGE

tion is an important factor, as is also the method of tamping. This fact should be noted carefully: It has been proved beyond a doubt that all explosives, whether dynamite, black powder or permissibles, when property tamped, add from 50 to 70 per cent. to their efficiency. The undercharge, the overcharge, the improper placing of the cap or the electric blasting cap, all are important and worthy of time and consideration in order to save explosives and obtain the highest efficiency from those employed.

Some ten years ago a school was started for the purpose of teaching the proper use of permissibles. I remember one company had 33 traveling instructors engaged in this work. Many readers will recall hearing the question, "How much of your powder do you intend to use for that shot?" The answer, "Three sticks." "Well, 2 to 2½ is sufficient of this powder." In this case the prime motive was not conservation of explosives, but there was nevertheless an evident attempt made at education in the direction of conservation, and to show that a saving was possible.

The proper undercutting of coal is an important matter. If making a 5-ft. undercut, the cut should be an even 5 ft. from rib to rib; if 6 ft., the cut should be an even 6 ft. clear across the room and free from sprags. Careful work means a wonderful saving in explosives.

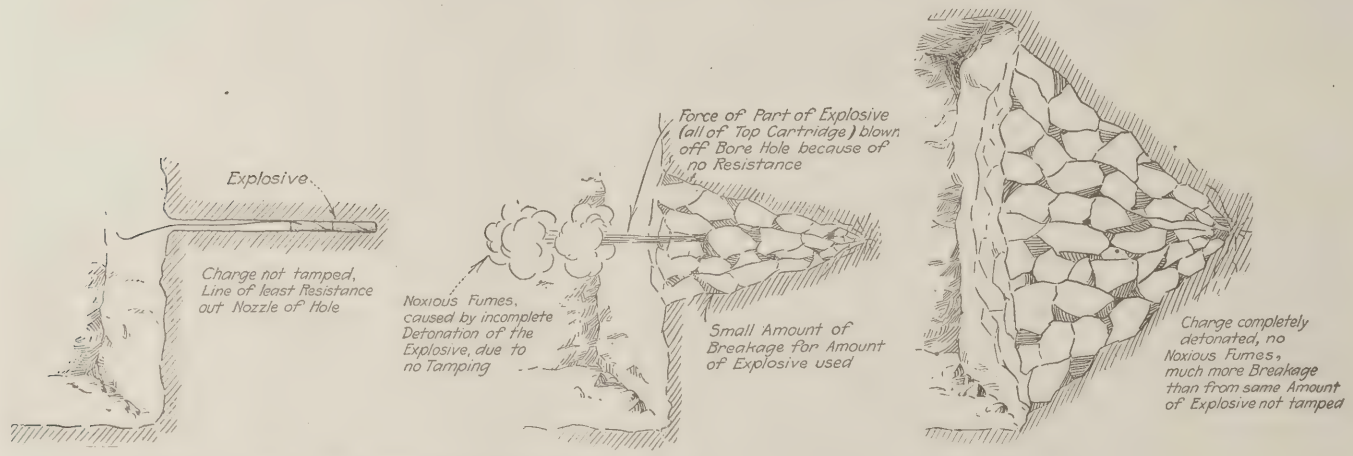
All fine coal and bugdust should be removed from the undercut. If snubbing is practiced, the coal should be loaded out before second-shooting. The "breaker," or "buster," shot should be fired first. The coal made by this shot should, if possible, be loaded out completely before more shooting is done, as by following this method the best results are attained in the next shot.



FIGS. 6 AND 7. PERMANENT AND PORTABLE MAGAZINES OF GOOD QUALITY

Fig. 7 shows the line of least resistance taken by a shot that is not tamped. To omit the tamping in a shothole in coal is analogous to placing a load of powder in a gun without inserting the wadding or the projectile. Plenty of noise may be made, but little effective work will be done by the charge of powder. Fig. 8 shows the shattering effect on the coal of an improperly tamped shot, while Fig. 9 shows the results of a shot which has been properly tamped.

Figs. 3, 4 and 5 show the proper method of placing the electric blasting cap in the charge of explosives. It will be noticed that a hole is first punched from the center of the end of the stick to the center of the side. A loop of the fuse wire is then pushed through this hole and the blasting cap drawn down into the stick; the lower end of the stick is then passed through the loop and the wire drawn up tight. The proper placing of the detonator in the charge of explosives, the proper placing of the hole in the coal, the proper loading and tamping of the charge, all have a direct bearing on the amount of coal secured per ton of explosive used.



FIGS. 7, 8 AND 9. SHOWING THE EFFECT OF PROPER AND IMPROPER LOADING AND TAMPING

In conclusion, allow me to diverge from the subject in hand and speak of one which is now of great importance; namely, the conservation of man power. During the serious epidemic which has just passed, it was deemed necessary to close the saloons. Many coal-mining men immediately noticed and remarked the general effect on their men and their output.

It has been my privilege to often ask this question of coal mine officials: "What has been the general effect on working conditions arising from the closing of the drinking places?" Invariably I have received the answer that the men are more efficient and have applied themselves to their work with more enthusiasm. Furthermore, there has been a greater output the day after payday while the saloons were closed than was ever achieved at any other known period.

Our duty then, not only as coal operators but as plain, ordinary, everyday law-abiding citizens, is clear: Close the saloons and bring out the real efficiency of the men.

Trained rescue crews wearing apparatus, as soon as they arrive at the scene of a mine disaster and have made necessary preparations, should immediately begin to explore the mine in advance of the recovery crews.—*Rescue and Recovery Operations in Mines.*

Continuance and Modification of Government Control*

By F. S. Peabody
Chicago, Ill.

I consider the coal industry the greatest industry in the world. Without coal there could be no real progress. There is nothing in which all of the people of the United States are more deeply interested than in coal. Nothing reaches nearer home than coal, since every person is interested in its consumption, transportation or production. Many thousands of men are employed in its production, and more than 80 per cent. of the cost of producing coal goes to labor.

As Samuel Gompers says, "These men must be kept employed. You cannot get freedom on an empty stomach. To maintain the standard of the American working people will furnish the greatest impetus to progress and civilization; the discontent of the hungry leads only to chaos and inaction."

I further quote from Frank Morrison, secretary of the American Federation of Labor, who says that "regardless of the wishes of any individual or group, any reduction in the present standard of living will be opposed. By standard of living I refer to substantial food, housing and all necessities to well-ordered living."

Labor is interested not alone in the dollar, but in how many things can be bought with the day's work. The world war has brought new responsibilities to everyone —to the employed and the employer. I see no difference between the great labor leaders and the great industrial chiefs. Both have been dreamers and idealists. One group has been dreaming and acting on the extension of industry and the returns on invested capital, and the other group has been dreaming and acting on the welfare of the people they represent; but under our new responsibilities, both must look at the other's side and meet on a common ground.

I view with great concern the departure from the capital of such men as Schwab, Ryan, Garfield, men possessing an intimate knowledge of the industries which they have been directing, and turning their work over to bureau chiefs, who though their intentions are

*Address before the Reconstruction Congress held under the auspices of the United States Chamber of Commerce, Atlantic City, N. J., Dec. 4, 1918.

of the best have not the broad vision and industrial experience of the big business men of the country.

I view with equal alarm the departure from the country of such men as Gompers and other labor leaders at this critical period, as their advice and counsel are needed on the great questions that this country must solve at this crucial time.

I believe that the Fuel Administration should be continued until peace is proclaimed, and strongly favor a continuation of the zoning system and price regulation until the Lever act ceases to operate.

Under the Lever law there are two important industries that were taken control of by the Government —food and fuel production. The Government made a contract with the farmers for wheat at $2.20 a bushel, and this contract covers not only the wheat in existence today, but the crop of next year, yet unplanted. What would be the result of the breach of this contract? Chaos and almost revolution. The Government made a contract with the union and nonunion miners to pay a definite rate of wages up to the time that peace was proclaimed. The Government made a contract with the coal operators, authorizing them to charge certain definite prices for coal, provided they carried out the Government's agreement to pay the wages the Government had contracted to pay the miners. Nothing but chaos could result from a breach of this contract—the shutting down of industry, congestion of railroads, and the necessity of a readjustment of wages during the most critical period in the industrial history of the United States.

Sherman Law Responsible for Waste

So far as price and distribution of coal are concerned, the Lever bill has suspended the Sherman anti-trust law, but with the proclamation of peace the Lever law will automatically cease to exist. We cannot go back to the survival of the fittest policy, which has resulted only in ruin and destruction in the industry.

The Federal Government, states or municipalities should not own or operate fuel facilities, except distributing facilities at isolated points, and then only when it is impossible to have such facilities operated by those in the industry. The individual who has made a life study of coal production can operate mines better than the Government.

Congress should be asked to reassemble and reconstruct the present laws prohibiting the combination of trade, commonly called the "anti-trust" laws, and make them clear, reasonable and adequate.

The Sherman anti-trust law is responsible for the heavy loss of life and the wasteful methods of mining under which approximately 50 per cent. of the natural resources of the country are ruined for future generations. All of us are extremely anxious to protect the lives of our workmen by the installation of every known safety device. Our workmen are entitled to this, but the installation of such devices involves the investment of millions of dollars, with no assurance of return of either principal or interest, as the Sherman law prohibits a discussion of competitors' prices which should cover cost and returns on investments.

None of us favors the wasteful methods of conducting our mining operations, and all would be willing to employ methods under which practically all of the coal would be recovered; but this would involve heavy investment over long periods before any return could be expected. Under the operation of the anti-trust law no return is assured.

The President has gone abroad to make certain that the peace which is established shall put an end in international trade to the old system of unrestricted cutthroat competition between one nation and another. To insure this result, he is advocating new standards of international policy and international trade, with some effective agency to maintain these new standards. Examined in detail, his program means international division of markets, international control of raw materials, with prices in international trade that are fair as between nations. His trip to France is a recognition of the fact that such results in international trade are impossible under unrestricted competition. If it is necessary to adopt such measures in international trade, surely the need in domestic trade for such control is equally evident; yet this is forbidden under the provisions of the Sherman Act.

Abandoned Gas Wells

When nature favors a section with both coal and natural gas, she introduces difficulties for the coal operator and gas driller alike. In regions where coal and gas are being exploited at the same time it is essential that a thorough understanding exist between the coal and the gas operator if difficulty is to be avoided. Many gas wells have been put down throughout the northern part of West Virginia, and in part of this territory where coal is being developed extensively systematic plugging of exhausted gas wells has been established.

In drilling the well, a 16-in. hole is put down for a distance of at least 50 ft. below the Pittsburgh seam. This hole is then lined with 3 in. of cement, which reduces its diameter to 10 in.; drilling then continues at this latter diameter. When the well is exhausted, a wooden plug the diameter of the hole and 3 ft. long is put in the well and forced to the bottom; on top of this is placed a lead plug of the same dimensions. This combination wood-and-lead plug is repeated 500 ft. higher up in the hole, some branches of a tree having been rammed down to offer an impediment to the descent of the wooden piece at the required distance. As before, a lead piece is put in on top of the wood, after which some 20 ft. of crushed rock and sand are placed.

At a distance of 500 ft. above this second plug the operation just described is repeated, and the plugging of the abandoned well is complete. It is essential that great care be exercised in all operations connected with gas wells in active coal fields. Should the protecting coal pillar become crushed or even seriously cracked while the well was delivering large quantities of gas, the mine workings immediately around the well would be quickly filled with the gas. A similar disaster might even occur after the well was supposed to be quiet, should a flow of gas start up again and find a way into mine workings.

All you need is a heart and a dollar. Are you helping the Red Cross in its noble work?

Some Characteristics of American Coals in Byproduct Coking Practice—II

By F. W. SPERR, JR.
Chief Chemist, The Koppers Co., Pittsburgh, Penn.

SYNOPSIS—*Conservation is served by the use of the byproduct coke oven, as the best coals formerly coked in beehive ovens are no longer essential for this purpose. High-grade, low volatile steam coals are reserved in many cases for the use for which they were intended, and mixtures of inferior coals substituted—the resulting coke being entirely satisfactory. The study of the behavior of various coals in the coking process (on a practical scale), of the quality of the coke produced, the yield of byproducts and the details of oven design and operation are touched upon.*

THE sources of the coal now being used for byproduct coking are remarkably localized. The great bulk of the supply comes from the bituminous and semi-bituminous beds of the Appalachian trough as mined in Pennsylvania, Virginia, West Virginia, Alabama and eastern Kentucky. Although some byproduct coke has been made from Illinois and Indiana coals, and an important plant will soon begin operation upon Colorado coals, the enormous reserves of good coking coals in the interior, Rocky Mountain and Pacific coast provinces have scarcely been touched by the byproduct oven in a commercial sense.

The present tendency is to use less of the expensive semi-bituminous coals—Pocahontas, Somerset, etc.—and to coke mixtures containing much larger percentages of bituminous coals, the volatile matter in such mixtures being from 30 to 35 per cent. The percentage of low volatile coal runs in usual practice from 15 to 30 per cent. Very fortunately it happens that not only do such high volatile mixtures produce larger recoveries of byproducts, but the coke itself is usually found to give better results in the blast furnace, the decrease in coke consumption per ton of pig iron being in several cases quite marked. Fig. 1 shows coke of an excellent quality now being regularly made by the Koppers ovens of the Minnesota Byproduct Coke Co. from a mixture of Pittsburgh and Elkhorn coals, containing no low volatile coal whatsoever. Of the commonly used bituminous coals, the most important come from the Pittsburgh, Freeport and Kittanning seams in Pennsylvania and West Virginia, and from two or three remarkable seams in eastern Kentucky, of which the Elkhorn is the most conspicuous. H. A. Kuhn estimated that in 1912, 75 to 80 per cent. of all the iron production of the United States was located tributary to the coking coal of the Pittsburgh district, and, although this condition has to some extent been modified by the subsequent enormous development of the new Kentucky coal fields, it is probable that the Pittsburgh district still holds the lead over any other as a source of byproduct as well as of beehive coke.

The study of the behavior of various coals in the coking process, of the quality of the coke produced, of the nature and yield of the different byproducts, and, finally, of the adaptation of oven design and operation to produce the maximum value in byproducts consistent with the manufacture of good coke, is a real science, the importance of which can readily be recognized. A description of the large organization and equipment which is devoted by The Koppers Co. to the furtherance of this special science would make an interesting chapter in itself.

It is this science that has made possible, during the last ten years, the rapid and at the same time steady progress in oven construction, without the haphazard design of costly alterations of the previous decade. The engineering feat of building a battery of coke ovens out of several different kinds of refractory materials, of most complicated and varying coefficients of expansion, so adjusted and coördinated that, although the total longitudinal expansion of the battery when heated to operating temperatures is nearly 4 ft., every oven wall is straight and every flue is gas-tight—such a feat is being repeated so many times that we are apt to lose sight of the high degree of skill involved. Something possibly more remarkable is the uniform and correctly proportioned heating to temperatures ranging considerably over 2000 deg. F., by gaseous fuel, of more than 700 sq.ft. of interior wall surface per oven—or, let us say, 50,000 sq.ft. in a battery of seventy ovens. Yet even such accomplishments will often fail if we neglect the investigation of the coal which the ovens are expected to handle.



FIG. 1. COKE MADE FROM PITTSBURGH SEAM COAL MIXED WITH 20 PER CENT. ELKHORN SEAM COAL

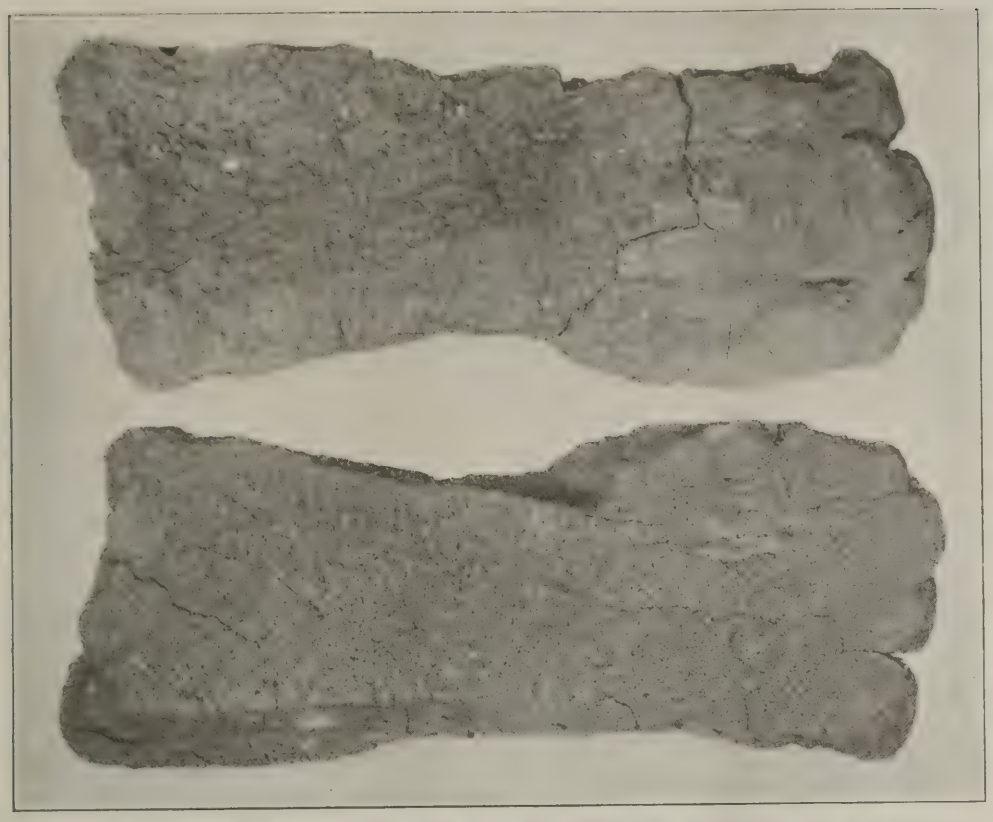


FIG. 2. BLOCK OF TYPICAL COKE FROM COALS OF PITTSBURGH DISTRICT

It is well known that the ordinary methods of laboratory investigation of coal—proximate and ultimate analysis, determination of calorific value, etc.—do not afford much assistance in obtaining information about the coking quality. From a general commercial standpoint some of them—*e.g.*, determination of ash, sulphur, and phosphorus, composition and fusing point of the ash—are indispensable. All of them have their place in adding to the sum-total of our knowledge of coal, and the writer believes that anything, no matter how remote its apparent application, that adds to that knowledge will, in the long run, aid in a more thorough understanding of the coking quality. As has been shown by the painstaking work of Doctor White, of the United States Geological Survey, a study of the amount and nature of combination of the oxygen is especially promising in this connection. No practical substitute has yet been found for the actual distillation of the coal under conditions simulating those that occur when it is coked on a large scale. This is not so easy as it sounds, because the conditions are very complicated, and very insignificant modifications of them in the laboratory lead to the most erratic results. The idea is widely prevalent that ammonia, tar, benzene, toluene, naphthalene, cyanogen, etc., are in the coal, the same way that iron is present in hematite or calcium oxide in marble, and that all the chemist has to do is to "analyze" the coal, to find out the amounts of these substances it will produce when coked in a byproduct oven. Such an idea is far from the truth. Coal contains merely the elements that under certain conditions of heating may go together to form these and other substances; but it no more contains these substances originally than an acre of uncultivated soil contains wheat or potatoes. The amount of variation possible in the yields of byproducts under different conditions is quite analogous to the variation possible in crops per acre of soil, depending upon fertilization, temperature, rainfall, etc. Most published results of laboratory coal distillations are on this account almost valueless for comparison with byproduct coke-oven practice.

The extraordinary possible variations of quality and yields of byproducts might make laboratory investigation seem almost hopeless, were it not for the fact that in almost every case we can fix one fundamental rule; namely, byproducts both in quantity and quality must be conditioned upon the production of a satisfactory coke.

In our methods for testing every sample of coal proposed for use in a byproduct coke oven, the conditions



FIG. 3. COKE FROM 100 PER CENT. ILLINOIS COAL (DISTRICT 6, BED 6)

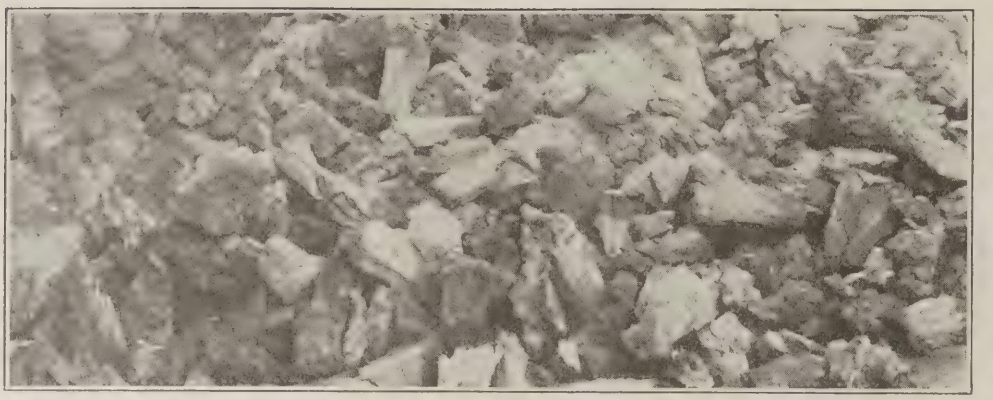


FIG. 4. COKE FROM UNMIXED COAL, PITTSBURGH SEAM, LOWER CONNELLSVILLE DISTRICT, FAYETTE COUNTY, PENNSYLVANIA

of distillation are adjusted according to this rule; and we are able in each case to predict to a reasonable degree of certainty the behavior and products of any coal in our type of oven. The yields of byproducts can be determined very satisfactorily by this method in the laboratory, but any estimate of the quality of the coke must be checked by an oven test. The oven test is desirable, not only to ascertain the character of the coke made under ordinary operating conditions, but also to determine how these conditions must be varied in order to produce the best possible coke from the coal in question. As has been pointed out in a previous article, the possibilities of making coke conform to a desired standard, by proper preparation, oven construction, coking regulation, and, as a last resort, mixture with some other coal, are remarkably great—much greater, in fact, than is generally supposed. The mistake of rejecting a coal for coke-making purposes on account of poor results obtained from a single test should be carefully avoided. Some illustrations of cokes made from coals from a number of the best-known American coal fields are given in Figs. 2 to 8. Fig. 3 is shown by courtesy of F. K. Ovitz, of the United States Bureau of Mines, who has written a very interesting bulletin on coke from Illinois coals.[1] These illustrations are characteristic of the fingery or "pebbly" coke that is very likely to be produced from a coking coal of high oxygen type. As a rule, such coals require more careful adjustment and regulation of conditions in order to produce a satisfactory coke than is necessary in the case of the commonly used coals of Pennsylvania and West Virginia, which contain about the same percentage of volatile matter, but less oxygen. A typical block of coke made from coals of the Pittsburgh district is shown in Fig. 2. The other pictures show the various cokes as they appear on the bench onto which the product of each oven is emptied from the quenching car. Fig. 8 is of some special interest because it shows an excellent coke made from a Nova Scotia coal which contains nearly 40 per cent. volatile matter. Each of these illustrations should be considered individually rather than as broadly typical, because the cokes were



FIG. 5. COKE FROM UNMIXED COAL, ELKHORN SEAM, KENTUCKY



FIG. 6. COKE FROM MIXED WASHED COALS, PUEBLO COUNTY, COLORADO

[1] U. S. Bureau of Mines Bulletin 138.

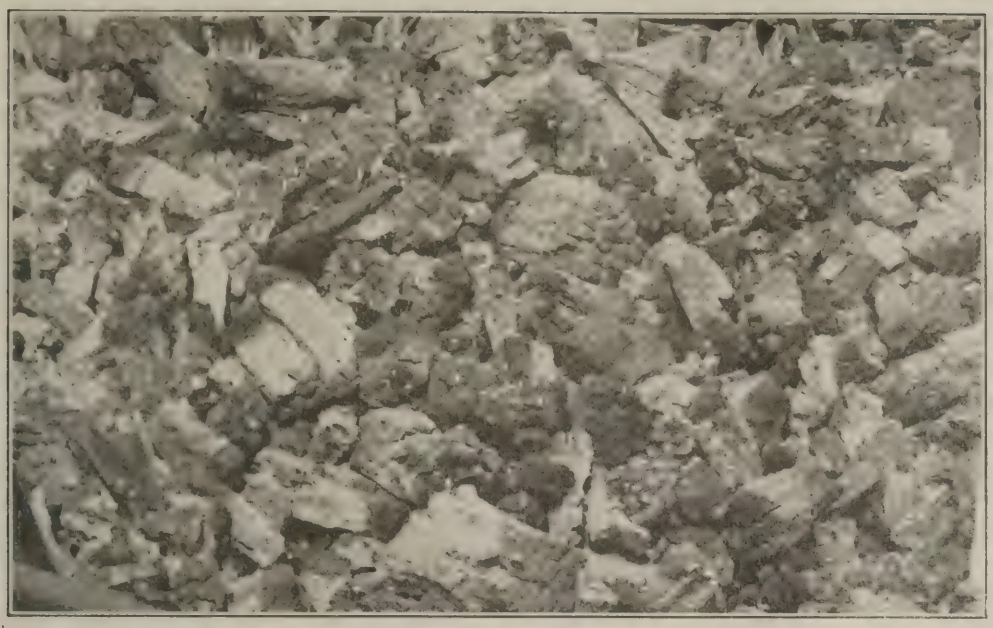


FIG. 7. COKE FROM MIXED WASHED COALS, PIERCE COUNTY, WASHINGTON

made at different plants and for different purposes, and were not intended for strict comparison. There is usually too much variation in the coking quality and byproduct yields of coal from even a small district to admit of the presentation of "typical" samples or data, without the necessity of considerable latitude of judgment. There is sometimes as much variation from mine to mine on the same seam as from coal from two entirely different seams.

There is here a very interesting and virtually unexplored field, namely, the correlation of the geological relations of coals with their coking qualities. There is no doubt that this subject is of great practical importance. A thorough knowledge of it would, for instance, enable us to estimate from simple geological considerations the value of a new mine on a known seam for byproduct coking; or, on the other hand, would assist in defining an unknown seam in new territory from the results of laboratory coking tests. Our present knowledge, however, is much too meager for this. There are a few outstanding facts which will be discussed briefly.

(To be concluded)

Concreting Work in Cold Weather

Occasions arise when concreting must be done regardless of season and temperature. The requirements of successful concrete work under conditions of low temperature are so generally known, says the *Engineering and Cement World*, that the work will be just as successful as though carried on during warm weather. The extra cost on the general run of contracting during such adverse conditions seldom runs more than 10 per cent. of work done in warm weather, and frequently not more than 6 per cent. Part of this extra expense comes from applying protective measures and partly from the lower efficiency of workmen exposed to the cold. Also some of the increased cost may be caused by the added time necessary for the concrete to harden, preventing as speedy progress of the work as under normal conditions. The general opinion seems to be that freezing will not injure concrete which has had an opportunity to harden for at least 48 hours under favorable conditions. Should concrete be allowed to freeze and thaw at short intervals, before early hardening has taken place, it will be damaged. Sometimes concrete will not show any serious effects from once having been frozen if, after it thaws out, it is not again frozen until early hardening is complete. However, it is much better to protect the concrete from freezing for at least 48 hours after it is placed; from four to five days' time would be better. If such protection is given it, little need be feared when the concrete is exposed to freezing weather.

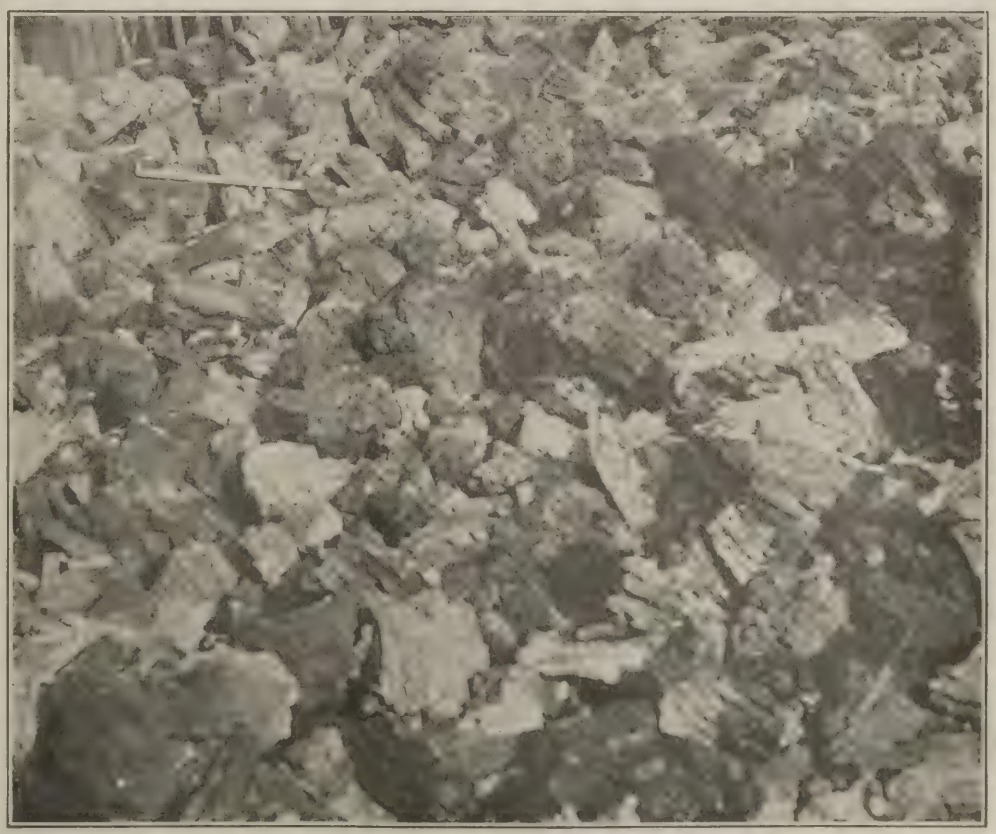


FIG. 8. COKE FROM UNMIXED WASHED COAL, NOVA SCOTIA

Acetylene and Electric Cap Lamps from a Safety Standpoint*

By H. M. CHANCE
Philadelphia, Penn.

SYNOPSIS — *Shows that many of the dangers encountered by miners are increased by lack of lighting. The relative merits of acetylene and electric cap lamps are tabulated, and a suggestion is made that Government experts compile statistical tables based on comparisons of total light by candle-power determinations made under precisely similar conditions.*

THE acetylene safety lamp has been used underground in relatively small numbers and no argument used in this discussion is intended to refer to acetylene safety lamps. This discussion is further limited to the use of acetylene open lights and electric cap lamps in mines that ordinarily are termed "non-gaseous"; that is, mines that produce no inflammable gas, mines that produce inflammable gas in such small quantities as to be practically negligible as an element of danger, and mines that, while producing larger quantities of inflammable gas, can in certain portions be made relatively safe for the use of open lights.

It is, of course, evident that in mines where open lights are used, the danger of ignition of inflammable or explosive mixtures of combustible gas and air from the flame of such lamp is practically the same, whether the lamp be an oil torch or an acetylene lamp. There may be minor differences in the danger of ignition by the flame of an open light, but these differences are small and unimportant.

Defines "Mixed" System of Lighting

It is not proposed to discuss any question of policy as to what is termed "mixed lighting" underground; that is, the use of safety lamps in some portion or portions, of a mine and the use of open lights in other portions of the same mine. Much has been said and written as to the expediency from a safety standpoint, and also from a managerial standpoint, of this use of safety lamps and open lights in the same mine. Where a mine is being worked with open lights used in all working places and the use of a safety lamp is restricted to inspection of working places by the fireboss, mineboss or other officials, such limited use of the safety lamp for purely testing purposes is not considered to constitute a "mixed" system of lighting—this term being used only where safety lamps are used in parts of the mine by the miner for the mining of coal or the driving of entries, etc., while in the same mine other miners are using open lights, or open lights are used by mule drivers, motormen, etc., on the main haulage roads.

It may, perhaps, be sufficient in this connection for the information of those not familiar with the literature on the subject to say that mining engineers, mine executives and miners engaged in coal mining are divided upon this matter and do not seem to be able to reach any conclusion to which unanimous consent can be secured. On the one side we have those who hold that if it be necessary to work any portion of a mine with safety lamps, then the whole mine should be worked with safety lamps and no open lights whatever should be permitted to be used in any part of such mine, and on the other we have those who claim that the use of safety lamps, where necessary in parts of the mine in conjunction with open lights elsewhere, conduces to greater safety than if the opposite policy be pursued. We have also a third class, claiming that under certain conditions the use of safety lamps in the mining of coal should be enforced, while open lights may be safely used upon the main haulage roads over which the coal is transported to the outlet of the mine, and over which the empty cars are returned to the points from which they are distributed to the working places. This subject is one of very great interest and doubtless will continue to be discussed for many years unless discussion be cut short by the enactment of laws requiring the adoption of the use of the safety lamps exclusively in all mines classed as "gaseous" mines.

Danger of Mine Fires with Open-Flame Lamps

Returning to the subject which it is the object of this paper to discuss, it may be well, in advance of a review of the physical differences in the two types of lights under discussion, to outline the elements of danger or of safety in which lighting may be an important factor. Having excluded from the discussion any question of the ignition of inflammable gases or mixtures of inflammable gases and air, by limiting ourselves to a consideration of the use of these types of lamps in "non-gaseous" mines, we have remaining one element of danger which in many cases is of great importance and which must always be increased by the use of any open flame light, whether the light be produced by acetylene, by candles or by any type of oil torch. This is the danger of mine fires.

In mines of all classes in which combustible material exists there is the ever-present danger of mine fires. In many cases this is greater in coal, sulphur and other mines in which the material mined is of a combustible nature than in metalliferous mines or mines working a mineral which is not combustible. Aside from spontaneous combustion, which is foreign to the subject under discussion, the danger of the direct ignition of coal from an open light is comparatively small. Fires in coal mines caused by open lights usually are due to the accidental setting on fire of mine timber, cotton waste, wooden boxes or other material, and not to the direct ignition of the coal from the flame of the light. The origin of such fires in coal mines, therefore is often similar to that of fires in metalliferous mines, in

*Paper read at the seventh annual congress of the National Safety Council, St. Louis, Mo., September, 1918.

which the fire is confined to the timber ring or other combustible material which has been brought into the mine.

It may at this time be well to refer to the common presence in mines of many different types of combustible material which are brought into the mine for various purposes. Where mules are kept underground we have, of course, hay and grain and the straw used for bedding, which frequently have been the cause of serious mine fires. In many mines we also have oil houses and lamp houses underground, in which oil for the lamps and lubricating oil for machinery is stored, and engine houses where machinery (such as pumps, compressors, fans, etc.) is used underground. In addition to the oil there is usually cotton waste, which is, of course, universally recognized as an element of danger. While the present practice in many districts is to discontinue the use of wood, so far as possible, in the construction of permanent inclosures underground, such as engine rooms, oil houses, stables, etc., the presence of lumber in such construction is an element of increased danger when open lights of any type are used. In addition to these materials we have the timber used for roof support along the gangways, entries, drifts, levels, chutes and haulage and travelingways, and in the working places. In mines where a timber mattress or cushion is used between the ore being mined and the overburden, we have large quantities of inflammable material which may frequently be in danger of ignition from the use of any type of open light. Again, in the working places the miner frequently brings in materials that are inflammable, such as powder boxes and other waste material, and boards or planking for use as shoveling platforms, brattices, stoppings, etc.

Mine fires in metalliferous mines are of course often due to other causes than the use of open lights. The decay of timber, heat produced by the great friction of moving masses during settlement or squeezing, and other causes of spontaneous combustion, have doubtless been responsible for many fires in mines of all classes. In addition to these we have of course the ever-present risk of fire from the accidental ignition of explosives and from the firing of shots in the brooding of the ore or other material mined.

Majority of Fires Due to Carelessness

All of the foregoing considerations apply with nearly equal force to the use of any type of open lights. Where candles, oil torches or acetylene lamps are used there will be some danger of mine fires being started by the flame of such lights. It is useless to argue that the majority of fires so caused are due to carelessness in the use of such lights. The danger in all cases, while similar, is not however exactly equal. In the use of candles we have in addition to the flame the danger caused by the dripping of paraffin, stearine or tallow, and in the case of oil torches a similar increase in danger from the dripping of oil from a leaky lamp or from a lamp or from the wick spout. In the case of the open oil torch we also have the additional danger due to the carriage of oil and the presence of oil in quantity kept underground for the use of the miner, and also that carried by him for supplying his lamp. In the absence of complete statistics showing the cause of mine fires, it is impossible to determine the relative difference in the character of the lights which may tend to increase or diminish this danger.

It will readily be understood that the danger of mine fires from the use of open lights will depend largely on whether the mine is relatively wet or relatively dry or damp. In regions where the air is extremely dry and the mines contain but little water, the timbering is much drier and the risk of mine fires correspondingly greater and the difficulty of extinguishing fires is increased, of course, by the dryness of the timber. This statement applies with equal and perhaps greater force to coal mines, because in coal mines that are relatively wet or in regions where the air is relatively highly charged with moisture, the coal is not so easily ignited by burning props or mine timber of any kind as when the mine is dry or is located in a more or less arid region. It is evident, therefore, that as the danger of mine fires is increased by the use of open lights underground, the electric cap has a decided advantage over any open flame light.

Miner Subject to Many Accidental Risks

In addition to the elements of danger peculiar to mine employees the miner is subject to many of the accidental risks commonly met by men on the surface. It would be beyond the province of this discussion to enumerate the hundreds of kinds of accidents which occur underground. In going to and from his work and in working in the room, chamber or stope in which his principal work is done, the miner is often the victim of an accident that may be designated as belonging to the "self-inflicted" class. In this class may be grouped all those accidents resulting from the use of tools employed in mining. The miner may accidentally strike himself or be hit by some flying fragment of coal or ore, be injured with a pick, may become entangled by machinery, or receive injuries from electric shock—there are many ways in which he may accidentally cause injury to himself or a fellow employee. He may injure himself by tripping over an obstacle, by falling down some hole, winze, shaft or other excavation, may be run over by a mine car, kicked by a mule, fall from a scaffolding or ladder, to illustrate that general class of accidents which are due to the voluntary or involuntary act of the employee which are avoidable. In many cases they are due to carelessness on the part of the miner or a fellow employee and do not belong to that class of accidents which are due to the risks peculiar to underground work. We may include in this class many accidents due to shots that have missed fire, to the presence of explosives in ore or coal which is being loaded by the miner, and many others which will be found in the reports of the mine inspectors in the states in which mining is conducted on a large scale.

I have not had the time to compile lists of accidents which belong to the class which has been described above as due to the voluntary or involuntary act of the miner or fellow employee and which are not due to dangers which are peculiar to underground work, but he is of the opinion that such compilation, if made, would show that most accidents underground belong to this class and that a much smaller proportion will be found chargeable to conditions which are peculiar to underground work.

I also believe this class of accidents is more important than that of all other classes combined and should be given prominence in any discussion, from a safety standpoint, of the use of the acetylene light as compared with that of the electric cap lamp.

It will probably be admitted without discussion that the risk of accidents resulting in injury or death to the miner will decrease as the efficiency and volume of light is increased. There can be no question as to whether accidents of this class occur more frequently underground than on the surface. The principal (but not the only) reason why accidents in this classification are more frequent underground than at the surface is undoubtedly due to the difference in the amount of light and in the illumination of the tools, etc., being used. It is also true that accidents of this class, underground, are increased over those that occur in similar work at the surface, because of less efficient supervision by foremen and supervision by foremen and superintendents as to the condition under which the individual employee is working. Neither the mine foremen, mineboss, or superintendent can continuously be present to supervise the work of the individual employee to notify him to avoid risks of injury, or to reprimand him for obvious carelessness. Therefore it is evident that the increase in accidents of this class underground is not entirely chargeable to deficiency in illumination, but is partly due to the impossibility of exercising as efficient supervision underground as at the surface.

As increased efficiency in illumination—that is, increase in the light furnished the individual employee—will materially reduce the risk of accidents of this particular class, it is evident that the acetylene light is superior to the electric cap lamp of the type and candlepower ordinarily used; also that the acetylene light is better than oil torches or candles, because of the greater illumination which it affords.

Reasons for Use of Acetylene Lights

The miner using an acetylene light is less likely to stumble, fall, or come into contact with electric wires, be run down by mine cars, injure himself or a fellow employee with hand tools, implements or machines used in mining; is less likely to miss his footing in climbing ladders or traveling winzes or stopes not provided with ladders, than if he were doing these things with the light afforded by the ordinary electric cap lamp.

In speaking of accidents peculiar to mines, it is not intended to include accidents due to the explosion of combustible gases, the burying of miners by accidental caving or squeezing whereby the travelingways leading to the surface are closed, accidents due to the flooding of mines, or to any cause not affected by the method of illumination.

The principal cause of those accidents underground are due to the falling or caving of the roof in working places or on the traveling or haulageways along which the miner travels and through which the material mined is transported. These accidents, generally, are not due to any direct act of the miner or his fellow employee but arise from some weakness in the material forming the roof or to a failure to recognize such weaknesses and to take measures to avoid the danger. This danger is present to a greater or lesser extent in all mines, but under some systems of mining it is reduced to a negligible factor by the method by which the material is mined; for instance, in the system where a mattress or cushion is used between the material being mined and the overburden, there is, of course, no direct danger from falling roof; the danger in such cases is from a general caving in or squeezing.

In addition to the hazard caused by a weak roof, or an insufficiently timbered roof, there is the danger of falls from material being mined. Where deposits inclined at a high angle or pitch are being mined the danger is principally from this cause and not from the roof or hanging wall of the deposit. When the deposit is relatively flat and of considerable thickness, there is danger of fragments falling from the walls or face of the material.

While this phase of the risks peculiar to work underground is of importance in connection with any consideration of the system of illumination used, it can be dismissed with very few words, because it is evident that the risk of injury will be reduced by an increase in the illumination of the working places, or of places where such roof falls or falls of material are likely to occur. The subject, however, is one which could be discussed at great length in its various bearings.

Value of Intensive Lighting Underground

The advantage of high illumination in working where the roof or the material mined constitutes an element of danger from falls has been recognized in many districts by the installation underground of electric arc systems of lighting, by which it becomes possible to more thoroughly inspect the roof from time to time and to more quickly detect dangerous conditions which may develop. Further, the use of such intensive lighting is of great advantage in prosecuting the work of removing the danger, either by the removal of loose material or the placing of supports to greatest advantage in places showing, or likely to develop, weakness.

The same principle applies to taking care of the roof in the rooms or chambers of coal mines, and in small stopes of mines working ore deposits, and it is evident that the high candlepower furnished by the acetylene lamp will contribute to the safety of the miner and his fellow employees, not only by enabling him to more readily and surely detect any dangerous condition at or near the place where he is working, but will assist him in setting his props or other supports in the best position to reduce this danger to a minimum. Failure to set such props or supports in the best position, or in a position where the prop gives such support as will remove the danger, is a frequent cause of accident, due to the fact that the miner having set the prop, or props, and believing that he has placed them properly, will then perhaps unnecessarily expose himself to greater risk than if he had taken no measures to prevent the roof from falling.

Unfortunately, there are no records available showing whatever difference there may be in the number of accidents from roof falls in mines worked with safety lamps (which, of course, give very small and inefficient illumination) and mines working under similar conditions as to roof in which open lights are used. I have suggested to the Bureau of Mines that statistics of this kind should be obtained, because this has an

important bearing upon the expediency of using safety lamps, and I understand that measures will be taken to secure such data. It must, however, be some years before sufficient information can be compiled to be useful in drawing conclusions as to the increase, if any, in roof-fall accidents which may be traced to the use of safety lamp illumination.

In the absence of these data it is of course impossible to say how much higher illumination of the acetylene light over that of the ordinary electric cap lamp will increase the safety of the miner in relation to accident from roof falls and falls of ore, coal or other material.

The acetylene lamp is objected to by some because it does not give as early warning of a deficiency in oxygen in the mine atmosphere as that given by an oil flame lamp, but by others this peculiarity of the acetylene flame is regarded as furnishing an added element of safety. The difference in the action of oil and acetylene flames in an atmosphere deficient in oxygen may be compared to the customary use by our railroads of green and red as danger signals. The green signal means, "Danger ahead, proceed with caution." The red signal means, "Danger, *Stop!*" One is a caution, the other serves as an imperative order to stop at once.

So it is with the lights. When the oil lamp begins to fail the air is still respirable; the flame may go out and the air may still be respirable—the warning to the miner being cautionary but not positive. Hence, he may walk directly into a deadly atmosphere. When, however, the acetylene flame begins to fail, or is extinguished, the miner knows that the danger is *actual* and is *present* and that he must at once retreat or be overcome.

In mines where atmospheres deficient in oxygen are likely to occur both oil and acetylene flame lamps are safer than the electric cap lamp, for the latter gives no warning whatever of any deficiency of oxygen or of the presence of any poisonous constituent in the mine atmosphere.

RELATIVE MERITS OF ACETYLENE AND ELECTRIC CAP LAMPS

	Acetylene Lamp	Electric Cap Lamps
Weight	Light	Heavy
Length of shift	Can be prolonged	Fixed
Quantity of light	Can be increased above normal	Fixed
	Can be reduced below normal	Fixed
Warning as to irrespirable atmosphere	Gives warning	Gives none
Repairs	Burner can be renewed or cleaned if clogged	*New bulb can be inserted
Mine fires	May be cause of mine fires	Not likely to cause mine fires
	Danger may be reduced by wire mesh guard or mica chimney to protect flame	
Extinguished by shotfiring	Yes (Can be equipped with auermetal or other re-igniter)	No
Debatable uses	In mines where timber is very dry	Can be safely used under these conditions
	In mines where coal is very dry and there is much coal dust	

* NOTE—In the electric cap lamp, as constructed for use in gaseous mines, no provision is made for replacing a broken bulb (or defective bulb)—but the lamp can be so constructed, if desired, for use in non-gaseous mines.

I have not attempted to show the difference in the illumination afforded by these two types of lamps, but may say for the information of those who are not familiar with the subject that the figures of candlepower as given in many publications must be analyzed before making a comparison. If the light, as in the electric and acetylene cap lamps, be concentrated by a reflector to illuminate a certain spherical sector, the light in this section is, of course, of much greater candlepower than if the light be permitted to radiate in all directions. Owing to differences in the reflecting mirrors used for this purpose, both as to design, polish, size and condition, and owing to the difference in the shape of the flame of an acetylene lamp and the incandescent filament of an electric cap lamp, many of the candlepower tests reported by different observers cannot be compared directly. It seems to me that the only fair basis for comparison would be to determine the *total light* by candlepower determinations made under precisely similar conditions, and the *available concentrated illumination* by determinations using the most effective reflectors for each of the two types. I do not know whether this has been done or not. From observations that have come to my knowledge from various sources within the last three or four years I believe that the available illumination given by an acetylene cap lamp, burning normally at average rate, is from three to six times that produced by an electric cap lamp operating under average and normal conditions. The difference in the concentrated illumination may be somewhat less than this, but when the acetylene lamp is operated at its full rate (and many miners so operate them continuously) the difference is often twice that indicated by these figures.



From *The Retail Coalman*

No Wonder Hard Coal Is Scarce!

Coal-Handling Plant at Sewalls Point, Virginia

New Facilities of Virginian Railway at Coal Pier near Norfolk Also Include Cars of 120 Tons Capacity and a Long Incline

A DOUBLE car dumper, with pier cars of 120 tons capacity and an elevator to raise them to the top of the pier, has been added to the facilities of the coal pier of the Virginian Ry. at Sewalls Point, near Norfolk, Va. They supplement a single dumper, pier cars of 60 tons capacity and a barney incline from the dumper to the top of the pier, installed in 1909, when the pier was built, and increase the capacity of the plant from 1500 to 3000 tons per hour. The operation of the pier is the same as before, the pier cars for both dumpers running out to the end of the pier by electric power on the outside track and returning down the inclined center track.

The double car dumper is the first built to overturn two ordinary road cars at a time. It is 94 ft. long between end posts. The car rails are carried on a movable platen which rests on rollers in the bottom of the cradle —or, in fact, two platens, end to end, one for each car. When the cars are on the dumper the platens are moved laterally until the sides of the cars come securely against the side of the cradle for support. When the two cars are of about the same width it is not necessary to uncouple them, but when they are of different widths the two parts of the platen can be operated separately. Eight clamps are operated independently by counterweights which travel in guides at the rear of the machine. They are so spaced that they engage various lengths of cars and are automatically adjustable to any height or width of standard railway car.

The machinery for rotating the cradle is located on top of the main structure, where it is free from dust and accessible for repairs. After the cars have been properly placed on the cradle, the rotating mechanism is started and the cradle with the cars is revolved until the cars are inverted to an angle of 20 deg. with the vertical. The clamps as well as the cradle are counterweighted, this facilitating the return of the cradle to its former position.

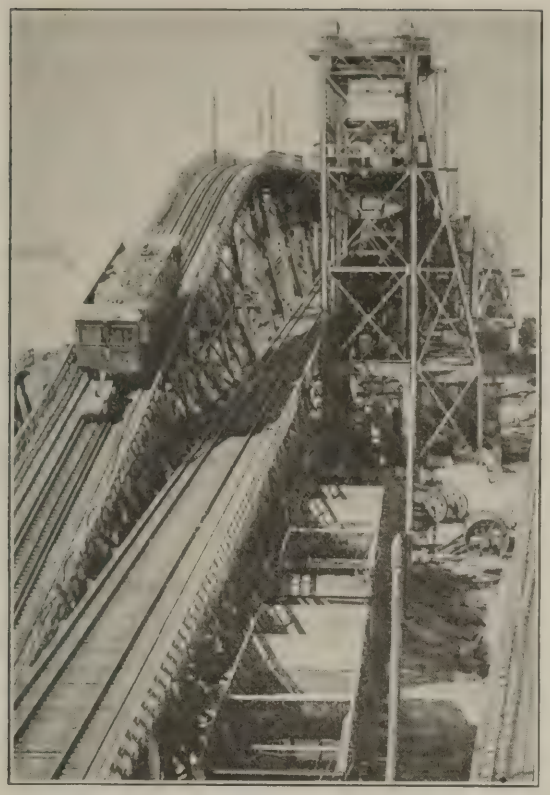
Coal dumped from two cars end to end is distributed over a maximum length of about 88 ft. This is much greater than could be gathered in the hopper of a transfer car, which in this case is about 51 ft. In order that all the coal from the road cars shall be properly discharged into the transfer cars without resort to a concentrating chute, which would at once result in an extreme drop of the coal, two steel apron conveyors are provided, each about 8 ft. wide and 34 ft. long, supported horizontally in a portal frame in front of the car dumper. A clear space of about 36 ft. is left between the conveyors, which form a portion of the bottom of a hopper into which the road cars are dumped. The longitudinal center of the conveyor is located directly over the center line of the transfer-car track. With this arrangement all the coal that falls on the conveyors is transferred horizontally and discharged into the transfer cars.

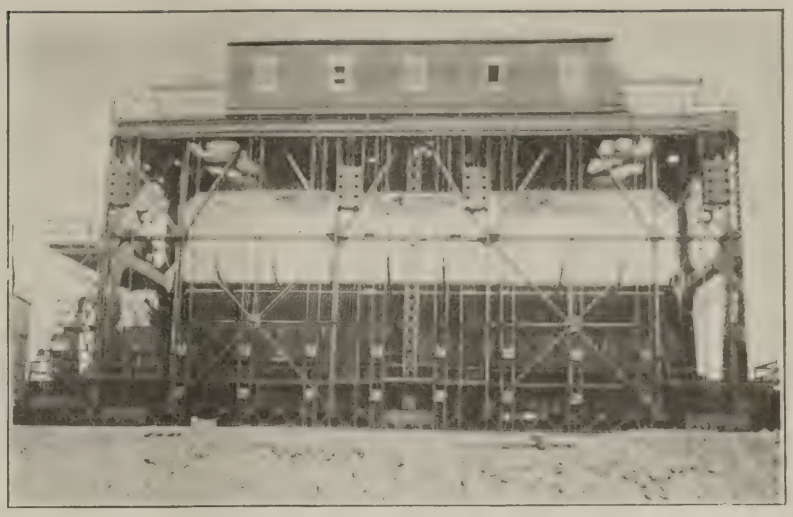


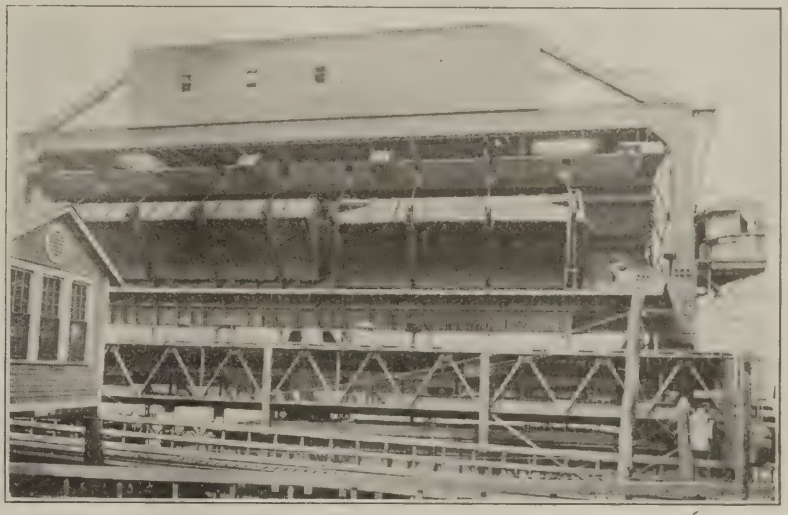
ONE OF THE LARGEST COAL TRANSFER CARS EVER BUILT—CAPACITY 120 TONS

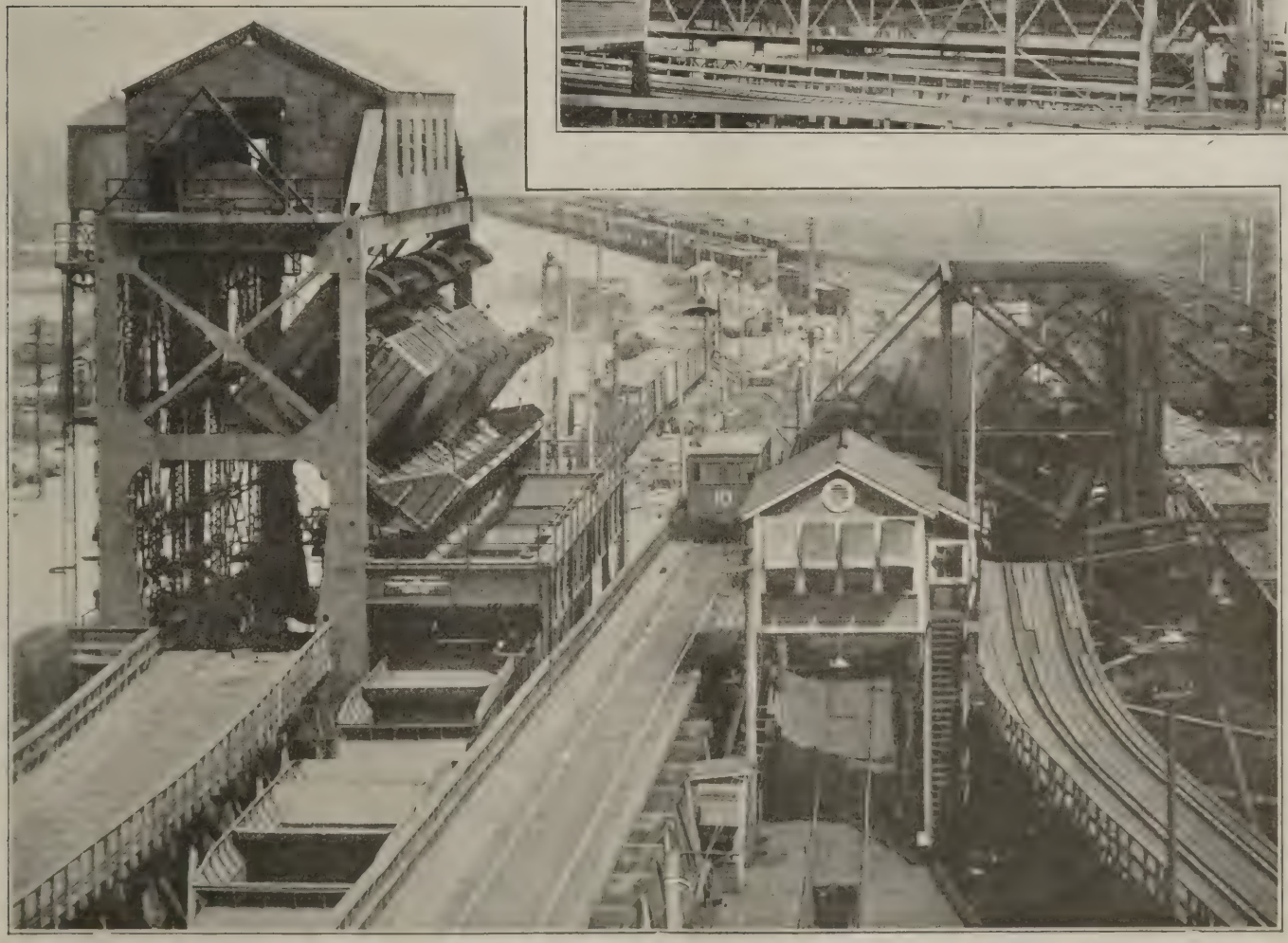
Two 275-hp. motors, designed to work on a direct current of 550 volts, operate the cradle, working through four drums geared by three reductions of cut spur gears.

As the cradle is rotated the contents of the car are gradually discharged over the edge of the apron plate, into the receiving hopper which carries the conveyors. This hopper, for a distance of 36 ft., is open at the bottom, and the coal is discharged directly through it into the transfer cars. The conveyors are interlocked with the cradle, so that when the rotation starts the conveyor motor is also started, and the conveyors are









TWO GENERAL VIEWS SHOWING OLD AND NEW FACILITIES SIDE BY SIDE, AND TWO VIEWS OF NEW DUMPER HANDLING TWO ORDINARY ROAD CARS AT ONCE

in full operation when the first coal falls on them. They are both operated by one 80-hp. motor.

A disappearing barney, which on the return trip, when near the bottom of the incline, follows a low-level track into the barney pit so that cars can be let down by gravity from the load yard before the barney is in position, pushes the road cars up to the dumper. Both the barney and the dumper are operated from a cab at the incoming end of the dumper. All of the speeds and the motions of the dumper are regulated to produce a complete cycle in two minutes.

The dumper will handle at once two cars of 60 tons capacity, or one of the new 110-ton hopper cars of the Virginian, which weighs 160 tons when loaded.

Transfer cars of 120 tons capacity—just double that of those originally installed on the pier—take the coal from the dumper. These cars, as one of the photographs shows, are mounted on two six-wheel equalized trucks, each of which is provided with a driving motor. The driving motors are of 60-hp. capacity, geared for a speed of 12 miles per hour.

The trucks are spaced 50 ft. center to center under the car, the total over-all length of which is about 70 ft., the height 16 ft., and the width 12 ft. The body of the car forms a hopper divided into three compartments, each having a capacity of 40 tons, the three compartments having a combined length at the top of about 51 ft. Each of the compartments is provided with a double system of discharge gates at the bottom, through which the coal passes into the pockets to the pier. The gates of each compartment are separately operated by an air cylinder located in the end of the car.

The discharge gates of each compartment are arranged in pairs and hinged to the car body at the sides and in the center, in such a manner as to provide two openings 9 ft. long by 3 ft. 8 in. wide. The operating mechanism is so arranged that the gates are securely locked when closed, and they cannot fall open.

All operations are controlled from one end, although each end is inclosed. The power for operating the cars is supplied from an overhead catenary system. The combined weight of the car and its contents is about 200 tons, making the cars the largest coal transfer cars ever built.

The transfer car elevator raises the pier cars about 67 ft. to the top of the pier. Heavy counterweights are used to counterbalance the weight of the platform and the car; they are so regulated that as much power is required to pull down the empty platform as is required to lift the platform and the loaded car. This arrangement permits the use of smaller motors than would otherwise be necessary.

The elevator is operated by two 450-hp. motors using a direct current at 550 volts. The gearing of the elevator is proportioned to produce a complete cycle in two minutes.

Connecting the frame of the elevator to the pier is a hinged run-off girder, introduced to insure perfect alignment of the rails on the platform and the pier. This girder is hinged to the pier in such a manner as to permit of a vertical movement of the free end amounting to about 2 ft. The free end of the girder rests on brackets on the elevator frame, from which it is lifted by projecting lugs on the platform as it comes to the position of its upper limit. This upper limit of travel is accurately controlled by an electric limit switch, geared to the hoisting mechanism. The power is supplied to the trolley wires in this position, and the transfer car passes out of the elevator, over the hinged run-off girder and out on the pier, where the coal is discharged to the proper pocket. The empty car then returns down the inclined track in the center of the pier structure to the loading track in front of the car dumper, taking its regular turn.

These additions to the equipment of the terminal were installed by the Wellman-Seaver-Morgan Co., Cleveland, which company furnished the original dumper. The work was carried out under direction of H. Fernstrom, chief engineer of the Virginian Railway.

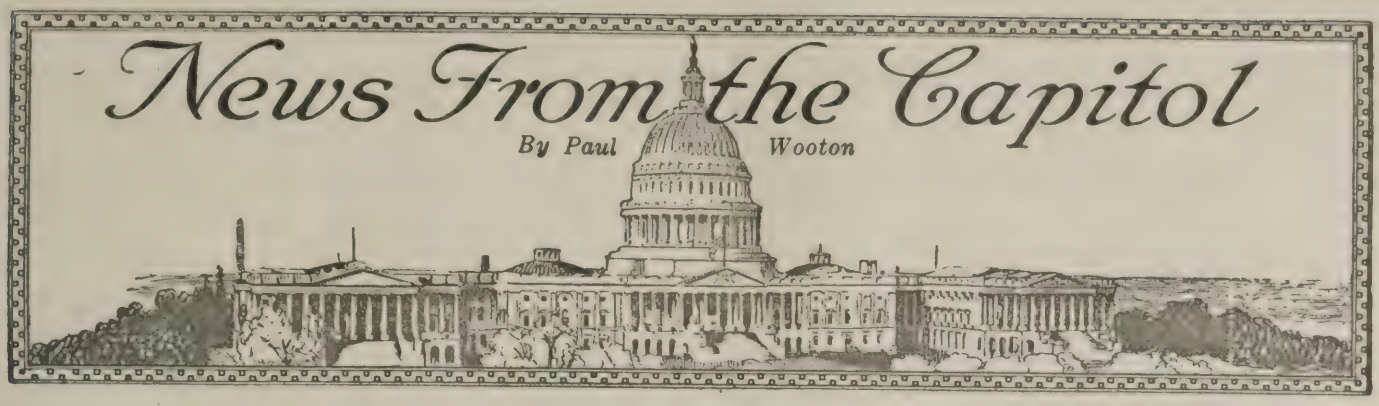
Legal Department

RIGHT TO TERMINATE SALES CONTRACT—Mere default by the buyer under a coal sales contract in paying for deliveries does not entitle the seller to cancel the agreement as to undelivered instalments. Delays in making payments do not justify a rescission by the seller where not the result of deliberate intent to break the contract, and not of such character as to amount to a substantial breach of the agreement. (New York Supreme Court, Alden Coal Mining Co. vs. C. L. Amos Coal Co., 171 New York Supplement, 980.)

STOCK IN KENTUCKY CORPORATIONS—Under the laws of Kentucky, stock in a coal corporation cannot be validly issued in return for services unless the fair value of such services equals the par value of the shares issued therefor. Where a single contract was tainted with invalidity by provision for issuance of stock at less than its par value, provision in the agreement for an exclusive coal sales agency was vitiated; the contract constituting an entirety. (United States Circuit Court of Appeals, Sixth Circuit; Detroit-Kentucky Coal Co. vs. Bickett Coal and Coke Co.; 251 Federal Reporter, 542.)

DEMURRAGE ON WATER SHIPMENTS—Provisions in a bill of lading concerning demurrage on water shipments of coal are binding upon the consignee. For a railroad which owned a dock to reserve discharge towers and prefer vessels carrying its own coal was not unreasonable. Therefore, the owner of a schooner carrying a cargo of coal and discharging at that dock, under a clause in the bill of lading giving a double rate of demurrage for detention on preference being given later arriving vessels, was not entitled to double demurrage because vessels carrying coal for the railway company were given a preference. Such provision for double demurrage is to be regarded as applying only when preference is given out of the usual course of business. (United States District Court, District of Massachusetts; Davis vs. Garfield & Proctor Coal Co.; 251 Federal Reporter, 743.)

RIGHT TO FORFEIT COAL-MINING LEASE—Where defendant coal company violated the terms of a lease held by it by failing for five years to develop a mine, the leasing land owner was entitled to maintain suit to cancel the lease. But the right to forfeit a lease in such cases is subject to waiver. So, the lessors, by subsequently treating the lease as still in force lost the right to enforce a forfeiture against the lessee company after it proceeded toward development work in good faith, and avoided further breach of the contract. When two or more persons own land in undivided interests, and make a joint lease of the entire tract, they become partners in the sense that one of them in writing a letter, leading the lessee to believe that no forfeiture of the lease will be insisted upon because of a delay in commencing actual mining production, binds all the owners. (Arkansas Supreme Court, Schmidt-Blakeley Coal Co. vs. Hembree & O'Kane, 205 Southwestern Reporter, 111.)



Year's Work of Bureau of Mines

Summarizing the year's work done by the Bureau of Mines, Van H. Manning, in his report to Congress, mentions the following results from the bureau's accomplishments in matters pertaining to coal mining:

Tests of a new method of signaling danger to miners underground by the injection of an ill-smelling substance into the compressed-air lines supplying mining machines and pumps have given promising results.

Surgeons of the Public Health Service detailed to the mine safety cars of the Bureau of Mines have surveyed sanitary conditions at more than 150 mines, smelters and mining towns, suggested improvements, and given talks on health and sanitation.

Tests of explosives to determine their suitability for use in mines and quarries were continued. Three new explosives were approved as permissible for use in dusty or gaseous coal mines, and six more were added to the list because of their being similar in all respects to explosives already on the permissible list. At the end of the year there were 160 explosives on this list.

An explosive made of liquid oxygen mixed with carbonaceous material was tested for its value in coal mining.

A new station for testing explosives was erected at the experimental mine of the bureau, near Bruceton, Penn., and methods of analyzing explosives were improved.

Coal-mining methods in Oklahoma were studied with reference to the prevention of waste in coal mines on Indian lands.

In coöperation with state mine inspectors, monthly reports on fatalities at coal mines throughout the country were printed and distributed.

Studies of the combustion of fuel and the baffling of boilers were made in connection with boilers for the Emergency Fleet.

In coöperation with the Bureau of Standards, the Roberts byproducts coke oven was tested to determine its commercial worth.

At the request of the United States Fuel Administration, coal mines in Arkansas and Oklahoma were examined and sampled.

As a result of representations made by the Bureau of Mines, Congress authorized the establishment of a Government coal yard, or yards, in the District of Columbia, whence all Federal buildings will be supplied. This yard will be under the supervision of the bureau.

An electric flash lamp, which should be an aid in mine rescue work, was approved for use in explosive mixtures of mine gas and air.

During the year 8851 miners were trained in first-aid and rescue methods at the bureau's mine safety cars and stations as compared with 4828 in the fiscal year 1917.

Causes of 38 mine accidents, 30 in coal mines and 8 in metal mines, were investigated.

The Gibbs breathing apparatus for protecting men from poisonous or irrespirable gases was further developed by the bureau. In coöperation with the Engineer Corps of the Army, arrangements were made for its manufacture for supplying the mining and sapping regiments, and for commercial sale. Six hundred sets were manufactured during the latter part of the fiscal year and manufacture on a large scale continues.

A large number of coal mines were sampled for the Navy Department, and reports were prepared on the quality of coal and the methods of mining and preparing it for market.

Further tests of the explosibility of coal dust from different mines have given additional information on how coal mine explosions can be prevented or limited.

George Otis Smith, the Director of the Geological Survey, makes the following statement in his annual report to Congress:

To meet the regular needs of the War Industries, Shipping, and War Trade boards and the Fuel and Railroad administrations, as well as special inquiries of the General Staff of the Army, the Ordnance bureaus of the Army and Navy, and the Tariff Commission, increased attention has been given to quarterly, monthly and weekly reports of mineral production. Even daily reports on coal shipments are compiled, and in the support of the Survey's coal statistical work the Fuel Administration has largely coöperated.

As a further contribution to the problem of meeting the Nation's fuel requirements, the hydraulic engineers of the Survey are engaged in a country-wide survey of the power situation to determine where water power can be substituted for steam-generated power or where coal can be saved by interconnecting electric plants or systems.

Instruction Station Arouses Keen Interest

Splendid results are being obtained, it is believed, from the instruction station for householders which the Fuel Administration is conducting in Washington. Keen interest is being taken by a large number of visitors anxious to learn how to operate their heaters and ranges so as to get the best results from the least amount of coal. A similar station is to be established in Detroit. Others will be started in cities that will be designated by the state fuel administrators.

Senate Investigation Committee to Visit Hard Coal Regions

That the Senate Committee on Manufactures expects to make a personal inspection of the anthracite coal fields is shown by a resolution introduced in the Senate by the chairman of the committee. The resolution reads:

Resolved, That the Committee on Manufactures of the Senate be, and it hereby is, authorized and instructed to make inquiry into the coal situation, its production, transportation and consumption.

Resolved further, That the said committee, or any subcommittee thereof, is hereby empowered to sit and act during the session or recess of Congress, or of either House thereof, at such time and place as it may deem necessary; to require, by subpœna or otherwise, the attendance of witnesses and the production of papers, books,

and documents; to employ stenographers, at a cost not exceeding $1 per printed page, to take and make a record of all evidence taken and received by the committee and keep a record of its proceedings; to have such evidence, record, and other matter required by the committee printed; and to employ such other clerical assistance as may be necessary. The chairman of the committee, or any member thereof, may administer oaths to witnesses. Subpœnas for witnesses shall be issued under the signature of the chairman of the committee or subcommittee thereof.

Senator James K. Vardaman of Mississippi has been made chairman of the committee. Senator Reed, the former chairman, has been transferred to the chairmanship of the Committee on Public Buildings and Grounds. The change in chairman will make no difference in the prosecution of the coal hearing now in progress.

Coal Exports for October

Exports of coal, in tons, as reported by the Department of Commerce, for October, 1918, and the figures for October, 1917, as finally revised are as follows:

	October, 1917	October, 1918
Anthracite	478,317	456,029
Bituminous	2,615,526	1,888,801
Exported to:		
Italy	31,094	None
Canada	2,157,857	1,660,229
Panama	94,681	17,605
Mexico	11,618	19,186
Cuba	117,615	89,941
Other West Indies	22,173	12,064
Argentina	29,374	None
Brazil	41,707	38,461
Chile	None	36,402
Uruguay	6,776	13,832
Other countries	102,631	1,081
Coke	114,013	118,796

As usual, there were no appreciable imports of coal from any country save Canada. In October, 1917, the imports from Canada were 130,680 tons and in October of 1918, 133,722 tons.

Recent Zone Modifications

Zones F-1 and F-2 have been modified so that coal from all operations along the Louisville & Nashville railroad in eastern Kentucky may move to all points in Indiana located on and east of the Chicago, Indianapolis & Louisville railroad. Such coal, however, must be used for industrial purposes only, but it may move to all points on the lower peninsula of Michigan without restriction.

Rembrandt Peale Resigns as Commissioner to the Tidewater Coal Exchange

Rembrandt Peale, one of the most prominent coal operators of central Pennsylvania, has resigned his position as Commissioner to the Tidewater Coal Exchange, effective Jan. 1. The Tidewater Coal Exchange is a pool of all coals shipped to tidewater ports of Hampton Roads, Baltimore, Philadelphia and New York City, and is one of the most effective measures for saving transportation taken during the war period. The chief offices of the Tidewater Coal Exchange were in the Woodward Building, Washington, D. C.

Mr. Peale has also presented his resignation as advisor and as director of the Bureau of Labor to Dr. H. A. Garfield, to be accepted at the pleasure of the Fuel Administration. Mr. Peale was one of the first men in the Fuel Administration. His long services there commanded the highest regard and respect everywhere.

His administration jointly with John P. White of the Bureau of Labor was the greatest single factor that contributed to the final success of the Fuel Administration. Mr. Peale has earned the gratitude of miners and operators everywhere by his work at Washington during this period.

J. W. Howe, who has been assistant commissioner of the Tidewater Coal Exchange, has been advanced to the post of commissioner.

Placement of Army and Navy Men

Employers seeking university graduates in mechanical, electrical and civil engineering, and in chemistry, and other technical men with several years of practical experience, are invited to make their wants known to the Professional Division of the United States Employment Service, 16 East 42d Street, New York, N. Y. Employers seeking such men are asked to inform the Division of the precise nature of the positions available, as there are a number of thoroughly equipped officers and men in the Army and Navy service who are qualified for responsible positions. The record of each man is carefully investigated before registration is permitted, and only men well fitted for the positions to be filled are sent to employers.

Brief Washington Notes

Coal-saving slogans put out by the Fuel Administration are being used in moving picture theaters as a part of the program to conserve domestic sizes of anthracite coal.

Shipment of 100,000 tons of coal to Holland has been authorized by the War Trade Board. The coal is to be transported on Dutch vessels, which now are lying idle in Dutch harbors.

To do away with certain confusion due to separate orders, the Fuel Administration has codified Virginia coal prices. No changes have been made in the prices or in the boundaries of the district.

At the special request of the President, Dr. Harry A. Garfield is holding himself in readiness to go to Paris to advise with the American delegation to the peace conference in matters pertaining to fuel.

Coal stocks being held by the Army are reported officially as being 1,190,193 tons of bituminous and 235,497 tons of anthracite. There is no intention of putting any of this coal on the market at present.

With the passing of any further difficulties in the fuel situation in Utah and southern Wyoming the assistant district representatives in those areas have closed their offices. Moroni Heiner, of Salt Lake City, the district representative, will look after such matters as ordinarily would have been handled by the assistant representatives.

Many letters are being received at the Fuel Administration urging the continuance of its Bureau of Statistics. Dr. Garfield has recommended that this work be continued under the Geological Survey. The matter, however, is one which must be passed upon by Congress, as the Survey's present appropriations would not permit of the carrying out of such an elaborate statistical program.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

There is still a disposition in the anthracite region to find fault with Dr. Garfield's decision as to the wage increase of the mine workers, especially in the Wilkes-Barre section. The objection is not so much to the scale provided as to the date from which that scale is made to be operative. The mine workers wanted a scale, markedly retroactive, to take effect Oct. 1. Instead a scale was granted which became operative on the day of announcement.

The trouble-making seems to be a clever trick of the insurgents to disturb the union fold. It is a matter of internal politics. The election may be expected to end the unrest by ending the political advantage which may be expected to come from its continuance. When it can no longer disturb the tenure of office of the officials in control we may expect that we shall hear no more regarding the dissatisfaction.

Still about this we shall do well not to be too sure. Trouble may be started for political motives and continue after the possibility of political advantage may have come to an end. On Dec. 7, 500 delegates, representing 30,000 mine workers of District No. 1, of the United Mine Workers of America—a district extending from Forest City to Shickshinny—met at Wilkes-Barre and unanimously declared the agreement negotiated through the Federal Fuel Administration unsatisfactory.

CONVENTION BY DEC. 28 OR ANTHRACITE STRIKE

This meeting urged that a tri-district convention of Districts 1, 7 and 9—constituting the whole unionized anthracite region—be called, Dec. 26, in the hope of securing a more satisfactory wage award. The meeting was stormy, and the delegates so worded their resolution as to provide for a cessation of work on Dec. 28, if their demands for a convention are not recognized. Another meeting is to be held in Wikes-Barre on that date.

The contract miners do not like the Garfield award. They grumble that they were not given an increase of 15 per cent. on the 1917 scale. They receive 40 per cent. on the scale of 1916, and as the 1917 scale conceded 25 per cent. on that scale, the increase from the scale of 1917 to the scale of 1918 only figures 12 per cent. The contract miners would have the increase made 15 per cent. on the 1917 scale.

Of all the men in the northern anthracite region the Plymouth men are loudest in their protests. They have even been discussing a strike to enforce their demands, and the unrest has already actually caused a strike at one plant. A footman had damaged some property and been discharged, and the men, thoroughly worked up over the larger matter of retroactive payment, went on strike for several days. Eventually the matter was amicably settled.

MUST TAKE BACK MUNITION MEN "SIGHT UNSEEN"

Thomas Kennedy, of Hazleton, district president of the United Mine Workers in the seventh anthracite district, alleges that the operators will not hire all the returning workers, but will "pick only the desirable ones," a policy which Kennedy says the mine workers will bitterly oppose.

The mine workers in the ninth, or Schuylkill, region at their annual session increased the salary of their officers 50c. per day from Dec. 1, 1917. They also urged that the Franklin B. Gowan Beneficial Fund, which was collected in part from the miners by the Philadelphia & Reading Coal and Iron Co., be used for the care of children orphaned by the recent epidemic. The Gowan fund predated the passing of the compensation act, and it is said that about $100,000 was on hand when the compensation act came into operation.

The fall of the tonnage in the anthracite region still occasions much anxiety. We are assured that 1017 anthracite mine workers will shortly be relieved from the army. There were 153,092 mine workers in the anthracite region in Apr. 1, of this year. Just how many there are now would be hard to determine, but assuming that the April force was maintained unchanged the addition of 1017 would add only 0.66 per cent. to that number. At best 1 per cent. is the gain to be expected. If these men go back quietly to their work in the mines without celebrations they will add between ½ and 1 per cent. to the output. If, however, there is much jollification by the other 100 per cent., the addition will really not result in increased tonnage. Reports from Camp Benning, Columbus, Ga., show that there are 9 anthracite workers to be discharged at that point. From Camp Johnston, Jacksonville, Fla., it is reported that 48 available hard coal workers are quartered there. Camp Greene, Charlotte, N. C., has 203, and Camp Humphries 17. With 690 men listed for release, under surveys previously announced, this makes 1017 men.

WAS FORMER DU BOIS PRESIDENT UNPATRIOTIC?

In central Pennsylvania the election seems to show that the old leaders have been discredited, a strong campaign having been conducted by the insurgents based on the alleged lack of patriotism shown by the circular of Aug. 26, which condemned the power given to the district manager of coal production, the secretary of the Coal Producers' Association, to act as the arbiter in cases covered by the scale agreement.

In consequence out goes John Brophy, of Nanty Glo, former president, and in goes Frank E. Waite, of Du Bois, former subdistrict president. "On official tabulations of 130 of the 200 locals," says the Du Bois *Express*, "including locals showing strong support both to Waite and Brophy, give Waite a total of 6870 votes and the incumbent 2907. It is believed in Clearfield that final returns will show Waite a victor by about 3500 votes."

The vice presidency seems likely to fall to William McEwan, of Brisbin, as he leads James Mark, the present holder of the office, by about 3000 votes. William Donaldson, of Du Bois, seems surely to have been elected international board member.

BITUMINOUS MINERS STILL WANT WAGE REVISED

The bituminous mine workers are exhibiting restlessness everywhere. They still want an increase in wage proportional to that granted the anthracite mine workers. The mine workers keep inching upon one another. The anthracite region gets an increase because the bituminous region has the bigger pay; then the bituminous region must have an increase because the anthracite region has been conceded one. It is time to call a halt. If there are to be any increases they must go to the peace-industry workers who have been as peaceful as their industries and have received no increases. As has been truly said, strikes are not between capital and labor, but between worker and worker. It is time for the peace worker to strike against the war worker who has been continuously impoverishing him by raising his cost of living. The peace worker has a right to live and keep warm without paying a prohibitive price for coal.

On Dec. 11 a mass meeting was held at Charleroi, near Pittsburgh, Penn., at which it was decided to hold a special convention to which delegates from the locals of the United Mine Workers would be invited, the purpose being to seek a wage increase. The meeting was presided over by Thomas Metcalf, of Findleyville and William Deiler, the candidate for national board member at the general election

held during the week. District President John H. Walker, who heads the mine workers in the Pittsburgh district, told the men why, in his opinion, they were entitled to more wages.

The influenza is still a factor in the bituminous mines of Pennsylvania. It is thought that the tonnage has dropped between 80 and 90 per cent. due to the epidemic.

Roaring Creek Miners Seek Wage Increase

The West Virginia mine workers have only just become unionized. The union is a new toy to be brought forward on every occasion. What good is it unless it furnishes an excitement every minute! So the war being over West Virginia is experiencing a lot of strikes. In the Roaring Creek fields, near Elkins, W. Va., the miners made a demand for an increase in wages to be granted Dec. 2. When that day came they struck. The mines from Belington, in Barbour County, southward to Mabie in Randolph County, ceased operation together. The plants of the West Virginia Coal and Coke Co., the Jenkins Coal Co., the Randolph Coal Co., and the Spates Brady mines were closed down.

Some of the largest producing mines of the West Virginia Coal and Coke Co. are in the strike territory. The managements of the various companies claim that under the regulations promulgated by the United States Fuel Administration they are without authority to increase wages and that there is no prospect of settlement unless either there is a change in the policy of the Fuel Administration or the miners abandon their demand for an increase.

Up to Dec. 12 there had been no settlement of these strikes except at one mine, the Junior mine of the West Virginia Coal and Coke Co. However, no sooner had these men gone back to work than a strike occurred at the mine of the Gage Coal and Coke Company.

Just north of the strike area described is the Boar Run mine at Philippi, Barbour County. The men at this mine struck Nov. 28, and up to Dec. 4 had not returned to work. As result of a meeting held at Scarbro, Monday, Dec. 3, despite the recommendation of President Gilmore and other union officers, over 2000 mine workers employed at the 15 operations of the New River Co., on Loop and White Oak creeks, quit work on Tuesday, Dec. 3. All the men, including the pumpers, left their posts.

The grievance of the miners relates to the payment of the extra $1.40 a day which the Federal Fuel Board awarded to the miners. The miners claim the company has been dilatory in making settlement under this award, and in some instances has not paid the full amount that is alleged to be due to the miners.

Carpenters and others employed by the month about the mines claim that they should share in the award of extra pay. The operators claim that only the day men directly employed in the production of coal are entitled to this extra money. This point was recently presented before Judge Allison Smith of the arbitration board. He declared in favor of the complainants. The operators were not represented at the hearing and for this reason Judge Smith granted them a rehearing.

Want Pay for Work That They No Longer Do

This strike, like the Roaring Creek difficulty, shows no sign of being settled. It has even spread to the mines of the Brown Coal Co., in South Nurral, Fayette County. The men at this mine have gone on strike to get pay for placing cars at the room face, though the company actually places the cars. An extra allowance of 10c. a car was at one time given the miner for each car placed at the room face. When the company began placing the cars the men did not object to the company's activity but objected to losing the pay that the company had paid for the car placing.

Some of the wages paid at the mines of the United States Coal and Coke Co. prove that it pays to be a mine worker. Bosco Spittisch, a coal loader, made $92.07 loading coal the week before last. He worked 6 days. Dock Smith, colored, a cokeyard man also working 6 days made $60.29 pulling coke. Frank Boots, a Pole, a machine runner, made $72.40 cutting coal in the same 6 days. Peter Vuncrivch, a driver made $35.11 in 6 days.

Out of curiosity we have multiplied these numbers by 52 and we find the Serbian apparently earned at the rate of $4787.64 a year, the colored man, at the rate of $3135.08 a year, the Pole at the rate of $3764.80 and the driver, of nationality unspecified, $1825.72. With such wages these men are surely well entitled to be content.

C. F. Keeney, president for district No. 17, has been absent from Fairmont. His work has been directed by H. P. Peters. He is candidate for reëlection and that is conceded to him for he had no rival candidate. Fred Mooney, the secretary in the same district, has undoubtedly been reelected. James R. Gilmore, the candidate for reëlection in district 29, was likewise unopposed.

The Grafton Coal Operators' Association in Northern West Virginia is determined to stamp out the bonus evil. On Dec. 12 a meeting was held at which it was decided to take up the matter with the United States Fuel Administration through the National Coal Association.

Scale for Deadwork Is Still Unsettled

On Nov. 29 a preliminary meeting was held at Fairmont, W. Va., between the operators' committee and the officers of the United Mine Workers of District No. 17. C. H. Tarleton, A. C. Beeson, L. J. Sandridge, C. J. Ryan, J. A. Clark and John M. Wolfe represented the former, and C. F. Keeny was the leading participant for the United Mine Workers. The discussion was as to "deadwork," that is, pay for work not actually involving the production of coal. A general meeting of the Northern West Virginia Coal Association will be called to give the tentative agreement, when made, final approval.

The Fairmont region in West Virginia is again a victim of influenza. The Clark mines in Harrison County have a number of cases and about half the employees of the Tucker mine of the Orr Coal Co. are afflicted with the disease. Adrian, on the Coal & Coke R.R., is so badly smitten that the local physicians and nurses found it impossible to cope with the large number of cases. Outside assistance was sought.

The Kanawha and Pocahontas districts are similarly affected. The Kanawha & Hocking Coal Co. had to appeal to the State Health Department and so did the Superior Coal Co. at Davy in McDowell County. Similar reports come from Kentucky.

In Kentucky great union activity is being exhibited in the Big Sandy River region under W. M. Peters, the vice president of District No. 17. The drive, the mine workers hope, will net 20,000 members. In Illinois, Frank Farrington, president; Walter Nesbitt, secretary, and Harry Fishwick, treasurer, the administrators of the past term, have been reëlected to their former official positions, according to official advices.

Parker Alleges Judge Elliot Was Coercive

Alton B. Parker, of New York City, is counsel for the mine workers in their appeal against a judgment requiring them to pay $720,000 for triple damages and costs in the matter of the suit of the Coronado Coal Co. It will be remembered that in the Federal Court of the Western Arkansas district at Fort Smith, Ark., judgment was given the coal company for $200,000. Trebling this and adding $120,000 for costs, it will be seen, brings the bill to $720,000. The mines of the company are in Sebastian County.

Parker, in his argument, laid his greatest emphasis on Judge James D. Elliot's supplemental charge to the jury. This charge he held to be coercive and purposed to bring about a verdict for the mining company. The charge was delivered after the jury had failed to agree and asked to be discharged. In it the judge gave the jurors to understand that they would not be released from duty until they had reached a verdict.

This was coercive, he argued, because the trial had occupied a month and the jurors were anxious to be released. Parker also objected to this language of Judge Elliot: "You are advised that the court is of the opinion that the facts in this case overwhelmingly justify you in the conclusion that it was the policy, and therefore the agreement for years of this national organization, to prevent mining of nonunion coal. There is no question in the court's mind but that the strike was ordered to prevent this."

Give the Foreigner Your Hand



We proclaim Americanism as a great gift. Then let us bestow it on the stranger with all the good will we express when we give a Christmas present. Let him know that it is his, from the cordiality of our smile, the heartiness of our handshake and the warmth of our good wishes.

EDITORIALS

May We Show the Warrior a Seat?

EVERYONE is anxious to see the mining men now in the Government forces get back into positions just as good as, if not better than, those they left when they prepared themselves to make the supreme sacrifice and started for camp and the front. Times are perhaps not entirely opportune for men to be looking for new positions, for the energy of production has somewhat spent its force. Still the fewer the places the more diligently they must be sought.

We are willing to help in that search. We have a "Positions Vacant" column in which we shall be willing to run free for four issues the advertisement for a position of any men released from service in the United States Government forces. We desire to know in each instance whether the applicant desires to receive a direct reply or would prefer that it be sent in care of *Coal Age,* to be forwarded without charge. The branch and unit of service from which the advertiser has been released should be given when forwarding copy, which item of information will serve as a credential.

Our International Flag

NO NATION can succeed that does not at times use violence in its defense and force to back up its beliefs. But neither can any nation succeed by force alone. For this reason, we may perhaps find in the future that the principal gain in the Great War was the outcome of our moral and not of our physical forces; and this came largely from the activities of the Red Cross and kindred charitable undertakings, more active in this war than in any other.

The reputation of no nation can rest in security solely on its record for bravery and success in war. A record of liberality is a far safer ground for honor, and it was our happy task to exhibit both bravery and liberality during the advance of our armies under the national banner and the banner of the Red Cross.

In their work the Red Cross officials want the backing of all America. They want a gift of one dollar from every man, woman and child from Carysford Light, in Florida, to the light on Tatoosh Island, in Washington. The hope and expectation is that the people individually will put themselves behind the great altruistic endeavor of the Red Cross, not alone that the noble purposes of that organization may be financially supported, but so that in all the work the officials do they may be able to declare that it is the whole manhood, womanhood and childhood of America that furnishes their work with its support.



A league of nations has once again been urged upon the public, as it has been time without number in the history of the world. It will involve for all nations a lot of self-denial. At heart we are all Tories and believe that an autocracy, with ourselves as the autocrats, would be better than any democracy that could be imagined. Therefore we, as nations, one and all approach any proposition for an international league with reservations. We reserve this and that, each for ourselves, as being something not safely left to the judgment of a congress of nations, because such a congress could not possibly, we feel, view these private matters of ours as rightly as we can.



But whether we have a league of nations or decide that such a league involves a greater sacrifice than we are willing to make, and more faith than we are possessed of, nevertheless we can, as individuals, break through the hard shell of our national environment in the generous work of the Red Cross. The Red Cross is truly international, and for all the earth its flag is an emblem of international sympathy and world-service.

In it is reflected all that is best and noblest in our character, all our benignity, self-sacrifice, humanity, intelligence and comprehension. That being so, membership of the Red Cross by us all, each individually, is a symbolic act of attachment to the best and truest in our international life, is a sign that our hearts are ready for union if our governments are not.

Germs Linger After Influenza Leaves

INFLUENZA is by no means at an end. A recurrence of its attacks is reported almost everywhere. Influenza may be like typhoid fever, which is also a germ disease, in that the germs of it may still be carried by those who have suffered from the disease long after they have become immune to its toxic effects. Such people should be extremely careful not to infect others. They should never relax any of those precautions which they felt it was necessary to take to protect others when still suffering from the disease. While it may not be true that the formerly afflicted continue to be a danger to the community, the probability is so great that no chances should be taken. Sanitary isolation is not so difficult or expensive that it cannot be persistently adhered to. Patients who are getting well seem utterly disregardless of the fact that while the germs have lost the power to hurt their first host, they may be as able and as active as ever to invade the organism of another host.

Four-minute men are needed urgently for service in stemming the disease. It should not be considered a mistake to call meetings for health propaganda, at least in the open air. At these meetings the life story of a germ might be told, tracing its passage by means of a towel, a cup, a wash bowl, a pillow slip, a cough or a

sneeze, from one victim to another. Sanitation is somewhat laborious and expensive; able and persevering must the four-minute man be who will induce the workman and his good wife to take the needed precautions. If a miracle-working drug which would defend the taker against influenza cost $100 a person, it might be possible to get everyone to buy it; but the admonition "Wash and be clean" is a less pleasing, and a bothersome way of meeting the difficulty, and it is hard to make the public accept it. It is not easy to convince the average person that almost none of us are free of faults which should, from a physiological standpoint, be labelled grossly uncleanly.

What the Public Does Not Know

WE WONDER, with justice, how naturalized foreigners who do not know the first thing about civics, the constitution, history and what not can vote with intelligence on American governmental policy. But when we think how little people in general know about coal, we are just as much justified in wondering why they consider themselves able and ready to regulate its production, distribution and consumption.

There is the Mayor of New York, for instance. Discovering a pile of buckwheat anthracite, he said he was going to see why the "poor" could not burn it. (Why impose it on the poor?) There, too, was the man who argued boldly that no matter what might be said, anthracite small sizes were in great demand in Baltimore. This same man, on being questioned as to the way in which he knew there was a shortage of small sizes, said that he had ordered coal for his own household furnace and had only received half of what he ordered. He finally explained that he wanted nut coal, and that in his belief nut was a "small size."

So it goes all along the line. The public doesn't know anything about coal. It can't understand that small sizes are what it calls "dust," and even "dirt." It does not understand that small sizes are always part of the product of every mine. There are those that believe there are chestnut mines and egg mines, and that when there isn't enough chestnut it is because the cruel coal baron has the chestnut mine locked up and hasped, and has wedged a rance securely up against the door.

The consumer does not know that one quarter of all the anthracite mined is buckwheat coal, of varying degrees of fineness; that another 10 per cent. is pea, for which the consumer is even now only just acquiring a tolerance. Thus as much as 35 per cent. of the fresh-mined coal the domestic consumer really doesn't want. But it has to be mined. However, by diligent coaxing, the operator gets most of his 35 per cent. on the market at a cut rate. Of the other 65 per cent., 25 per cent. is nut, 20 per cent. is stove, 15 per cent. is egg and the rest "broken."

Every now and again some tribune of the people hears of a deposit of coal containing some millions of tons. This coal is already being mined at the utmost speed possible under the conditions obtaining, but the tribune of the people believes that if he were down there he could put those millions of tons aboard cars in a week at some impossibly low price. If the public understood the true conditions he would be laughed at. The people would not be so gullible; there would not be so many bewildered misleaders to guide them headlong to the ditch.

Much has been learned during the recent shortage about the conditions environing coal production, and the public is beginning to understand also the possibilities of utilizing domestically other fuels than large size anthracite. But there is much work remaining to be done. Some of us forget that there are hosts of people in the Eastern cities who don't believe that bituminous coal can be, and is, used for domestic purposes. Misconceptions of the plainest facts about coal are common, but one finds it hard to scheme a way to enlighten the voting public. If their only lack were in their knowledge of coal it would be easy, but there are so many matters in which they need new light and so many industries of the nature of which they have only the faintest of inklings, that the work of their enlightenment seems endless.

However, we shall have to rely on their judgment such as it is. They decide the laws and regulate the national policy. If there is a way of making them understand and qualify for the job that they must perform, that way is surely worth the finding.

Keep Iron and Wood Out of Coal

IMPURITIES in coal which reduce its efficiency are trying enough, but other impurities like hardwood caps and pieces of iron (pit-car links, pins and swivel couplings) not only dilute the coal and so give it less thermal efficiency than it should have but do damage to automatic stokers. We have been asked by a member of the Fuel Conservation Division of the Railroad Administration to draw attention to this difficulty.

We can the more readily do it because the operator is partly to blame and we have in these columns an unequal opportunity to appeal to him. Where pit cars are leaky, the miner can do nothing else than use a cap piece to correct the trouble. Poor doors and broken bottoms sometimes need a temporary repair. The cap is handy and is used for that purpose.

As for the car links, pins and swivel couplings, they are not shipped from malice aforethought. They are thrown on the car by the driver merely for use when needed. Drivers, like other men, sometimes forget to pick up what they lay down, and the iron then goes into the car with the coal.

Then, again, the railroad itself is sometimes to blame. Its cars, like those of the operator, at times need patching and the cap piece is used for that purpose, rightly so it seems to us. However, no one has worried much about these matters hitherto because a piece of wood or of iron did little harm with hand-stoking. As times have changed, it is necessary to call attention to the importance of avoiding shipment to market of material in the coal which in the use of that fuel may damage machinery. The loaders beneath the tipple should always be instructed to clean out the railroad cars before loading them. When, however, several inches of frozen material are found in a car, it is often a question to determine what should be done.

The Call of Humanity
is "Join the Red Cross"

DISCUSSION BY READERS

Zoning System of Coal Shipments

Letter No. 1—I have been greatly interested in the numerous references made in *Coal Age*, regarding the zoning system adopted by the Fuel Administration regulating the shipment of coal. It is unnecessary to state that the zoning system, which was made necessary during the war crisis, has since become a matter of deep concern to coal operators in certain districts. Our own experience in this regard is by no means exceptional.

Allow me to say that our company is operating a mine located at Bream, W. Va., and shipping on the Coal & Coke Ry., at that point. Since the war started, we have spent more than $50,000 for modern equipment, which enabled us to increase our output as urged by the Government to help win the war.

The practical effect of the zoning system is to limit the sale and shipment of coal outside of the limits of the zone in which a particular mine is situated. Since Saturday, Oct. 23, it has been our misfortune to have no orders in the zone prescribed for shipment from our mine; and, as a result, the mine has been forced to lie idle for more than a week.

Zoning System Restricts Trade

The fact is that the states embraced in our zone of shipment are oversupplied with coal, while other states where there is a large demand for West Virginia coal can get none of our product despite their frantic efforts to do so. It happens that West Virginia coal is suited for their particular purpose better than the grade of coal that they have been and still are obliged to use because it is mined in the zone in which they are located.

Our sales agents inform us that they have orders for coal in Indiana and the East, where they could place all our present and future output, as quickly as mined. In common with all the coal operators in West Virginia, we have considered it a patriotic duty to conform in every respect and to comply cheerfully with the rules of the Fuel Administration made to better the movement of coal during the war.

Is it, now, too much to ask for the powerful protection of the same Fuel Administration during the present period of readjustment? Do not the principles of readjustment of economic conditions, following the war, call for the unrestricted shipment of coal to points where operators have urgent orders for their product?

It is only justice to state, here, that coal operators are losing, and will continue to lose, large amounts of money if the restrictions of the zoning system are to continue in force while the demand for coal has shrunk, in some zones or districts, to such an extent that our mines are idle. At the same time, the country loses the output of these mines and the coal industry is sadly handicapped because of the inability of operators to ship their output where it is needed.

Our operators, relying on the impartial judgment of the Administration, and their spirit of justice, firmly believe that permission will shortly be granted them to move their coal to points in other zones where they have urgent orders waiting to be filled.

It is for the purpose of inviting a free discussion, in the columns of *Coal Age*, that I have written this letter, hoping that such a discussion will serve to draw the attention of the Fuel Administration to existing conditions and the need of reconstruction in respect to the shipment of coal from mines, which is a fact that is absolutely necessary to maintain the healthful growth of the coal industry in the country.

Ernest B. De Ligny, Pres.,
New York City. Empire Coal Mines Co.

Air-Cylinder Lubrication

Letter No. 2—In looking over some of the recent issues of *Coal Age*, my attention was attracted to the inquiry of an engineer who had experienced trouble in the lubrication of the air cylinder of his compressor, and asked to be informed in regard to the best lubricant to use for that purpose. I have had some experience in the lubrication of cylinders and can appreciate the correspondent's situation fully.

Although everything stated in the reply to this inquiry is quite true, I was surprised to find that the writer omitted to mention one of the best air-compressor lubricants manufactured or used. I refer to flake graphite, which has no equal as a lubricant not only in air-compression practice, but likewise for steam engines, gas engines, journals, valves, and, in fact, wherever a lubricant of superior quality is required.

Lubricating Qualities of Flake Graphite

Flake graphite possesses the peculiar properties not found to the same degree in other lubricants. For example, its structure is such that it fills up or overlays the roughnesses of metallic bearing surfaces. As is well known, graphite has a strong tendency to attach itself to a metal surface and quickly imparts to it a superficial glaze that almost eliminates friction.

Again, used as a lubricant, graphite is not only more enduring than oil, but possesses the important feature of withstanding high degrees of heat. It is this feature particularly that adapts it to the lubrication of air-compressor and gas-engine cylinders, where the heat is sufficient to volatilize or carbonize oil and render it useless as a lubricant under such conditions.

Everyone who is familiar with the operation of air compressors or gas engines freely admits that oil has many disadvantages that render its use inefficient and often harmful. The use of graphite for the purposes named would have become universal long since had it not been for the difficulty encountered in introducing the graphite into the engine cylinder.

That difficulty, however, is more imaginary than real. Special devices have since been made for automatically feeding flake graphite into cylinders and on all bearing surfaces that must be lubricated. One of these devices is known as the Winans Dry Graphite Lubricator; another, Johnson Graphite Lubricator. It is claimed for each of these that from 50 to 60 per cent. is saved in the cost of lubrication, by the use of graphite instead of oil.

In my own practice, I have been using Dixon's Ticonderoga Flake Graphite for the lubrication of air-compressor and gas-engine cylinders, as well as on other moving parts, in all classes of mechanical equipment. Permit me to name a few of the advantages I have found that graphite possesses over oil when used as a lubricant. They are as follows:

Graphite, in lubrication, (1) is unaffected by high temperatures; (2) cannot be carbonized or ignited; (3) cannot give off explosive vapors; (4) does not clog discharge valves; (5) will not accumulate dust or grit; (6) enables a large saving in cost of lubrication; (7) avoids danger of explosion in air-compression practice.

Last, but not least, I have found that the use of graphite in cylinders improves the fit of the piston, while at the same time reducing friction, making repairs less frequent and saving trouble and expense.

Paterson, N. J. ANOTHER ENGINEER.

Efficiency in Firebossing

Letter No. 1—In reading some of the recent articles that have appeared in *Coal Age*, where references have been made to the treatment of firebosses, I have wondered whether any of the mining men who have struggled from the bottom to the top, via the fireboss route, have experienced the same feeling that I have when they see such statements as sometimes appear in print.

It is hard to find words that rightly express my sentiments at the time of reading some of the fireboss' duties in different states. The words "from the sublime to the ridiculous" flit through my mind, although they do not fully convey the impression made. My feelings are similar to those a man experiences when reading a good cartoon in *Life* or *Punch*. First comes the pleasure the cartoon excites; then follows contempt mingled with sadness when one reflects on the true situation.

Underrating the Status of the Fireboss

Undoubtedly, each of the coal-mining states have different conditions with which the fireboss must contend, and his status will naturally vary with these conditions. While, in some states, he is rightly regarded as a mine official and treated as such, in other states he is a combination of a mine examiner, coal digger, timberman, or trackman, as the case may require.

Although my experience is varied, having been gained by travel and work in many mining countries, it would be presumption on my part to comment on the practice in any one state, without knowing the exact conditions in that district and state. However, when I read of a mine foreman putting his fireboss to work digging coal, laying track, or timbering haulage roads, it is evident to my mind that the foreman is off the track, all wheels.

As in other trades, success in mining is primarily due to organization and, to obtain this, it is necessary to have efficient officials and mutual confidence. Let me ask, Is a foreman who puts his fireboss to work to dig coal, or to lay track or switches, proceeding in a manner to develop the highest efficiency in the particular work that fireboss must do each day? Is the foreman doing his duty to the company or to the fireboss? Does he not, rather, undermine confidence and destroy ambition?

To my mind, a man who spends two-thirds of his time digging coal would be a poor man to put in charge when the emergency arises calling for higher duties. My claim is, then, every mine official must perform his work conscientiously. The foreman should teach the man under him to take his place and act for him in his absence, while at the same time the foreman should prepare himself for assuming higher duties when the opportunity offers. It is a mistake for a foreman to run a mine in such a manner that the loss of any one man would prove a severe blow to the efficient operation of the mine.

Frequently, the fear of being supplanted in his position will keep a foreman from training men under him so that they will be able to take his place. When the fireboss, in the early days, went about the mine burning out the gas before permitting the miners to proceed to their work, there was little cause for jealousy and few men were ambitious to assume the duties of that position. Today, however, there should be every incentive to ambition and mine officials should strive continually to foster that ambition in the men working under them. No foreman should attempt to run a difficult and dangerous mine with the organization of the "mine-examiner-coal-digger principle." Such an attempt will only prove a failure. A poor foreman with a good fireboss under him will often pull through; but a good foreman with poor firebosses under him stands a poor chance for success.

Dangers and Responsibilities of the Position

The fireboss should be, and is, in many mines and in many respects, as important as the foreman. It is the fireboss whose duties call him to enter the stygian darkness of the mine at an ungodly hour and face unseen dangers with every sense alert. It is the fireboss who is responsible for reporting what places in the mine are safe for work and in what places dangers exist. Where everything is in good shape, the work of firebossing is performed without unusual effort; but more often difficulties are encountered, such as overflowing sumps, roof caves, accumulations of gas owing to the ventilation being poor or the air current short-circuited by the setting open of a door. It is then that the fireboss emerges from the mine, at the last moment, wet through and "all in."

In addition to answering questions regarding the general safety of the mine, the fireboss must often give accurate answers to questions as to the number of cars, empty and loaded, on certain landings, the quantity of water in certain sumps, the quantity of timber on hand or needed in the workings, and the amount of loose coal that is ready to be loaded, etc.

Having fulfilled these duties in compliance with the law, his report being signed, it happens too often that the remainder of the day must be spent "carrying bricks," or, in other words, doing odd jobs about the mine, according to the custom prevailing in that district

or state. Instead of continuing to examine each working place and giving needed instructions to men regarding their safety, the fireboss is too often made responsible for getting out the coal. He soon learns that, in order to be classed as a good man, he must have the name of a hustler. He is taught that promotion comes to the man who can get out the coal.

Viewed from almost any angle, it must be admitted that firebossing, in many coal-mining states, offers little inducement to the best trained men, and this, again, acts as a positive hindrance to securing good foremen, since it is the faithful fireboss who is acquainted with the conditions throughout the mine and who is better fitted for the work of foreman than many men who now hold that position, provided the fireboss possesses those qualifications that fit him to take charge of men. Let me urge, in closing, that the fireboss be regarded as a mine official, put on the salary list and treated by the mine foreman as his assistant which will not only establish confidence but stimulate ambition and increase the efficiency and safety of the mine.

Chicaloon, Alaska. F. G. J.

Freezing of Shaft in Winter

Letter No. 1—I was interested in the inquiry regarding the freezing of shafts in winter and want to ask why it would not be possible to overcome this trouble, which occurs so frequently in coal mining, by installing a hot air chamber near the top of the shaft. I have never seen this tried, but it would seem to me that such a scheme could not fail to warm the air sufficiently to prevent the shaft from freezing.

To explain more fully my idea, I would say an oven should be built at one side and near the top of the shaft. The idea is to install a furnace or heating system similar to that used for heating homes in winter. A 12-in. pipe could be used to conduct the hot air from the furnace, or hot air chamber, into the shaft.

It is my belief that to reverse the fan in order to prevent the freezing of a shaft would conflict with the requirements of the mining law, in some states. A hot air system such as I have mentioned seems to me better than the use of steam coils for heating the air. I shall watch this discussion with interest.

———, Penn. Evan Jarvis.

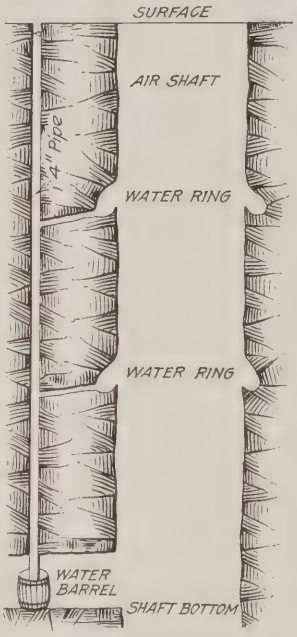
Letter No. 2—Looking through a recent issue of *Coal Age*, I noticed an inquiry in regard to the best method of preventing the freezing of a mine shaft in winter. As I had been up against this same problem, several years ago, I was naturally interested in reading the inquiry and the reply thereto.

The plan that we adopted was so successful that I have often wondered that many of our smart engineers and mining men have not tumbled to the same idea. When I think of the simple way in which we overcame the difficulty, the correspondent's suggestion of putting in steam coils at the shaft to heat the intake air seems funny to me; and the further suggestion, offered in the reply to this inquiry, of impregnating the water draining into the shaft with salt does not appeal to me.

In explanation of the method we adopted, let me say that I saw the idea first tried out at a mine where I worked some years ago. At that mine, the air shaft was located at the extreme end of the field; and, as the fan was exhausting, the air was drawn into the mine through this air shaft. The shaft was very wet and, naturally, froze up in cold weather and gave much trouble. It often happened that the air current was completely shut off by the ice, which would close the shaft tight.

Draining the Shaft by Means of Water Rings and a Borehole

Under the conditions described, it is clear that it would be impracticable to put in steam coils to heat the air. Also it would be a difficult job to impregnate the water with salt to prevent it from freezing in the shaft. The method we adopted is shown in the accompanying figure.



DRAINING A WET SHAFT

A hole was drilled about 6 ft. outside of the shaft curbing, and a 4-in. pipe inserted in the hole. Water-rings were put in at points in the shaft where the water entered. These rings were then tapped into the drillhole so that the water drained to the bottom of the shaft. In order to trap the air and prevent its entering the pipe, the latter discharged into a barrel, the end of the pipe being submerged in the barrel, as shown in the figure.

It was important to keep the end of the pipe submerged in the sump or water barrel at the bottom of the shaft. If this is not done the air entering the pipe from below will cool the pipe and cause trouble. This method has been tried in a number of wet shafts and has proved successful in every case.

Smock, Penn. Mine Foreman.

Letter No. 3—Referring to the question of preventing the freezing of a shaft in winter, as suggested in the inquiry that appeared in *Coal Age*, Nov. 28, p. 1004, kindly permit me to give my experience in this regard.

For the past 15 years I have used the exhaust steam from the fan, for this purpose. Putting a valve in the exhaust line and extending two joints of pipe down the shaft made it possible to use part or all of the exhaust steam, according to the condition of the shaft. The plan proved very successful. Previously we had tried the method of reversing the fan at night, but this caused considerable confusion and expense, besides freezing up the hoisting shaft and cages.

Use of Exhaust Steam Removes Ice Trouble

At one mine, our downcast shaft was partitioned off to provide for a hoistway for lowering men and supplies into the mine. In that case, although there was a water ring surrounding the shaft, we had no end of trouble and delay, both in the airshaft and the hoistway. The accumulation of ice threw the cages and the coun-

terweights out of the guides, or bound them fast so as to prevent their operation.

The ventilating fan at this mine was a blower, producing 100,000 cu. ft. of air per min. When the exhaust steam from this fan was turned into the shaft, the ice disappeared and we had no further trouble. The steam, moreover, increased the humidity of the air, which was a decided advantage, considering the dry and dusty condition of the mine. Since that time, we have used the same method every winter and have had no trouble. Whenever I have seen men engaged in cutting ice in shafts, I have advised them to use the same method wherever exhaust steam from the fan or pump was available.

Experience Relates to Shallow Shafts

It may be well to state, however, that my experience in the use of exhaust steam for preventing the formation of ice in shafts is confined to comparatively shallow openings, the shafts being 200 and 350 ft. in depth, respectively. We are using the same method at present and utilizing, in addition, a part of the exhaust steam from the pump located at the bottom of the hoisting shaft.

It is my belief that this method can be depended upon to keep a shaft free from ice and produce no ill-effects. I will say that, as the mine advances and the first entries are worked out, we carry part of this steam on the day shift, as it is quickly absorbed in the air current and does not extend to any working place. I trust that others may find this plan of value, and that it will help them to overcome what is always a serious trouble in coal mining. Superintendent.

Athens, Ohio.

Portable Coal Loaders

Letter No. 1—Having given much study to the question of loading coal by means of a mechanical shoveler, I was naturally interested in the inquiry that appeared in *Coal Age*, Nov. 21, p. 961, in which an operator, at Rugby, Colo., asked for information regarding portable machines for loading coal at the working face. I am glad to give him a little of my own experience along this line.

During the past 15 months, we have had a Myers-Whaley coal shoveler and loader at work in our mines. This is a No. 4 machine and has been used for excavating bottom coal after shooting. It has given excellent satisfaction. It is guaranteed to shovel and load, dependably, 40 tons of coal per hour, or 1 ton per minute of heavier material.

More recently, we have been running into thinner coal, which makes it desirable to trade off our No. 4 for a No. 3 machine that would work better in the low coal we are now mining. The No. 4 machine works well in a 6- to 8-ft. seam. I have no hesitancy in saying that, in such a seam, with good tracks, good motive power and plenty of loose coal at hand, the machine will surely load its guaranteed capacity.

For his information, let me say to "Operator" that he can see these machines at work at some of the mines in Utah, where they are in regular and successful operation. My belief, based on experience, is that wherever this machine is installed and given personal attention, it cannot fail to prove an unqualified success. The fact that the manufacturers are behind on their orders, also bears out that statement. We have used our No. 4 machine on a 42-in. gage track, operating with direct current at 250 volts. C. H. Thompson, Vice-Pres.,

Darbyville, Vt. Darby Coal Mining Co.

Constructive Practice in Mining

Letter No. 1—Before taking up my work on the Fuel Administration Board I was engaged in mine-welfare work, which has caused me to be intensely interested in the recent letters of *Coal Age* readers discussing the safety of miners; the elimination of the alcohol curse; the Americanization of foreigners; and the increase of coal production by the use of modern methods and machines. Too much cannot be said on these subjects, for they are the most essential problems in the great coal industry today. Their discussion is constructive.

One of the writers very properly referred to the shortcomings of the miner. It would be wrong, however, to infer that the careless action of employees, in any way, excuses the employer from taking every possible precaution for the safety of his men. Unfortunately, the examples of the carelessness of mine workers are only too true, which any man familiar with mining conditions knows by experience. But the very nature of the foolish acts of some miners points to the necessity for double care and thought on the part of every conscientious mine operator and, likewise, every responsible man who represents him.

Training Men for Safety

Foolish acts of workers indicate that the men who perform them are not men but boys, mentally, if not in years. They cannot be treated, therefore, in the same manner as men who do their share to make mining a safe occupation, but must be handled as men regard boys. The man foresees dangers that beset the path of the boy and strives to remove the danger to the best of his ability. The same preventative action on the part of the operator requires constant vigilance, constructive thinking and an exact knowledge of every phase of the work.

The miner spends at least a third of every day in the mine and the man who is to make the mine safe for him cannot hope to do so, effectively, unless he also spends much of his time in the mine. Even a conscientious miner is prone to feel that, while he is in the mine, his safety is up to the boss. He knows the law requires the protection of employees, but he seldom realizes that it is his duty to coöperate in carrying out that provision of the law, and he must have safety thrust upon him. Adequate ventilation, proper timbering and the carefully regulated use of lights are safety fundamentals so important that they are laws.

The ever-present problem of mine safety has two important aspects. The operator must not only strive to make his men safe men, who will obey the rules and take necessary precautions, but he must also keep them safe, by adopting every possible form of safety device and by lessening every dangerous condition that exists in his mine. The more successful he is in making his

men safe men, the less attention he will have to give to keeping them safe; for careful men will keep themselves safe in spite of dangers. They will, also, assist by reporting dangers and making suggestions for their removal. To make men safe men, they must be educated and given a sense of responsibility, which means the personal development of each man.

Protecting the Homes and Making Life Attractive

Many mining companies realize that good housing conditions is an important factor in raising the standard of employees. Houses should be so built that it will be possible for those who live in them to make them into homes. A man with a real home will give his employer far better service than when compelled to live under disagreeable conditions. Houses should be sanitary, warm and kept in good repair. They should be as attractive as possible. To make a house attractive does not require extra money for material and labor, but only requires extra thought in making the plans.

The company doctor, if possible, should have duties beyond the bare attendance of the sick and injured. His work should be largely educational and along the lines of prevention rather than curative. We are relying, for the operation of our mines, on a large percentage of foreign-born men with little or no idea regarding sanitation and health. A doctor of the broad human type can do much to enlighten the minds of these people and keep them healthy and in good working condition. Another means in the improvement of the home conditions of miners is through the school. Children's minds are fresh and unhampered by custom. They are quicker to catch the new ideas and are able to introduce them into their homes most effectually.

Alcohol is without doubt the supreme curse of every mining center, but the curse can only be removed by country-wide prohibition. State prohibition is calculated to upset labor conditions, but absolute dryness throughout the country would be of incalculable advantage to the mining industry as well as to every human enterprise. Until such prohibition comes, however, the evil can be mitigated by careful regulation of the sale of alcohol and by providing suitable counter attractions. Unfortunately these are few; but some good work can be done with the younger generation who have not as yet fallen victims to the curse. Company clubs and schools, outdoor sports and games, good moving pictures, and the encouragement of religious organizations are effectual means of combating the saloon.

Safeguarding the Work in the Mine

Turning again to the actual work in the mine, greater safety in blasting coal and rock is assured by providing the proper explosives and allowing only carefully trained men to use them. There are laws that limit the amount of explosives that may be carried into the mine by each man. Strict adherence to these laws and the giving out of explosives to authorized men only should be the standard practice among all mine officials who really care to make their mines safe. The daily use of explosives makes men forgetful of their power and unstable nature. It is therefore important to keep fresh in the minds of the men the fact that they are working with a strong but treacherous ally.

Many men are yearly injured and killed by the many mechanical devices that are so valuable in increasing production. These devices can be made safe, however, without interfering with their productiveness. The use of modern types of mine cars makes far more efficient haulage conditions. Most coupler accidents causing the loss of fingers can be avoided by the use of modern couplers that have been found useful in railroad work, and adopted in many of our best mines.

Cars equipped with roller bearings, especially in mines where they are pushed by hand, have a distinct safety value in cutting down the danger of strained backs, which are frequently caused when men have to push the old type of cars. Moreover, the latter is a menace to the men, because the old car spreads oil along the track, making it unsafe to walk and adding to the possibility of fire.

The installation of positive signal devices will guard against chance collisions. Here, again, education of the men must supplement the mechanical device in order that they will not disregard the signals. Such signals belong wherever there is any possibility of locomotives or cars running into each other. Continuously sounding signals on moving trips avoid running men down.

Dangers in Mines Electrically Equipped

Too much cannot be said relative to safeguarding mine workers against contact with live wires wherever the electric current is used in mines. A large majority of miners are ignorant of the laws of electricity and although they may have a healthy fear of its effects their very ignorance lays them open to its dangers. Education must always supplement protective devices. Automatic cut-out switches insure the harmlessness of the trolley in any working district during the absence of the locomotive. The motorman may forget to make the trolley safe behind him, but the trolley wheel performs that function for him. Careful insulation of cables to coal cutters and coal loaders is necessary, and these cables should be frequently inspected to detect any serious abrasions of the insulation, which is likely to occur due to the rough handling that the cables receive.

By the use of a good system of communication between the surface and the various internal parts of the mine, much guesswork is eliminated, which is always a source of danger. Many accidents occur to men working around a shaft bottom and to men while being hoisted to the surface. There are practical protective devices to keep men working at the shaft bottom from being struck by falling coal. Installing such devices makes that part of mining equipment a much safer proposition. With the coal at the tipple and the mining operation practically complete, easy moving cars and good car unloaders do their share in minimizing tipple accidents.

Warning signs, in as many languages as there are nationalities working in the mine, are necessary wherever there is danger. The use of steel signs will prevent alterations and destruction of these warnings. Mining will never be an altogether safe operation, but its degree of safety can be brought much higher by constructive, conscientious effort on the part of the mine operator. Many mine operators are willing to make this effort for the good of humanity alone; but even those who are not should be as much interested, for it means increased production at a less cost per ton.

Washington, D. C. Maverette Ashley.

INQUIRIES OF GENERAL INTEREST

Winding Armatures

Would it be possible, through the medium of the *Coal Age* columns, to ask readers to discuss the different methods of winding armatures, explaining the tools used for that purpose and describing the particular adaptation of the methods employed and the advantages resulting therefrom. Permit me to say that I am an armature winder by trade, myself, and have found that different types of machines require different methods of winding.

It has occurred to me that a practical discussion along these lines might be of interest to all who are engaged in coal-mining practice. I have found much helpful information in reading many of the discussions in *Coal Age*, and feel that, while the subject of winding armatures is a wide one, many points may be brought out that will help to simplify the work.

Molus, Ky. GEORGE W. RAMSEY.

A volume could be written on the subject suggested by this correspondent, and a discussion of the different methods employed in winding armatures would necessitate much detail in the way of illustration and, at the same time, be apt to cover ground that is already fully covered in textbooks treating the subject. Hence, it does not appear that there would be any great advantage in a discussion of the methods of winding armatures. *Coal Age* will be glad, however, to receive the suggestions of readers bearing on the subject, with particular reference to explaining kinks or points of practical interest that may prove helpful in expediting the work of winding and simplifying what is difficult in the process.

Wire-Rope Formulas

Among the examination questions answered in *Coal Age*, Oct. 31, p. 838, is one giving the method of calculating the breaking strain and safe working load of a $1\frac{3}{8}$-in. steel hoisting rope. I want to ask if the same formula will answer for calculating the breaking strain of different ropes; as, for example, ropes of Swede iron, cast steel, extra cast steel and plow steel. Also, how do haulage ropes differ, in this respect, from hoisting ropes, which the answer to the question referred to states is a 6-strand, 19-wire rope. Kindly give the formulas used for calculating the strength of the different wire ropes used in mining practice.

Witt, Ill. JOHN H. PLANT.

The formulas for calculating the strength of all kinds of wire rope are of the same general character as that given in the answer to the question to which this correspondent has referred. The formulas relating to the different kinds of rope differ only in the constants employed.

Hoisting ropes differ from haulage ropes in the requirement that they must be more pliable to withstand the severe jerks and sharp bends to which they are subjected, in the daily practice of hoisting in shafts. In American practice, both hoisting and haulage ropes consist of 6 strands. Each strand of a hoisting rope, however, has 19 wires, while a single strand of a haulage rope is made of 7 wires.

The 19 wires forming a strand in a hoisting rope are much smaller and therefore more pliable than the 7 wires that make up a strand of a haulage rope. The larger wires of the haulage rope are better able to withstand the abrasion to which such ropes are subjected in mine haulage. In conclusion, therefore, hoisting ropes are adapted to withstand bending, while haulage ropes are fitted to withstand abrasion.

The following formulas are based on the tables giving the breaking strength of different sizes of the four kinds of wire ropes manufactured for mining use. These tables were published by manufacturers of wire rope in this country. The constant in each formula is the breaking strain of a 1-in. rope of the material stated.

In hoisting practice, today, cast steel, or extra crucible cast steel ropes are chiefly employed. The breaking strain of a 1-in. cast steel, 6-strand, 19-wire hoisting rope, as taken from the tables mentioned, is 34 tons, while that of a similar, extra or crucible steel rope is 39 tons. Following are the formulas giving the breaking strain, in short tons (2000 lb.), of each kind of rope employed for hoisting and for haulage purposes:

	Hoisting Ropes 6-Strand 19-Wire	Haulage Ropes 6-Strand 7-Wire
Swede iron	$S = 17d^2$	$S = 16d^2$
Cast steel	$S = 34d^2$	$S = 32d^2$
Extra cast steel	$S = 39d^2$	$S = 37d^2$
Plow steel	$S = 44d^2$	$S = 42d^2$

In these formulas, S equals the breaking strain of the rope, expressed in short tons (2000 lb.); and d equals the diameter of the rope, expressed in inches. In ordinary mining practice, in shafts not exceeding, say, 300 yd. in depth, the safe working load of a hoisting rope is commonly taken as $\frac{1}{8}$ of the breaking strain of the rope. In deeper shafts, the safe working load may vary from $\frac{1}{8}$ to $\frac{1}{10}$, depending on the depth of the shaft and the style of equipment.

Elements in Mine Ventilation

Assuming a large mine capable of producing 3000 tons of coal a day, kindly say what are the three elements essential to its efficient ventilation.

Springfield, Ill. STUDENT.

The three elements most essential to efficient ventilation are: A mine fan of sufficient capacity to produce the required air volume; a proper distribution of the air current in the mine; and, third, well-built stoppings, doors and overcasts that will prevent the leakage of air through them.

EXAMINATION QUESTIONS

Hoisting Engineers' Examination. Springfield, Ill., 1918

(*Selected Questions*)

Ques.—How would you test a steam boiler to ascertain its safety?

Ans.—To insure the safety of steam boilers, they should be inspected regularly and kept free of all accumulations of sediment. The condition of all joints, rivets and stays should be carefully observed. The only safe method or test to apply to a steam boiler to determine the pressure it can safely carry is the hydraulic test, which consists in filling the boiler full of water under pressure and noting any leaky joints.

Ques.—What is the available power of a pair of hoisting engines, with 24-in. cylinders, 5-ft. stroke, when making 40 r.p.m., the gages on the boiler indicating a pressure of 75 lb.?

Ans.—With a boiler pressure of 75 lb. gage, the mean effective pressure in the cylinder of an ordinary slide-valve engine, cutting off at, say ⅔ stroke, may be taken as 60 lb. per sq.in. The sectional area of a 24-in. cylinder is $0.7854 \times 24^2 = 452.4$ sq.in., and the total pressure on one piston of the engine is, then, $60 \times 452.4 = 27{,}144$ lb. With a 5-ft. stroke, an engine making 40 r.p.m. has a piston speed of $2 \times 5 \times 40 = 400$ ft. per min. Finally, assuming the efficiency of the engine as 85 per cent., the available horsepower, under the assumed conditions, is

$$H = \frac{0.85\ (27{,}144 \times 400)}{33{,}000} = 280\ hp.$$

In hoisting practice, it is customary to estimate the power of a duplex engine on the basis of a single cylinder, as one cylinder is carrying the full load when the other cylinder is on dead center.

Ques.—What kind of engine would you prefer for hoisting at coal mines?

Ans.—Because of its simplicity of construction, the ordinary slide-valve engine is generally preferred for hoisting, in coal-mining practice, except where a large power plant is installed and the hoisting shaft is deep, requiring a larger engine, and greater efficiency is desired in its operation. In that case, a Corliss engine may be preferred.

Ques.—The piston speed of an engine is 540 ft. per min., the number of revolutions per minute is 150; what is the length of stroke?

Ans.—Since an engine makes two strokes in each revolution, the number of strokes per minute, in this case, is $2 \times 150 = 300$ strokes. The piston speed being 540 ft. per min., the length of stroke is $540 \div 300 = 1.8$ ft., or $1.8 \times 12 = 21.6$ in.

Ques.—How would you fasten a rope on a drum?

Ans.—Before attaching the end of the rope to the winding drum, the former should be passed at least twice around the drum. The end of the rope should then be passed down through a hole bored in the lagging of the drum, and made secure to the drum shaft, by being passed around it and then fastened by a clevis binding the end of the rope to itself. Care must be taken to make no sharp bends in the rope. Two spare coils are required to be kept on the drum as a precaution against overwinding and to provide sufficient length for recapping the rope, at frequent intervals, where it is attached to the cage.

Ques.—How would you open and close the valve to start and stop an engine? Give reasons for your answer.

Ans.—The valve controlling the supply of steam to an engine should be opened and closed gradually, in order to avoid any undue strain on the engine, owing to the inertia of its moving parts.

Ques.—We have a tank full of water, in the morning, when we commence work. We have no more water in sight; the tank is a circular tank 14 ft. in diameter and 20 ft. deep. How long will we be able to run using 1200 hp. per hour.?

Ans.—Estimating a single horsepower as 34½ units of evaporation, which means the evaporation of 34½ lb. of water per hour, from and at 212 deg. F., the weight of water required in this case would be $1200 \times 34\frac{1}{2} = 41{,}400$ lb. per hour. The cubic contents of this tank is $20(0.7854 \times 14^2) = 3078$ cu.ft. Taking the weight of water as 62.5 lb. per cu.ft., the time required to empty this tank under the assumed conditions would be $(3078 \times 62.5) \div 41{,}400 = 4.64$ hr.; or, say 4 hours 38 minutes.

Ques.—If a boiler generates steam at 85 lb. pressure, what percentage may be gained by heating the feedwater, originally at 65 deg. F., by means of a feedwater heater to 200 deg. F.?

Ans.—Using Marks & Davis steam tables, the total heat in steam, above 32 deg. F., at 85 lb. gage or 100 lb. absolute pressure is 1186 B.t.u. The total heat in the steam above 65 deg. F. is therefore $1186 + 32 - 65 = 1153$ B.t.u., which is the heat absorbed in generating a pound of steam at 85 lb. gage (sea level), and a feedwater temperature of 65 deg. F. Now, using a feedwater temperature of 200 deg. F. means a saving of $200 - 65 = 135$ B.t.u. per lb. of steam generated. The percentage of saving is, therefore, $(135 \times 100) \div 1153 = 11.7$ per cent.

Ques.—What is meant by the terms, water line, steam space and the heating surface of a boiler?

Ans.—The term "water line" is the normal water level in the boiler. The "steam space" of a boiler is the space occupied by the steam in the boiler, which is the total space above the water line in the boiler, including the steam dome. The "heating surface" of a boiler is the entire exterior surface of the boiler plates that is exposed to the heat and gases of the furnace, and includes also the inner surface of the flues or tubes of the boiler through which the heated gases pass.

COAL AND COKE NEWS

What Happened in November

[The bracketed figures in the text refer to pages in the present volume and should the reader desire further information he can obtain it by reference to the pages indicated.]

Nov. 1—New wage scale in anthracite region comes into effect, having been approved by Dr. Garfield Oct. 31 [789, 829, 867, 908]—Nichol Thompson, Pacific Coast representative of the Fuel Controller of Canada, raises the price of coal in British Columbia 75c. per ton to accord with the wage increase [920]—Benjamin L. Flynn, general superintendent, Logan Mining Co., Logan, W. Va., dies of influenza [921]—The Fuel Administration declares its intention to commence on Nov. 15 its campaign to provide coal for points in the East, including Pennsylvania, New York, New Jersey and the New England states.

Nov. 2—Fuel Administration announces that 19 more coal mines are closed because their product has been improperly prepared [906]—Fuel Administration decides against regulation of opening and closing hours of offices, stores and other mercantile establishments and places of amusement.

Nov. 4—MacBeth Coal Co. begins the shipment of coal from its Rum Creek mine in Logan County, West Virginia [880]—Tipple and boiler house of the Cross Mountain Coal Co., Briceville, Tenn., burned down [921].

Nov. 6—New anthracite price schedule agreed upon [905]—The railroads in the coke region around Uniontown, Penn., being shorthanded owing to the influenza, call on the employees of the coke companies to help move coke cars [905].

Nov. 7—Dr. Garfield requests that the police survey of New York City's fuel resources ordered by Mayor J. F. Hylan be not made [906]—Burton L. French introduces into the House of Representatives a bill providing for reconstruction projects [952].

Nov. 9—New regulations made regarding "lightless nights"—Regulation made that placing coal in householders' bins shall not permit the retail coal dealer to add more than 75c. to the price.

Nov. 10—Fuel Administration announces that hereafter applications for new railroad switches for use of coal mines shall be filed with local railroad officials and not with the Fuel Administration [949]—Fuel Administration announces that New England desires a reduction in its bituminous coal allotment from 30,000,000 tons to 27,300,000 tons [950].

Nov. 11—United War Work Campaign Fund Drive starts [923]—Armistice is signed by Allies and Germany.

Nov. 13—All restrictions on the use of fuel in the production of building materials including brick, cement, lime, hollow tile and lumber are removed.

Nov. 14—Fuel Administration announces that all rules and regulations in force will so remain till the promulgation of the treaty of peace unless revoked by officers of the Administration [949]—Restrictions on clay products and cement set at half those established in the order of Apr. 3 and Aug. 8 respectively [950].

Nov. 15—Fuel Administration decides to restrict the operations which it has set on foot to promote the more efficient use of power at mining plants.

Nov. 16—Fuel Administration announces that its plan to save by zoning 160,000,000 car-miles seems likely to be more than effected [949, 994]—Fuel Administration announces that it will conduct schools of instruction in the cities of Illinois, Indiana and Michigan at which will be explained how bituminous coal can be satisfactorily used as a domestic fuel.

Nov. 17—Fuel Administration rules that smaller sizes of anthracite than pea shall be sold at a price at least 50c. below that established for anthracite of pea size [950].

Nov. 18—Explosion of gas in No. 11 colliery of the Lehigh Coal and Navigation Co., in anthracite region, kills one and injures six men [1007].

Nov. 19—Frank P. Walsh, joint chairman of the National War Labor Board resigns [952]—John P. White, joint director of the Bureau of Labor in the Fuel Administration resigns [995]—Fuel Administration announces that certain parts of its work such as the supervision of anthracite and the maintenance of the zoning system cannot be suspended, at least at the present [993]—Fuel Administration announces that four more mines have been closed down because of the impurity of the coal produced, making 119 in all.

Nov. 20—United States Fuel Administration announces that instructions have been issued to all camps to release anthracite mine workers [993]—"Lightless Nights" are discontinued throughout the country though rulings may still be made by local fuel administrators if in their belief such a regulation is needed.

Nov. 22—Storage limits on bituminous coal are lifted [994].

Nov. 23—The zone restrictions are modified on the Kanawha and Michigan district in the Kanawha, Guyan Valley and Logan districts of the Chesapeake & Ohio, and the Kenova-Thacker districts of the Norfolk & Western, all in West Virginia and the Sandy Valley and Elkhorn districts in Kentucky. Producers are allowed to ship coal to industrial plants in a part of Indiana and for general use in an increased portion of Ohio.

Nov. 25—Arrangements are announced by Fuel Administration under which Pittsburgh consumers are allowed to store their winter's fuel [1039].

Nov. 26—Fuel Administration speeds up the "Burn Wood" campaign.

Nov. 28—Submarine attacks having ceased, coal from two pools is to be permitted to be sold for bunkering purposes. The coal from these pools makes a telltale smoke which in war would have aided the enemy to discover the presence of the vessels using it—Avondale washery of Delaware, Lackawanna & Western R. R., Coal Department, burns down [1052]—Evan D. John, director of the Illinois Department of Mines and Minerals, dies after an illness of five weeks [1052].

Nov. 30—Dr. Garfield announced that zoning and coal-price restrictions would probably be removed Dec. 15 [1039].

Harrisburg, Penn.

The Pittsburgh & Lake Erie Railroad Co., the Erie Railroad Co., the Bessemer & Lake Erie Railroad Co. and the Northwestern Pennsylvania Railroad Co. were ordered by the Public Service Commission on Dec. 11 to make effective in two weeks a joint rate of $1.55 per ton on bituminous coal delivered from the mines to Edinboro, Penn., on complaint of the Edinboro State Normal School that the railroads had failed to comply with a similar order issued by the commission last April. The commission retains jurisdiction in the case to ascertain the amount of damages due the complainant by this failure to comply since the issuance of the first ruling.

Profiteering in coal, sold by the bucket or small quantity to the householders, will be prevented in Philadelphia, and the peddlers and storekeepers will have no chance to duplicate conditions in New York, where as high as $40 per ton has been charged by coal gougers. Dealers in nut and pea coal are obliged to sell at a price set by the Fuel Administration and are restricted by the Bureau of Weights and Measures from giving underweight.

Storekeepers are licensed to sell nut when in bags of 25 lb. net weight, at 19c.; pea in bags of 25 lb. net weight, 16c.; nut in 10-qt. buckets, containing not less than 18¾ lb., 13c.; pea, in 10-qt. buckets, containing not less than 18¾ lb., 11 cents.

From what railroad men say, and what railroad and state police say in corroboration of them, there is not much stealing of coal considering the large amounts that are being hauled every day. Last year, owing to the severity of the weather, there was some annoyance because of the way cars were raided, but this year there has not been much doing along that line. The strict policing has prevented much of the coal picking that used to go on, while the gangs that used to jump coal trains and throw off coal have been fairly well broken up throughout the state.

Charleston, W. Va.

Production in the Tug River and Pocahontas fields at the present time is about 100,000 tons a week under the maximum mined during the war. The influenza epidemic has broken out anew, and this is chiefly responsible for the loss of man power. There has been no decrease in the amount of coal coked.

In the Fairmont region, during the week ending Dec. 7, production was maintained on the same level it had been throughout November, when a total of 24,184 cars were loaded. The car supply was exceptionally good at the beginning of the week, but on the last day of the week the supply fell short of requirements by about 500 cars. Much of the coal produced in the region in the first week of the month was used for railroad purposes, and between the demand from that source and the commercial sales, producers were rather elated over market conditions. In some quarters complaint was made that the market was somewhat stagnant.

Production was curtailed in the New River region during the week beginning Dec. 2 by serious labor troubles combined with more or less sickness in certain localities. While New River coal had accumulated to some extent at Newport News and Locust Point, this did not materially interfere with shipments. As against a gross tonnage output during the last week of November of 233,000, only 216,540 gross tons were produced during the first week of the month, a decrease of 16,000 gross tons. There is an excellent demand, generally speaking, for New River smokeless.

There has been no effort to restrict production in the Kanawha region, even though the product of the district is shut out of certain eastern and western markets by zone restrictions. During the first week of December the total net tonnage produced was 148,434 tons, a decrease of 3000 tons, the principal production loss being due to labor shortage. The car service during the week was ample for all requirements. However, 21 mines did not submit a report.

There was a sharp decline in production in the Roaring Creek field during the first week of the month due solely to labor troubles. Further south, on the Coal and Coke, influenza had spread rapidly and many operations were affected.

Perceptible improvement was shown in the production record of the Logan mining district during the week ending Dec. 7, the output for that week reaching a total of 210,934—a tonnage of nearly 80,000 in excess of that for the final week in November, when only 131,797 tons were produced and when only 47.80 per cent. of the full tonnage of the district was produced, as against 78.89 per cent. the first week of December. Production losses from "no market" in this district were reduced from 123,305 tons to 19,117 tons, or from 44.72 per cent. to 7.15 per cent. of the full capacity of the mines. The car shortage was almost negligible.

Birmingham, Ala.

Despite the ravages of influenza, operators in the Birmingham district are optimistic over the prospects faced with the coming of the new year. The demand supplied by the mines in this section is steadily showing an increase with the removal of all Government restrictions on storage of coal by firms and individuals.

Mobile is handling greatly increased steamer tonnage, and the demand for bunker coal from that port, as well as from New Orleans, is such that many cars are being used to make shipments there. The entire equipment for Warrior transporta-

tion is being used in this trade also. A goodly quantity of domestic coal is also being shipped in that direction.

Coal experts throughout the district, despite the influenza situation, expect production to show an increase shortly. However, if such an increase is recorded, it will not be due to the letting up of the epidemic, but to the redoubled efforts which miners are making at the urgent appeal of union officials and organizers.

Differences between operators and miners as to when the present contracts are to become void have become an issue in the district, but no trouble is anticipated at present, as union officials and organizers of the United Mine Workers are going to the various camps and appealing to the men to continue working under the war contracts. Throughout the district Sunday, Dec. 8, the officials were making talks at camps in the district and asking for increased efforts to meet the demand for fuel to be used in converting the industries of the country from a war to a peace basis.

The labor problem is expected to become a dead issue with the discharge of many thousands of men from Southern camps. Already Federal labor directors are writing to corporations here, asking how many men they can use. Advantage is being taken of this opening by many operators.

Coke manufacturers report an excellent demand for their product, being full up with contracts at present. Additional orders are being refused by nearly every operator in the district. The foreign demand for this commodity is showing a steady increase. Most of the export trade from the district is with Mexico.

PENNSYLVANIA

Anthracite

Nanticoke—In an announcement made public on Dec. 10, General Manager Robert A. Quin, of the Susquehanna Collieries Co., stated that the management had made arrangements whereby all former employees now with the colors will obtain their former positions when they return home. Nearly 800 young men are affected by the company's decision.

Drifton—Tuesday, Dec. 24, has been selected as the date for the annual festivities which surround the Coxe Christmas tree in Cross Creek Hall, where thousands of little ones of the mining towns in this community will be remembered with substantial gifts. The giving of toys and wearing apparel will be omitted this year, a cash donation and candy taking the place of these.

Shamokin—Ex-sheriff W. E. Taby, of this city, and a number of others are erecting a large washery at a point in the creek channel midway between Green Ridge and Atlas. Already the framework for the structure is raised and within a short time the culm and coal in the creek channel will be run through the washery for market. A spur of railroad has been run to the structure. The building of the washery was held up for some time because of a dispute between coal companies as to ownership.

Bituminous

McDonaldton—The Brothers Valley Coal Co. has contracted with the Roberts & Schaefer Co. for the installation of a coal storage plant, to be installed in connection with the tipple at Mine No. 3.

Charleroi—The Winstead Coal Co. has received a Federal permit to construct a coal tipple, three ice breakers and four dolphins on the right bank of the Monongahela River, about 2400 ft. above Lock No. 8, near Point Marion, on the Fayette County side of the river.

Pittsburgh—The Pittsburgh Coal Co. is opening a large new mine, to be known as Montour No. 10. It is located on the Montour R. R., near Library, Allegheny County. There will be two drift openings, one on each side of a wide ravine about on the railroad grade. The coal from each opening will be conveyed to tipple height by chain car hauls, the tipple spanning the ravine. The coal will be screened on two Marcus screens, of 300 tons per hour capacity each, furnished by the Roberts & Schaefer Co., of Chicago. The mine is being equipped for a capacity between 4000 and 5000 tons per day and will be modern in every respect. A large town will also be built to accommodate the employees.

Uniontown—Additional coal lands owned by J. V. Thompson, bankrupt, have been disposed of for a total of $2,154,870.27, according to announcement made on Dec. 10. The deals have been completed, it was stated, but are subject to the approval of the creditors of Thompson, who will meet Jan. 7. The biggest of the deals was with James Edward Dorsey, of New York City, who purchased 2566 acres in Cumberland, Monongahela and Dunkard townships, Greene County, for a consideration of $1,460,098.03. The average price per acre was between $625 and $650. Another deal was with H. G. Rockwell, of Chicago, who purchased 1177 acres in Whittley and Franklin Townships for $450,645.80, the price per acre ranging from $300 to $400. About a dozen individual purchases were made.

WEST VIRGINIA

Huntington—Equipped with a new high-tension power plant in operation, the Coneva Coal Corporation of Chavies, Ky., has greatly increased its output. The company has installed an electric fan at its No. 2 mine and is preparing to begin operations at the No. 3 mine. Within a short time a 500-ton storage bin will be available for use. The company also contemplates installing storage-battery gathering motors.

Huntington—During the first week in January the Solvay Collieries Co. will start the publication of a magazine for free circulation among its employees at its fifteen mining plants in West Virginia and Kentucky. The publication office of the magazine will be in Huntington. The new publication is to be known as "Solvay Folk," and George C. McIntosh, who recently resigned from the Bureau of Information, United States Fuel Administration, will be its editor.

Richard—A conflagration destroyed the greater part of the plant of the Elkins Coal and Coke Co. at this place, on the night of Thursday, Dec. 5, only a few fireproof buildings escaping destruction. The loss to the company is estimated at approximately $50,000, partly covered by insurance. The fire had its origin in the engine room of the crusher plant. Though the company has its own fire-fighting apparatus, the flames, fanned by a high gale, spread rapidly, burning to the ground the tipple, crusher plant, supply trestle, power house, etc. On the morning following the fire the work of reconstruction was begun, and although it was necessary to order much new material and machinery, General Superintendent J. B. Hansford expected to be able through hastily improved means to resume producing coal within a few days.

Fairmont—Jacob F. Straight, who is now secretary of the Fairmont and Cleveland Coal Co., will sever his connection with that corporation in an official capacity on Jan. 1. Mr. Straight has disposed of a portion of his holdings to William E. Watson, Jr., and associates. The Fairmont and Cleveland Coal Co.'s operation is known as the Parker Run mines at Rivesville, where the Sewickley seam is being worked. Mr. Straight has retained a considerable portion of his holdings in the operation. He has not decided as yet whether he will reenter the coal business.

TENNESSEE

Knoxville—The tipple and chutes of the Wisconsin Steel Co. coal and coke works, at Benham, Ky., were destroyed by fire Dec. 2. The loss is considerable, as the company had remodeled the plant in 1916 and 1917 at a cost of approximately $50,000, putting in up-to-date screens with pendulum hangers, boom conveyor leaders, box-car leaders, conveyors, etc., and replacing part of the structure over the loading tracks with steel. The company is producing some coal from new mines recently opened across Looney Creek from the original opening, but the old mine and the 408 beehive ovens will be idle until the tipple can be rebuilt.

INDIANA

Petersburg — Arrangements are being made for the installation of the big new steel tipple at Atlas mine No. 1, north of Petersburg. The structure, which is to replace the big tipple destroyed recently by fire, is to cost $156,000, will be 96 ft. high and built to handle 4500 tons of coal daily. Big washeries will also be installed. Workmen have begun labor upon a washhouse which will accommodate 450 miners. One hundred and fifty new cars have been shipped to the new Atlas mine and switch room is being made for sixty empty coal cars a day. More than $300,000 will be spent in improvements this winter and early next spring.

ILLINOIS

Carlinville—The purpose for which the Standard Oil Co. is sinking its great mines at Shoper, near this city—to furnish coal for its vast oil refineries—is about to be realized, for within a few days the first consignment of coal will be shipped to Whiting, Ind. The coal will be routed over the Northwestern, and Trainmaster Culp of that road has been in Carlinville and vicinity conferring with local railroad men as to the proper handling of coal. The first shipment of coal will come from what is known as Mine No. 3, which has been opened with marvelous rapidity, considering the size of the shaft. The railroad between Carlinville and Shoper has been completed as far as the Northwestern tracks, and a shuttle train will be run just as soon as the coach arrives. This will take the workers to within half a mile of the mines and will enable them to live in Carlinville. The road will be completed into the mine just as soon as the viaduct over the wagon road can be built and the dam of the reservoir completed. The dam will be used as roadbed.

Lincoln—Coal miners who failed to file income reports last January to April are being interviewed by a deputy internal revenue collector from the office of J. L. Pickering, of Springfield.

Decatur—So well have the people of Decatur and Macon County stocked up on their winter's supply of coal that the miners state that they will have a regular "summer" season, as far as work is concerned. All summer the local mines were working at capacity digging coal to fill the basements of Decatur homes and the yards of Decatur industrial plants. Now the mines are running only part time and the miners are receiving only about half the usual pay.

West Frankfort—The Byproducts Coal Corporation is installing 500 kv.-a. at Mine No. 19 and 550 kv.-a. at Mine No. 18. The company was purchasing power from the Central Illinois Public Service Co., but was compelled to make the installation because the service company rendered unsatisfactory service. A 72 x 18 horizontal tubular boiler is also being installed at Mine No. 18.

The Old Ben Coal Corporation is sinking a new mine two miles southwest of West Frankfort. It is now down 165 ft. and is going to a depth of 420 ft. The main shaft is 12 ft. 8 in. by 22 ft. Coal only is to be hoisted at the main shaft. The air shaft is 12 ft. 8 in. by 24 ft. Men and material are to be hoisted and lowered at air shaft only. The capacity of the mine is expected to reach 5000 tons a day. A temporary steam hoist is to be used, but later an electric hoist is to be installed. Mine is to be electrically operated below with 20 locomotives and 35 machines. Building is to be of high-roof type and of brick and steel sash construction. Energy will be secured from Mine No. 11 at Christopher, Ill., and No. 9 at West Frankfort.

OKLAHOMA

Okmulgee—Purchase of the Okmulgee County properties of the Blackstone Consolidated Coal Co. by M. C. Rosenbaum, of New York, and G. G. Gillette, of Tulsa, and the fact that the new owners of the Blackstone property were working on a plan which would lead to the construction of a direct route from Oklahoma City to Okmulgee and Henryetta was announced recently. The coal mine of the Blackstone company near Schulter has already been taken over by the new owners and the mine is being completely equipped with modern electric coal-mining machinery. The mine is now producing between 400 and 500 tons per day, and when all the new equipment is installed the mine will produce about 1000 tons a day.

BRITISH COLUMBIA

Nanaimo—One of the smaller powder houses of the plant of the Canadian Western Fuel Co. was completely obliterated recently by an explosion the cause of which is a mystery. Fortunately the accident happened when there were only a few men in the vicinity, and no one was seriously injured. It is thought that some detonators were left in the building by mistake and that the explosion was the result of some of these falling to the cement floor.

Princeton—Fire in the workings of the Princeton colliery interfered with operations toward the end of November. It is now well under control, however, and work is proceeding.

Prince Rupert City—The Telkwa collieries, situated on the line of the Grand Trunk Pacific Railway Co., northern British Columbia, are finding some difficulty in keeping coal moving from the mine to provide the domestic needs of Prince Rupert City and the adjacent district. Jabe Ashman, the superintendent, asserts that there is plenty of coal in the bunkers but, because of bad roads and for other reasons, there has been delay in arranging for its transportation.

New Westminster—That the British Columbia collieries are exporting coal before fully providing for the domestic needs of the Province is a charge made by the civic authorities of New Westminster. In a recent discussion of the fuel situation in this city it was stated that the dealers did not

have their normal supply of coal and, if exceptional conditions arose, a serious shortage might develop. It was decided that Nichol Thompson, Fuel Controller, be requested to see that all home demands were filled before the collieries were permitted to fill export orders. Incidentally the action of Mr. Thompson in allowing the dealers to raise their price to the consumer 65c. a ton following an advance in miners' wages of 75c. a day was criticized, it being pointed out that the per capita rate of coal production at the mine was 5½ tons a day. One of the aldermen, taking the viewpoint of the dealers, sarcastically observed that "it pays to increase wages."

Personals

J. W. Powell, mine manager at the Cassidy's colliery of the Granby Consolidated Mining and Smelting Co., Cassidy's, B. C., has resigned and has been succeeded by **James Hargreaves.**

M. L. O'Neil, of Morgantown, W. Va., superintendent of the Connellsville Basin Coke Co., has resigned that post to become superintendent of the New York Pyrites Co., a New York concern.

M. R. Evans, formerly senior inspector with the Associated Companies, has resigned to accept the position of safety engineer for M. A. Hanna & Co., of Cleveland, Ohio, with headquarters at Wilkes-Barre, Penn.

Louis H. Spier, formerly with Olin J. Stephens, Inc., New York City, has been appointed general manager of the coal business of Joseph Gordon, at the foot of East 38th St. Mr. Spier was connected with the Stephens Co., one of the largest coal concerns in The Bronx, for more than 20 years.

P. C. Thomas has been chosen as general manager of the East Gulf Coal Co., headed by P. M. Snyder. Mr. Thomas' headquarters will be at East Gulf, W. Va., in the Raleigh County field. Up until the time he accepted his new position Mr. Thomas was assistant to the general manager of the New River Coal Company.

F. H. Watson, who has been district manager in charge of the Columbus office of the George M. Jones Coal Co., of Toledo, has resigned to accept the sales managership of Monsarrat Brothers, an operating concern of Columbus. The Monsarrat interests control extensive properties in the Hocking Valley and have a daily output of about 1500 tons. Mr. Watson assumed his new duties Dec. 10.

Obituary

John Kerr, of Fayette City, Penn., district mine inspector for the Pittsburgh Coal Co., died Dec. 8 of influenza.

Hugh Sloan, shift boss at the Cassidy's colliery of the Granby Consolidated Mining and Smelting Co., Cassidy's, B. C., died recently from pneumonia following an attack of influenza.

John J. Cannon, chief engineer of the Guerber Engineering Co., Bethlehem, Penn., died of pneumonia on Sunday, Dec. 18. The deceased was 31 years of age. Mr. Cannon was partly or wholly responsible for the designing and erection of the majority of the coal structures in the anthracite fields of Pennsylvania.

William Cameron, for many years secretary of the St. Louis Coal Traffic Bureau and chairman of the St. Louis East End Bound Freight Committee, and who has had charge of coal-tariff making in St. Louis for many years, died in a sanitarium in Denver, where he had gone for his health. He is survived by his widow.

William Lewis Phillips, ex-President of District 18, United Mine Workers of America, which includes the eastern British Columbia and Alberta coal-mining camps, who left Fernie, B. C., with the 225th Overseas Battalion C. E. F., has been reported killed in action on Sept. 28 last. Thomas, a brother, was officially reported killed on Sept. 29, the day following. W. L. Phillips first came to Fernie from Wales seven years ago and was employed on the engineering staff at the Crowsnest Pass collieries. After holding minor offices in the Fernie Union, he was elected to the post of President of District No. 18 in 1914. After the expiration of that term he was reëlected but resigned before the end of the year in order to take up arms with the Canadian forces. Two brothers, David E. and Richard S., are residents of Fernie.

Industrial News

Cape May, N. J.—The Government has completed plans for the construction of a new coal-storage building at the local naval air station. The structure is estimated to cost $50,000.

Chicago, Ill.—W. F. Keckeisen, formerly advertising manager of the International Filter Co., and previously associated with the Federal Sign Co., has joined the staff of Russell T. Gray, advertising engineer, Chicago.

New York, N. Y.—The Bertha Coal Co., of Pittsburgh, Penn., has opened a New York office in the Hudson Terminal Building, in charge of Dr. Henry M. Payne, assistant to the president, and George N. Reed, Eastern traffic manager.

Punxsutawney, Penn. — The Onondaga Coal Mining Co., of Punxsutawney, has contracted with the Roberts & Schaefer Co. for the rebuilding of the steel tipple at this point. Marcus screens, rock disposal machinery and boiler house coal equipment will be provided for.

Ironton, Ohio—The Ironton Engine Co. announces that it has discontinued its branch office at Pineville, Ky., and has opened an office at 1501-1502 Fayette National Bank Building, Lexington, Ky. W. H. Patton, who was formerly located at Pineville, will be in charge.

Elkins, W. Va.—An operation will be established in Barbour County by the Row Coal Co., which will open a coal mine near Junior. The new company has an authorized capital of $20,000. The incorporators are W. A. Row, W. J. Row, G. F. Row, L. H. Row and Cora V. Hillyard, all of Junior.

Charleston, W. Va. — Capitalized at $25,000, the Barbe Coal Co., of Morgantown, will have its plant in Harrison County, where a tract of coal land will be developed. The organizers of the company are W. D. Reed, of Fairmont; Victor E. and Edith Barbe, of Clarksburg; Guy Hall and Mabel Wilson, of Morgantown.

Charleston, W. Va.—Reconstruction work on the railroad connecting its Coal River properties with the Chesapeake & Ohio R.R. near Seth has been virtually completed by the Federal Coal Co., which will develop leases in the Coal River section as well as on the extension of the Kanawha & Michigan Ry. in Nicholas County.

Morgantown, W. Va.—Operations both in Monongalia County and in Preston County, West Virginia, will be established by the Wilmoth Coal Co., financed by Connellsville capital, the new company having an authorized capital stock of $95,000. The incorporators are S. R. Goldsmith, W. S. Metz, Emanuel Horvetz, J. C. McClenen and C. S. Pore, all of Connellsville.

Wenatchee, Wash.—The Wenatchee Apple Orchard Co. has let a contract for the sinking of a 300-ft., double compartment shaft to tap a 12-ft. vein of coal which diamond drill tests have shown underlie the company's entire 1100-acre property in the Moses Coulee district. Government and state experts have pronounced the coal equal to any mined in the state.

Columbus, Ohio—The George M. Jones interests, of Toledo, Ohio, operating the Ohio Collieries Co., in the Hocking Valley, and the Cambria Collieries Co., in eastern Ohio, will not fill the vacancy created by the resignation of W. Guy Srodes, assistant general manager, recently announced effective Dec. 16, but the position will be filled by G. S. Jones, secretary of the companies.

Philadelphia, Penn.—By the installation of new pumps at the Lardner's Point and Roxborough pumping stations, the city water department has effected a saving in coal alone of 20 tons per day at each plant. It has only been a year since that by the introduction of new stoking devices these plants were enabled to change from rice coal to the smaller anthracite sizes.

Toledo, Ohio—The Hocking Valley docks at this place loaded the last coal for the season on lake vessels during the past week. The amount loaded was 29,144 tons. The total loaded by the docks for the season was 5,161,626 tons as compared with 4,937,000 tons during the season of 1917. The season as a whole was one of the most successful in the history of the lake trade.

Atlantic City, N. J.—The Board of Directors of the National Coal Jobbers' Association, at its meeting held here on Dec. 5, decided to change the name of the organization to the American Wholesale Coal Association. The change becomes effective on Jan. 1, 1919. George M. Dexter, of Dexter & Carpenter, New York City, is the president. L. Romanski is the secretary-treasurer of the association.

Oklahoma City, Okla.—The Producers and Consumers Coal Co. has been organized at Miami, Okla., and charter has been issued by Secretary of State Lyon at Oklahoma City. The company is capitalized for $100,000 and the incorporators are J. R. Cavanaugh, E. M. Smith and C. R. Jordan. The company owns leases to a considerable acreage of coal lands. It will mine coal and also conduct a retail coal business in Shawnee.

Harrisburg, Penn.—The Pennsylvania State Compensation Board has rendered a decision holding that a miner who injures himself in an effort to shut down mining machinery when a cable slips or other interference in operation occurs, is entitled to compensation when the accident is in discharge of his duties in order to prevent mishap at the works. The Board ruled that this is "an untoward event which is not to be expected."

Scranton, Penn.—In a suit brought by Herman F. Trager against the People's Coal Co. to recover for damages to his property brought about by mine settlings in West Scranton, the jury awarded plaintiff $26,500. The verdict is the largest ever returned in a case of this kind in the county. The coal company made no denial that it was liable for damage, but objected to the price asked by Trager, and against any punitive damages. Counsel for the defense will ask for a new trial.

Columbus, Ohio—The properties of the King Coal Co. and the Tidewater Coal Co., located in the Pocahontas field and owned largely by C. H. Boardman, of Columbus, have been taken over for the purpose of operation by the Houston Coal Co., of Cincinnati. The shipping point is Vivian. Mr. Boardman retains his interests and the change was made to relieve him of much of the responsibility. A large part of the tonnage will continue to be sold through the Interstate Coal Co., of Columbus.

Louisville, Ky.—Coal men from various sections of the Ohio valley were present at the two-day session of the Ohio Valley Improvement Association, which adjourned on Dec. 12. The organization adopted resolutions calling upon Congress for larger appropriations to hasten the work of completing the nine-foot stage of locks and dams from Pittsburgh to Cairo. Attention was called to the fact that during the past fall more coal was handled through the partly completed locks and dams by means of artificial rises than ever before in the history of the river.

Orange, N. J.—The Edison Storage Battery Co. announces the appointment of George Simons as district sales manager of its Detroit district. Mr. Simons succeeds Bertram Smith, who was recently called to the main office at Orange, N. J., in the capacity of assistant general sales manager. Mr. Simons has been associated with the Edison Storage Battery Co. for the past three years. He has had valuable experience in storage-battery practice, and previous to his coming to the Edison Storage Battery Co. was for nine years associated with the old National Battery Co., Buffalo, N. Y., and with the United States Lighting and Heating Company.

New York, N. Y.—The advisability of separating the Byproduct Coke Producers' Association into two groups was discussed at a meeting of the organization in the Hotel Knickerbocker this city, on Monday and Tuesday of this week. The object is to have the producers east of the Mississippi represent one group and the producers on the Atlantic coast and Middle Western points represent the other group. With the fuel restrictions practically removed, it was explained at the meeting it is intended to acquaint the public with the possibilities of coke, with a view of increasing its domestic consumption. Among the speakers was W. S. Blauvelt, Director of the Division of Coke of the Fuel Administration. J. D. Forrest, of Indianapolis, presided.

St. Louis, Mo.—Recommendation has been made by John C. Hall, director of enforcement of fuel regulations in Missouri, to the enforcement division of the Federal Fuel Administration that the St. Louis branch of the Searls Coal Co. be required to refund to the Light and Development Co., of St. Louis, $2,269.88, which it is alleged to have collected through overcharge for coal. The complaint of the light and development company is that since July 5 it has been charged by the Searls company $2.17 a ton for coal described as modified mine-run, which was in reality 2-in. screenings, for which a charge of only $2.05 should have been made. E. B. Cullman, manager of the company, called before Hall, refused to make a statement.

MARKET DEPARTMENT

Weekly Review

No Change of Any Account in Market Conditions—Soft Coal Buyers Not Eager for Fuel—Many Mines Forced to Curtail Operations—Anthracite Situation Improving

NO CHANGE of any moment can be looked for in the coal market until the arrival of real cold weather. Bituminous coal is plentiful in spite of the fact that output has fallen off considerably during the past two months. Consumers of soft coal are resorting to their reserve stocks for their current needs, not coming into the market at this time in the belief that the elimination of Government prices is imminent and that coal will be cheaper before long.

As a direct outcome of the decision on the part of buyers to stay out of the market many mines are working only part time, particularly in the Middle West, where only the demand for railroad coal prevents complete cessation of operations at a number of plants. Government prices are holding up rather well.

Present industrial requirements of those who have no large stocking facilities are being filled without any difficulty, bituminous production being maintained at an average of 1,835,000 net tons a day. The total output of soft coal from Apr. 1 to Dec. 7 of the present coal year is placed at 420,731,000 net tons as against 382,708,000 net tons for the like period of 1917.

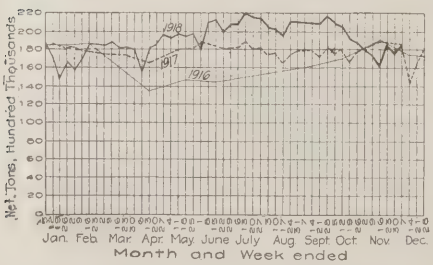
No extremely urgent need for anthracite coal is in evidence. Production increased slightly during the week ended Dec. 7, with the shipment of 1,807,000 net tons. The total hard-coal output from Apr. 1 to Dec. 7 is 68,778,000 net tons, compared with 70,397,000 net tons in 1917.

Weather conditions have been favoring the consumer of anthracite, and the educational campaign inaugurated by the Fuel Administration to teach users the utility of the smaller sizes of hard coal has helped ease the situation. It has resulted in somewhat decreasing the demand for the hitherto favored larger sizes. The Fuel Administration has demonstrated that Buckwheat No. 1 can be burned efficiently and economically in household ranges, and it would prove no surprise if consumers showed a more decided preference for this size in the future.

There was a time when pea coal was considered a steam size solely; now it has taken its rank as a domestic size. No fear need be entertained of a coal shortage at any time if more consumers turn to the use of the smaller coals, as these are always plentiful and cheaper than the larger coals. When handled intelligently the small sizes give just as satisfactory results as the larger sizes, which are in short supply.

WEEKLY COAL PRODUCTION

Production of bituminous coal in the week ended Dec. 7 is estimated at 11,008,000 net tons, an increase compared with the week of Nov. 30 of 1,312,000 tons (or 13 per cent.) but 1,135,000 tons (or 10 per cent.) below the corresponding week of 1917. From the reports of operators it is estimated that the average number of days worked in Thanksgiving Day week were 5.3. The average daily output that week is shown as 1,830,000 tons compared with 1,835,000 tons in the week of Dec. 7,



a six-day week. The influenza epidemic is still interfering seriously with production in the eastern fields, and production of domestic sizes of coal in the fields supplying the Atlantic seaboard and southern states is not up to requirements.

Production of anthracite in the week ended Dec. 7 is estimated at 1,807,000 net tons compared with 1,613,000 tons the previous week and 1,778,000 tons in the corresponding week of 1917. The total production from Apr. 1 to date is estimated at 68,778,000 net tons compared with 70,397,000 tons in 1917, a decrease of 1,600,000 tons, equivalent to about 850,000 tons of domestic sizes.

Reports from the railroads for the week from all districts compared with the week ended Dec. 7 show increased shipments from all districts compared with the week of Nov. 30. Compared with the corresponding week of 1917, the only districts recording greater shipments were Fairmont, Ohio, southern West Virginia and southwestern Virginia.

The final report of Lake shipments for the season shows 28,153,317 net tons of cargo coal, a new high record, and slightly in excess of the program of 28,000,000 tons established early in the season. Shipments in the week ended Dec. 7 were 80,580 tons. It is interesting to note that although the Lake traffic in 1918 was greater than in 1917, the vessel fuel used was less than 1,600,000 tons in 1917 against 1,300,000 in 1918. This is attributed to the fact that with fewer vessels in the trade in 1918 there was less movement of steamers either up or down the Lake without cargo.

Bituminous coal shipped to New England for the week ended Dec. 7 is estimated at 328,897 net tons, a decrease of 8.6 per cent. compared with the week preceding. Rail shipments—92,352 net tons—decreased 12.4 per cent. and tidewater shipments—236,545 net tons—decreased 0.7 per cent. Baltimore was the only harbor to report an increase in shipments. Shipments from Hampton Roads decreased 14.3 per cent. and from New York 4.8 per cent.

Total shipments for the coal year to date are estimated at 20,038,000 net tons, or 0.8 per cent. ahead of budget. Rail shipments, amounting to 7,573,311 net tons are 5.4 per cent. ahead of budget, while tidewater shipments, amounting to 12,464,586 net tons are 1.8 per cent. behind budget. Shipments from New York, Philadelphia and Baltimore are slightly in excess of budget, but Hampton Roads is 3.3 per cent. behind.

Tidewater shipments of bituminous coal for the week ended Dec. 7 were 718,738 net tons, 10.8 per cent. higher than for the week preceding. Shipments from Hampton Roads decreased slightly; New York and Philadelphia increased 21.3 per cent. and Baltimore, 5.2 per cent. For the coal year to date tidewater shipments amount to 31,550,000 net tons, approximately 10 per cent. ahead of the budget established by the Fuel Administration. Of this total nearly 15,000,000 net tons have been shipped through New York and Philadelphia, 2,848,000 net tons through Baltimore and 13,785,000 net tons through Hampton Roads.

The production of beehive coke in the week ended Dec. 7 is estimated at 543,000 net tons, an increase compared with 522,000 tons in the week of Nov. 30, but a considerable decrease compared with 695,000 tons in the corresponding week of 1917. Production of beehive coke is now below that of byproduct coke, but the total coke output is above that for last year. Operators in the Connellsville, Greensburg and Latrobe districts report for the week ended Dec. 7 the production of 307,112 tons of coke compared with 291,972 tons the previous week. The gain was the result of better labor supply. The same operators shipped 159,700 tons of coal in the week of Dec. 7 compared with 160,500 the week of Nov. 30.

The production of byproduct coke in the week ended Dec. 7 was 578,139 net tons compared with 572,239 tons the previous week and 429,000 tons in the corresponding week of 1917. The percentage capacity produced is reported as 88.7 against 87.9 in the week of Nov. 30. Losses aggregating 5.1 per cent. of capacity are reported as the result of repairs being made to plants and 3 per cent. for other causes, among which are noted operation on extended working time and using coal from stock pile that gave coke difficult to "push." The loss of 37 per cent. of production because of no market for byproduct coke in Massachusetts is to be noted.

BUSINESS OPINIONS

Marshall Field & Co.—Current wholesale distribution of dry goods is running about even with the coresponding week of 1917. Road sales for immediate and future delivery were less than for the same week of last year. The number of customers in the house was about the same. Retail business in holiday merchandise continues excellent. Collections are good.

Dry Goods Economist—During the week two important developments have occurred in the textile situation. First, the Government has decided to sell gradually its stocks of wool. Auctions will be held periodically, but efforts will be made to avoid any unnecessary or sudden effect on prices. Second, the Department of Agri-

culture has announced that its final estimate of this year's cotton crop is 11,700,000 bales, exclusive of linters. This quantitiy is approximately 400,000 bales in excess of last year's yield. Some of the big woolen and worsted plants that had been seized as enemy-owned have been sold by the Alien Property Custodian. The other seized plants are to be sold in the near future.

American Wool and Cotton Reporter—That wool held by the Government is to be offered for sale at public auction is an announcement greeted with considerable satisfaction by the wool trade. It is understood that the amount of wool to be offered at each sale will be such "as in the opinion of the wool experts the market can easily absorb." A minimum reserve price will be fixed, below which no bids will be entertained. Removal of restrictions against foreign and speculative short selling cotton contracts has put the trade in a more satisfactory position. Cancellations are raising ructions in the cotton market but there does not seem to be any question that practically all of the goods manufactured for the Government can be disposed of.

The Iron Age—Unexpectedly the general committee of iron and steel manufacturers reported to a large meeting of producers in New York, Dec. 9, in favor of a "moderate" reduction in prices of pig iron and all rolling mill products effective Jan. 1. It is expected that pig iron will be reduced $3, plates and shapes $5, and sheets and tinplates, $10 per ton, with other prices in proportion. The past week has brought further export and domestic business to the steel companies, some of them booking more than their current output; but, as heretofore, it was an aggregate of small replenishing orders. The belief that with the heavy cancellations by England, France and the Government at Washington, demand for some months would fall below capacity is still the dominant consideration.

Bradstreets—Plans are being formulated by leading lines to vigorously go after business in the new year, but it is conceded that the campaign will have to overcome the waiting attitude of smaller dealers, most of whom are strongly wedded to the belief that prices will work downward. Best reports as to distribution come from the northwest, trading in that zone being singularly free from the uncertainties that beset every other part of the country. In industrial lines, readjustments of war contracts, branching out for peace-time trade, and the absorption of labor that has been liberated from war work, proceeds apace. Labor is restive, fearing the effects of readjustments, and supplies, especially of less efficient help, are better, but as yet congestion is not in evidence, and the government is endeavoring to place men before freeing them from camps.

Atlantic Seaboard

BOSTON

Situation is mixed. Water-borne coal goes begging while all-rail deliveries are increasingly hard to get. Trade much interested in probable attitude of labor. Only light inroads made on reserve stocks. Hampton Roads shippers at loss to place coal here are using every means to load offshore or ship west. Little inquiry for coals over New York piers. "Storrow bituminous" now practically cleaned up. Rail movement drops below 300 car daily average. No indications of lower prices f.o.b. mines. Talk of spring prospects. Differentials a matter of some anxiety. Coastwise freights the important factor. Anthracite receipts show slight improvement. Complaint of volume of desirable sizes still coming forward for distribution by New England Fuel Administrator. "Independents" not held to the line as strictly as companies. Retailers getting overstocked with pea while fuel authorities solicit orders for stove and chestnut.

Bituminous—The current market is in a confused state. At the various distributing plants where coal is forwarded inland it is next to impossible to dispose of cargoes in the open market, and at the same time the few buyers who are trying to secure deliveries all-rail find it difficult to do so for anything like prompt shipment. We have steamers in over-supply along the coast and we have long lines of empty coal cars stored on the railroads, although for somewhat different reasons. All-rail the coal is not being produced, and coastwise there are no buyers. Everybody is waiting to see what will happen and from day to day, there are almost no developments. The present wide differential between rail and water delivery, in favor of the rail route, is one element in the situation, and the reserve stocks now in New England are what have saved buyers here from what would have been a most embarrassing situation. It so happened that rail shipments sagged off just at the time when New England consumers had become so well stocked that all buying interest disappeared. If the reserve supplies had not been taken on early and steam-users had been obliged to buy water coal to a much greater extent at the higher price level there would have been a lot of dissatisfaction. It may be that stocks are larger than ever before, but as it has turned out it has been no small advantage to a great many to have had their coal all-rail and during a season when it could be had in volume.

The only price shading that has come to notice has been in the case of water coal at distributing points like Boston and Providence. These instances are very few, however, for all the regular shippers have been extremely cautious about sending coal forward unsold. Needless to say every contract has been right up to quota on water borne coal and only the more reckless would take chances with such a market as prevails at all the New England re-handling points. Tidewater coal with its high marine freights and demurrage and other charges is going begging at this writing, and it is doubtful if there will be any inquiry worth mention until March or April.

All-rail prospects are bound up with the probable attitude of labor. Current reports of idleness in the region and generally light production with a great surplus of cars tend to show that output will not increase until the market calls loudly enough for increased shipments to eliminate all possibility of a reöpening of wage discussions. The mine-workers will make every effort to keep wages on at least their present level and one of the most effective methods to that end will be a decreasd production until the market is again in shape to take coal in large tonnages. It looks therefore as if there would not be any free movement of coal until present stocks have been worked down.

The number of bottoms loading at Hampton Roads for New England has steadily decreased and practically all the agencies are hard put to it to find outlet for the heavy volume of coal now being poured from Pocahontas and New River districts to the piers. Suspended shipments are the order of the day, and every effort is made to increase shipments offshore, to the line trade, and of prepared coal for the west. Difficulties of export license and securing ships for certain destinations are clearing up somewhat, and it is predicted that offshore dumpings will continue to increase.

Coal over the New York piers is also rather druggy. Inquiry on Long Island Sound has again dropped off, and it is likely there will be little call for deliveries in barges for the balance of the winter, unless the shortage of rail coal should become really acute. The better grades are moving rather easily, but less desirable coals meet with practically no demand. Bunker requirements are not yet heavy, but it is certain they will improve.

For the first ten days of December the receipts of bituminous at the five New England gateways have averaged only 290 cars, company fuel included. Compared with the November figures this is a further drop of nearly 100 cars daily, or less than 40 per cent. of the movement during September. Perhaps this is the most striking commentary that can be made today on the New England situation. It is on the basis of such facts as this that the trade is discussing spring prospects. The possibility of lower prices f.o.b. mines is heard less and less as the season advances, but there is a great deal of anxiety on the part of water shippers as to whether coastwise freights will be modified in season for next year's business. If the present differentials are maintained between water and rail deliveries the general state of the market will be decidedly awkward for everybody concerned, and it would seem that some measures are bound to be taken before long to remedy the discrepancy in price between the two routes. Marine freights then are the important factor in all calculations for the future.

Anthracite—Receipts of domestic sizes show some improvement, although the increase has not been large. The first 10 days of December showed a daily average of 371 cars as compared with the November average of 333 at the five New England gateways. By water there has also been a slight improvement, but tonnages are apt to be misleading because so large a proportion of current shipments by water are sizes like broken and pea.

Through the anthracite committee requisitions and directions continue to be filed for stove and chestnut, the most eagerly sought sizes. Besides the sheaf of other demands through this channel there are still approximately 100 cars daily being shipped to the order of Mr. Storrow for disposition through his office. Retail dealers who have regular connections with large shippers are being told their requirements for stove and chestnut must wait until Government demands are met, and at one and the same time, the New England Fuel Administration, for instance, is in the proud position of actually soliciting consignments in order to dispose of the Government stove and chestnut being shipped to its order on a preferred basis. The Rhode Island Fuel Administration recently made an official announcement that all talk of a shortage of stove and chestnut on the part of retailers was nonsense, for that office had available for sale eight cars every day.

The plain truth of the matter is that the New England Fuel Administration should now cease taking "emergency" coal forthwith, for there are today no real cases of distress that cannot be met with better satisfaction and far more intelligently through regular trade channels. Acting on figures that are far astray, and taking no account of local conditions, embargoes are being declared against communities that are just getting on from hand to mouth, while in other instances retailers who have already had generous shipments are being flooded with "free coal," apparently for no other reason than their ability to send certified checks in advance.

NEW YORK

Surplus of anthracite steam coals puts salesmen on the road for the first time in nearly two years. Stove and chestnut sizes scarce, with egg and broken easier. Householders take to using buckwheat. Retail dealers well loaded with small coals. Present condition of bituminous market due to small production. Weather keeps down consumption and demand. Bunker coals move quickly.

Anthracite—Receipts here during the past week show a falling off from the previous week, but the increase in production reported the last of the week is encouraging. The lack of domestic coals is expected to be overcome by the middle of January. In the meantime the public has been educated to use pea and No. 1 buckwheat, which not only saves money for them now but will prove a greater benefit in years to come.

During the week ended Dec. 13 there were dumped at the local piers 6098 cars of all sizes of anthracite, as compared with 6127 cars the previous week.

The heavy call for stove and chestnut continues, but shipments of these sizes are slow. In many cases where they have been ordered by the consumer and where coal is urgently needed other sizes are substituted, provided the buyer is willing. However, there are many instances where the buyer, having had two-thirds of his order delivered, prefers to wait for the other one-third rather than take other sizes of coal.

The ending of Lake shipments this week will mean the diversion of a portion of that tonnage to this market, while further additions will be made as a result of the satisfactory conditions as a whole existing in New England, although there are some of the smaller towns along the coast that have not yet received their full quotas.

Broken and egg sizes are easier than either stove or chestnut, and because of the warm weather the entire situation is "looking up." Many wholesale houses, for the first time in nearly two years, have sent salesmen out to visit the trade. For the present they are looking for buyers for the steam sizes, but after Jan. 1 it is expected the heavy demand for all sizes will have subsided and buyers will be wanted to take care of the surplus.

Pea and No. 1 buckwheat are tightening because of the efforts of the dealers to substitute these coals for the larger domestic sizes. Rice and barley are long, and cuts in regular prices have been reported in order to move the surplus. Quotations ranging from $1.75 to $2 at the mines have been reported for barley.

The retail dealers are well supplied with the small sizes, some of them having so much in hand that they are refusing additional shipments. Labor troubles are facing the dealers in Queens Borough, their drivers asking a wage increase of $5 per week, with three deliveries a day. The dealers in other Boroughs may be asked to make similar increases shortly.

Current quotations, per gross tons, f.o.b., tidewater, at the lower ports are as follows:

	Circular	Individual		Circular	Individual
Broken	$7.80	$8.55	Buck	$5.10	$5.90
Egg	7.70	8.45	Rice	4.65	5.10
Stove	7.95	8.70	Barley	4.15	4.30
Chestnut	8.05	8.80	Boiler	4.60	
Pea	6.55	7.30			

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates. Prices for buckwheat, rice, barley and boiler are not fixed by the Government.

Bituminous—The demand for the better grades of coal is far in excess of the available supply. With the removal of the coal assigned to Pools Nos. 4 and 10 the coals suitable for commercial purposes have been greatly reduced. Coals for bunkers are moving freely, and there are sufficient bottoms here to take all that can be obtained. While the high grades of coals are scarce there is a fair supply of other grades, one shipper stating that early in the week he knew of 10 boat loads in the harbor waiting for buyers.

The market is uneasy. Buyers are in a quandary as to which way to jump. Many are of the opinion that notwithstanding the reports from Washington that the price restrictions will not be removed for the present, there will be something doing soon in that direction. Because of this uncertainty they have no desire to keep their bins filled. With the price restrictions removed some of the trade believe the market will settle to a steady basis.

The closing down of various branches of the steel industry has caused a surplus here of gas coal, but there is not sufficient to result in a price reduction.

Producers do not look for any considerable increase in production until after the New Year, and even then much will depend upon conditions such as transportation and temperatures. At present large consumers and public service corporations are well supplied with fuel.

Dumpings at the local docks for the week ended Dec. 13 amounted to 5250 cars, a decrease of 1200 cars from the previous week's figures.

Operations this week were slow. Some openings were closed while many others were able to work little more than half time because of the lack of help. Reports brought back from the mines by representatives of local houses indicate that many workers are suffering from illness and that those who are convalescent are not yet able to take up their regular work. Meantime empty cars are piling up.

Producers here are interested in the announcement coming from Washington that the War Trade Board has agreed to allow Holland 100,000 tons of coal, which is to be shipped in Dutch bottoms.

The first week of the existence of the Exchange Bureau of the Wholesale Coal Trade Association of this city, which opened for business on Dec. 9, proved satisfactory to the officers of the association. There were many inquiries and the trade appeared to be interested.

Current quotations, based on Government prices at the mines, net ton f.o.b., tidewater at the lower ports, are as follows:

	Mine Gross	F.o.b. N. Y. Gross
Central Pennsylvania:		
Mine-Run, prepared or slack	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of Mine	3.08	5.23
Prepared	3.36	5.51
Slack	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite demand easing off. Mild weather continues. Better shipments. Administration modifies storing order. Cold weather needed to sustain individual prices. Stove and nut tight. Pea and egg quite free. Buckwheat only strong steam size. Bituminous unchanged. Good supply. Government prices still effective.

Anthracite—The trend of sentiment in regard to the local situation seems now to be running in one direction. The pessimists are gradually changing their views and now admit they were unduly disturbed. It is probable the unusually wild weather has done much to calm the fears of the seller as well as the buyer. Householders with a few tons in the cellars are certainly not showing the same anxiety to have their orders completed, and in most cases are accepting the assurance of their dealers that there is no cause for alarm.

The consignments to the city have not been unusually heavy, but they have been wisely distributed. The largest operating company's shipments have been most substantial. It was this trade that was becoming panicky, because it had been almost neglected for about six weeks. It is believed that before the first of the year the entire situation will be well in hand.

Dealers who have unfilled orders in the suburban and outlying districts have been informed by the local fuel administrator that they may deliver up to 100 per cent. on egg and pea sizes. He explains that this is to prevent any accumulation of these apparently free sizes and to keep equipment moving. However, where dealers have a stock of other sizes that warrant it, permission will be given to deliver these sizes up to 100 per cent. of orders on hand, when a written application is made for same. This latest ruling indicates better than anything else the sudden change in the situation, for it was only two weeks ago that the fuel administrator notified all dealers that they must not deliver 100 per cent. of any order previous to Jan. 1.

There has been considerable talk in trade circles as to the position of the retailer when business connections are only with the smaller operators and brokers, whose prices are 75c. and 90c. higher than the big companies. The thought seems to be that if the Federal Fuel Administration retains control until Apr. 1, these rates will remain effective, because after the strenuous efforts to gain this point the individual operator will hesitate to change his position. If the retail business falls off before Apr. 1, which is far from improbable, coal will be free and the dealers who handle individual coal are wondering how they will compete with the dealer who purchases his supply from the companies.

Stove and chestnut are still scarce and most yards are bare of both sizes. This is usually because shipments are delivered to the consumers' cellars as soon as received. While buyers have not been able to accumulate stocks of these sizes, yet we have come across two large dealers who had all sizes for sale, one of them going so far as to advertise the fact in his office window for an entire week. Egg is quite free, and it is probably only from the Germantown and Chestnut Hill sections that the demand is for a substantial tonnage. A number of dealers have held orders on this size with their shippers, and late in the week one of the large companies was finding this size to be quite a problem for it to handle. Pea too is easy, and a number of dealers advise us they have suspended shipments of it for a time. This size is sure to come into its own later in the season. One dealer who handles an enormous tonnage of this size, on account of his 1916 business, finds himself with an extra heavy tonnage now on hand and moving slow for this time of year. He explains that last year a large portion of his trade got so used to the larger sizes that they have found out the economy and convenience of their use despite the higher price and are now insisting on the larger sizes.

In the steam trade buckwheat is quite brisk and one house reports selling at $4.50 here, and 10c. higher in New York. Rice is weaker than buckwheat, but much stronger than barley or culm, which are flat. The piles of these latter in the storage yards of the big companies are mounting.

Bituminous—There is no particular change in the situation. Coal is fairly plentiful, especially the low grades. The good coals are all quickly taken. There has also been some increase in production, with the car supply about equal to production requirements. Some of the wagon mines are still able to get out a little tonnage by making use of flat cars, which is the only class of equipment they can get now.

BALTIMORE

Heavy movement of soft coal continues. More of better grades released on open market. Some sales below maximum. Big improvement in supply of anthracite promised.

Bituminous—With a general industrial supply of ample proportions and demand not overactive, the flow of coal from mines to this section is of such a nature as to require side-tracking at production points at times to prevent undue congestion at plants that can handle no more fuel for the present. The same conditions exist at the terminals here. Coal on demurrage for several days at a time has been noted here recently. This is striking, and shows the effect of the stoppage of war-order work in this and other nearby sections.

Georges Creek Tyson and other grades of more or less desirable nature are appearing on the market with increasing frequency. Some high-grade coals have also been released from pools that were until quite recently considered strictly Government distribution groups. The trade as a whole views with satisfaction the semi-official announcement from Washington that there has been abandonment of a plan of sudden cancellation of zoning orders and of all price regulation, and to substitute therefore a more gradual plan of release after business generally had settled down to post-war conditions. It is felt that this will prevent the overflow of higher grade coals into some sections where dealers and distributors are heavily stocked with inferior coal bought at full Government prices. Meanwhile there can be no doubt that coals are now offering here in some cases below the Government maximum. Some fuel, not those of best grade, have been offered here at anywhere from 15 to 40c. off the Government maximum.

Anthracite — The hard-coal situation shows signs of improvement. The mild winter so far has been a tremendous factor in easing the situation. The past week saw a considerable movement here, and much needed nut and some urgently needed stove coal came through. One of the largest producing companies, which was about 30 per cent. short of its usual annual movement to dealers here, also sent a promise that, now the New England and Northwestern movement had let up, it would attempt to make up the deficiency in the next thirty days or so.

The local fuel administration is planning, as soon as everyone has some coal in their cellars, to allow delivery of one-half of the one-third undelivered to most customers under the two-thirds delivery plan of the administration.

Lake Markets

PITTSBURGH

Production only slightly increased. Gas coal in demand. Market generally steady.

There has been only a slight further increase in coal production in the Pittsburgh district, but apart from gas coal the supplies have been sufficient to demand. There is no snap to the market, but if there are any actual price concessions they apply only to poorer and less desirable grades. Railroad requirements continue heavy. As usual, high-grade gas coal is in short supply for steel mills and gas works.

There has not been much rearrangement as yet in the distribution of coal to by-product coke ovens, although many switches are deisred by the coke producers in order to provide them with coal more suited to their work. In several instances Connellsville coal is sought in larger quantity, but supplies from that quarter are but slightly increased. When everything is working smoothly as to distribution, a large tonnage of Pittsburgh district coal will still be used for byproduct coking.

Many consumers are drawing upon stock piles as they are not seriously concerned as to the continuance of supplies during the winter and think there are considerable chance of the market's easing off. A report from Washington is that the Fuel Administration intends to end its work by Dec. 31, except as to anthracite, but it is not at all certain that the body will continue to function for the first three months of the new year.

The market remains quotable at Government limits: Slack, $2.10; mine-run, $2.35; screened, $2.60, per net ton at mine, Pittsburgh district.

BUFFALO

More anthracite for the city. Too much bituminous everywhere. Jobbers confident. Restrictions going. Better tone all through the trade. Lakes closing.

Bituminous—Jobbers grow more confident every day. With the existence of a surplus of coal, operators are returning to them and old relations are being resumed. So much coal is in the hands of consumers that they are indifferent to the market, and buyers are no longer anxious over the supply. They purpose using up most of their coal before purchasing more, as coal can be had when wanted.

In the dropping of restrictions one after another, bituminous sellers see a chance to make their old April contracts again without any Government supervision. At the same time they do not like the idea of giving up the arbitrary price, for many of them think that if this is done before the supply on hand is reduced materially the price will decline. Operators are saying that they will shut down rather than stand low prices.

The situation in Canada has been serious to the shipper. Coal was piled in there till nobody could sell any, and there is a

surplus there yet. Even the munition plants that shut down offered their surplus coal on the market, and the situation was about as bad as it could be. The Canadian license to shippers has been dropped, which means that the authorities are no longer afraid that the supply will run short.

Anthracite—The change has come. The lakes are closing and coal is pouring into the city, sometimes faster than the retailers can handle it. Other points in the all-rail district hereabouts are also getting more coal. It appears that the New England demand has been pretty well satisfied, so that there is plenty for this section. Already the feeling is improved. One big factor in the situation is the weather.

The lake trade closes with all upper lake ports pretty well stocked up. There was a shortage in Milwaukee, but that has also been made up. Shipments for the week are mainly to Milwaukee, 66,300 tons; to Chicago, 12,500 tons, and to Duluth, 12,000 tons, a total of 90,800 tons. The final cargo is not reported, but the season is practically at an end, with shipments of 3,557,000 tons, as against 4,106,598 tons last season. The season has been prosperous; scarcely any losses on the lakes has been reported.

CLEVELAND

Some large steam-coal buyers stand ready to take fair-sized blocks of regular No. 8 at 25 to 35c. off the Government maximum, but this business so far has not proved attractive to operators. Stripping coal continues to be offered at marked reductions, while it is believed some No. 8 coal has failed to bring the top price. Anthracite receipts are beginning to increase.

Bituminous—In their efforts to move surplus stocks at the mines, several operators have come across a couple of large steam-coal users in northern Ohio who have made known their willingness to do business at a concession of 25 to 35c. from the Government schedule. These interests have not yet felt the curtailing effects of the signing of the armistice or have made the change from a war to a peace basis without a ripple. Consequently, not having added to their stock piles for about 30 days, their stocks are fast being depleted. Another 30 days will find them actively in the market, unless they place their business meanwhile. So far, it appears, no operator has been so pressed or has reached the state of mind where he is agreeable to breaking through the top of the market to this extent.

Barring a few spots where pessimism reigns unchecked, a feeling of optimism pervades the local market. Operators agree freely that every element entering into the situation is unfavorable. The lake trade is at an end. The mild weather has wrecked retail business, and stock piles abound everywhere. But, operators point out, another three months will see coal again moving toward lower lake ports. The industrial readjustment is being made with a great deal less flurry than anticipated, and unless business receives a severe check shortly, steam-coal users will be back in 30 to 45 days. If the trade can weather December and the beginning of January without a break, it is safe, in the opinion of many well informed operators. It is of this reasoning that the determination to shut down before shading is born. The market hinges entirely upon the ease with which the readjustment is made.

Despite insistent denials that any standard No. 8 coal has been sold below the Government price, the fact remains that more than one retail dealer claims to be able to locate a few small blocks at about 25c. off, a 25-cent reduction apparently representing the idea of buyers where the price list should take a fresh hold. Stripping coal is consistently offered at 50c. to $1 off the top price, with much offering and little taking. This action on the part of stripping operators is weakening—at least sentimentally—the position of standard No. 8 coal.

Production again is on the upgrade, and it is believed influenza has been conquered. The report of the Pittsburg Vein Operators' Association of Ohio for the week of Nov. 30 places shipments at 5264 cars, compared with 4742 cars the first week preceding and 4760 the second. Many mines in eastern and southern Ohio are being worked only half time, while several have been closed for several weeks—because of inability to market coal with labor and material costs so high, the mine workers have been pointedly told.

Anthracite—By paying a small independent $1.05 more a ton than the larger operators demand—of which 30c. represents commission—one retail dealer is able to get shipments of pea at the rate of five to six cars a week. This finds ready takers at a retail price of $10.35 a ton, delivered. The continued warm weather has virtually knocked the bottom out of retail consumption and the calls for anthracite have fallen off markedly.

DETROIT

Undistributed stocks in retailers' yards and large reserves in possession of steam-coal users curtail bituminous trade. Anthracite supply is short.

Bituminous—To the presence of too much bituminous coal in Detroit and the fact that considerable of it is stock of an inferior quality jobbers ascribe the present rather inactive condition of the local market. For some time past wholesalers and jobbers have found it difficult to book orders for further supplies.

In the case of many of the large consumers of steam coal, reserves seem to have been increased to unduly large proportions by the fear that the supply of coal might be cut off or made uncertain with the coming of winter. In their anxiety to escape perils of deficient supply, a number of buyers are said to have released orders to agents with apparent disregard of the total of the tonnage represented, until shipments began arriving. They contrived also to accumulate considerable of the coal sent into Detroit by the fuel administration from mines in Illinois and Indiana.

Because of the more-than-sufficient reserves built up through these activities dealers find the steam-coal users are not now in receptive mood, though the jobbers are again able to supply the more desirable grades of coal from West Virginia and Ohio. These for a time had been withheld from the steam plants.

Te retail dealers also are overstocked with bituminous coal, while the weather of the last six weeks has not been sufficiently severe to create an incentive for buying among their customers. The domestic consumers also are showing an inclination to discriminate in favor of coal of a better grade or in more desirable form than the stock many of the retailers are able to supply. The City of Detroit has been asked to assist the retailers by taking over some 25,000 tons of the excess stock.

Anthracite—Supplies of anthracite in the yards of nearly all dealers are low, while the small volume of receipts scarcely meets the requirements of the classes of concumers that, under the fuel administration regulations, are permitted priority of supply. Were weather conditions to become severely cold, dealers would be besieged with calls for anthracite which they could not provide.

COLUMBUS

The coal trade continues quiet in every way. Steam demand is small and domestic trade is also reduced to a minimum because of continued warm weather. Prices are not demoralized, although some cutting is reported. The tone of the trade is not good.

The coal trade is now "marking time," so to speak, until readjustment is started and until reserve stocks on hand are used up. As a result there is little demand for any grae of coal and production has been reduced. Coal men in all departments of the industry believe that present conditions are only temporary, and that there will be a much better demand after the first of the year. Steam trade is quiet, as surplus stocks in the hands of consumers are extra large. Purchasing agents are loath to increase their fuel stocks until the trend of affairs is seen. Many plants have fuel stocks to last for three to five months and additional orders are out of the question. The smaller consumers are not worrying about their stocks, believing that they can buy at any time. Railroads are not taking any large amount and that is cutting into the volume. Steam prices are being shaded, but it is realized that orders can not be secured by cutting, as the buying public do not want the coal at any price.

The domestic trade is also quiet, due largely to the continued warm weather. The season so far has been very unfavorable for the retail trade. About 75 per cent. of the users have their winters fuel on hand, and it will require a cold spell to bring the remainder in the market. Rural dealers are buying to a certain extent, as their customers are not as well stocked as city residents. Retail prices are steady at former levels and there is no general disposition to shade quotations. The differential between thick and thin vein Hocking has been removed, however.

CINCINNATI

Extremely mild weather continues to dominate market, while industrial uncertainty also holds down demand. Shipments are satisfactory, in view of this situation.

The continuation of extraordinarily mild weather has kept the demand for fuel down to a very low point, considering the lateness of the season, as domestic consumers have not been forced into the market to the extent which is usually the case at this time of the year, especially with the high average of stored coal on hand. When it is considered, in connection with this quiet state of the domestic market, that the steam side of the market is equally quiet, or more so, it can be seen that the trade, rather to its surprise, is facing an unusually dull period.

The decided uncertainty of all branches of manufacturing as to the future, and the quandary in particular of those numerous industries which have for several years past been engaged almost wholly on war work, makes for cautious buying on their part, and also accounts for very limited needs by them. Many plants, in fact, have virtually nothing to do just now, and will have little to do until business has had a chance to adjust itself to peace, and peace demands have an opportunity to make themselves felt, which it is hardly expected will happen in less than several months.

The recurrence of the influenza epidemic, after it was thought to be on the wane, is also having its effect on business, both at the mines and among industrial consumers of coal. While the disease seems to be less virulent, judging by the proportion of fatalities, the number of cases is alarmingly large, and is hampering industry seriously. In spite of this continued handicap at the mines, however, production measures well up to the limited requirements of the trade, on account of the conditions named.

LOUISVILLE

Demand for all grades draggy and poor. Producers and jobbers making a hard drive for business. Retailers waiting for telephones to ring, and trying to collect old accounts.

December half gone and no business coming and none in sight, appears to be the situation in Louisville. Kentucky operators, eastern, western and southeastern, are all trying hard enough to land business, and their selling organizations are working overtime. However, there is very little industrial demand, while domestic demand is at a standstill as the weather has been so mild that the really poor man hasn't had to start a fire as yet. Western Kentucky nut and slack, also thin screenings, are being sold at considerably under the market. Prices show much weakness, although locally the trade is making a hard drive to hold up Government prices in a retail way.

It is doubtful whether a similar situation to that now existing has ever been known at this time of year in the coal trade, as the bottom has dropped completely out from under the demand, and it is merely a question of whether the market will shoot to pieces.

BIRMINGHAM

Inquiry brisk for both steam and domestic coal. Supply of both grades short of requirements. Production now badly crippled; will likely show little improvement until after holidays and subsidence of influenza.

There is a sharp and strong demand in the local market from all classes of steam users, and inquiries have been more plentiful and insistent the past week than for quite a while. Industrial plants, public utilities, railroads and furnace companies are reported as active in the buying movement. Undoubtedly the trade is stimulated by the approach of the holidays and the desire of users to stock up for the idle period at the mines, and the demand is further strengthened by the depletion of stocks in the hands of consumers some weeks ago, due to current receipts not being sufficient in some time to avoid resorting to the stock pile. Domestic coal is specially scarce, while the demand is strong and incessant.

Coal mining in Alabama is suffering seriously from a second visitation of the influenza, and there is so much sickness among the mine workers and their families that operations are badly handicapped and the output fell to 322,591 tons for the week ending Nov. 30, or a loss of about 36,000 tons compared with the previous like period. Little betterment in production can be expected until after the holidays.

Coke

CONNELLSVILLE

Coke still scarce. Furnaces concerned over possibility of early removal of Government control.

Production of coke in the Connellsville region has increased, but only slightly, and blast furnaces are feeling the effects of the reduced output that has now obtained for several weeks. While few furnaces are

banked, many are operating with reduced blast pressures so as to cut down the consumption of coke. While the epidemic of influenza is charged with the reduced output of coke, the disease is much less prevalent and output would probably be larger if the men were more anxious to work. Operators are not encouraging them as formerly, and seem to regard the curtailment in output as very far from an unmixed evil by reason of its tending to support the market.

The quality of coke being made is decidedly improved as a result of the inspection system now in operation, whereby inspectors of the furnaces scrutinize coke before shipment.

Blast furnaces are much concerned over the possibility of the Fuel Administration relinquishing its control of coke prices Dec. 31. They fear a sharp advance in the market if this is done, as coke is decidedly scarce and indeed is generally scarce at holiday time. Pig iron prices are marked for a $3 decline, in line with the recommenations the general committee of the American Iron and Steel Institute had prepared for submission last week to the War Industries Board, to make a price basis for the first quarter of the new year. While the War Industries Board refused to consider the matter, as it is relinquishing price control, the iron and steel producers will probably act on the schedule of price reductions just the same. With a $3 decline in pig iron, furnacemen think they should have a lower price for coke. Many coke contracts have been made for the first half or all of next year. Some of these call for adjustment at the open market price in case Government control is taken off, but others provide that in such case the last Government price shall apply. Furnaces holding such contracts would therefore like to see the Fuel Administration reduce its price limit before it ceases functioning.

The market is quotable at Government limits, as follows: Furnace, $6; foundry, 72-hour selected, $7; crushed, over ¾-in., $7.30; clean screenings, over ½-in., $5.50, per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended Dec. 7 at 272,750 tons, an increase of 16,035 tons, and raw coal shipped at 194,091 tons, an increase of 2053 tons.

Buffalo—The scarcity still continues. All the furnaces in this territory, even those with byproduct plants of their own and commonly making a surplus, are asking for coke of the beehive producers. The shortage is not likely to last, as the labor shortage that has caused it is not expected to last. It appears that the demand for iron is to keep up, so the coke market ought to remain strong. Fuel coke is firm where it competes with anthracite, but not otherwise. Receipts of iron ore to December were 8,663,400 gross tons, as compared with 7,438,533 to the same time last season. A little will still come in this month.

Middle Western

GENERAL REVIEW

Market as weak as ever on all grades of bituminous. Too much coal is being produced for current needs. Talk of curtailing production to keep prices at Government maximum.

The coal market in this territory is uniformly weak, and will continue so for at least the next month or two. There has never been a time in the history of coal production in Illinois or Indiana when the production has been so large and the demand so small. Today, the market is weak on all bituminous coal, all grades and sizes, and the demand is lessening from week to week. It appears that every consumer of coal, factory or retailer, has more than enough fuel on hand for current needs.

It is well known that for the past month or so the mines of Illinois and Indiana have been producing much more coal than the zones allowed them can absorb. Some of the producers of the "weak sister" type have tried to force coal on the consumer by the price-cutting method. At first this means of obtaining orders met with some success, but after a short time it failed to prove effective.

It was also shown in a number of instances that the operator who remained firm and sold his coal strictly on a basis of "Government price current at time of shipment" had just as much business as the producer with cold feet who rushed out into the market and tried to sell his coal at a discount. It has been pretty conclusively proved, of late, that if the average buyer of coal is in the market, he is willing to pay the Government price for his coal. He knows that the Fuel Administration has set a fair margin of profit on coal, and nine times out of ten he is willing to pay it.

The long and short of the present situation, or dilemma, rather, in this part of the United States is that too much coal is being produced. If any sort of order is to be maintained in the market, and in the coal industry, it will be absolutely necessary for the operators to curtail production. The object of shutting off on production would not be to increase prices, which is impossible, as they are controlled by the Fuel Administration, but to keep the operators from becoming demoralized through reckless price cutting and competition.

As a matter of fact the public have on hand today more coal than their immediate needs require, and in view of the fact that this coal was purchased earlier in the season, at full Government price, it will not help the standing of the coal industry with the public to offer coal now at substantial discounts from the various prices set by the Fuel Administration.

The resignation of Dr. Garfield came as a distinct surprise to the majority of the coal trade here, and the news of his withdrawal lent an additional element of uncertainty to the market. The coal industry in the Middle West, practically as a unit, very much regret Dr. Garfield's resignation, as he has won the entire confidence and well wishes of the coal-producing industry as represented by the operators of Illinois and Indiana.

CHICAGO

No demand for either steam or domestic. Removal of zone restrictions not favored by Mid West operators.

There is practically no demand in the city for steam coal, and no demand whatsoever for domestic coal. The Fuel Administration a short time back published a statement to the effect that they were considering abolishing all zone and price restrictions, to become effective Dec. 15. If such a step is taken, it will seriously affect the retail dealers of Chicago as well as a number of operators producing the better grade Illinois and Indiana coals. The retail dealers will be hurt because it will mean they will be kept with a big stock of unsold Illinois and Indiana coals on hand that will be exceedingly difficult to move, and the operators will suffer because they will lose a tremendous tonnage in Chicago, which will revert once more to the higher grade Eastern coals.

Raymond E. Durham, the United States Fuel Administrator for Illinois, has written to Washington and requested that the present coal zones be maintained, at least until next spring. He has asked in addition that at least six or eight weeks' notice be given before the zones are abolished, in order to give the industry a chance to adjust itself to changed conditions.

MILWAUKEE

Unusually mild weather makes the coal market slow. Liberal receipts of anthracite during the closing days of lake navigation. Situation considered satisfactory.

The coal market is dull and lacks the nervous tension which has characterized it at this time of the year since war conditions brought about restrictions in movement and price. There seems to be a feeling that there will be coal enough on hand when the last vessel is docked to meet all wants during the coming winter. The hard coal supply will necessarily have to be supplemented by rail, but the docks are loaded with bituminous coal. Soft coal is not in brisk demand on account of the extremely mild weather and also because many consumers in the city and interior who formerly were sure of getting their supplies during the winter as needed, have safeguarded their interests by accumulating stock piles by rail during the summer. The dockmen are pressing their holdings on the market, but as yet prices have not been shaded.

The movement of coal by lake to this port thus far in December has been very liberal as far as anthracite is concerned, and Fuel Administrator Fitzgerald holds that when the season closes Milwaukee will have received her full quota of hard coal. Within two weeks 160,000 tons of coal for Lake Superior and 140,000 tons for Lake Michigan have been shipped from lower lake ports. Two large cargoes of anthracite are still to arrive here. Some soft coal cargoes will probably be allowed to remain afloat until there is more room on the docks.

Thus far in December eleven cargoes of hard coal aggregating 87,817 tons have been received. During the same period 29,500 tons of bituminous coal have arrived. Lake receipts of anthracite will show a falling off for the season of approximately 140,000 tons, while bituminous coal will show a gain of about 400,000 tons. Receipts by carferry and by rail were both heavier than last year throughout most of the season.

Soft coal piles seem to develop spontaneous combustion to a greater extent than usual this year. In addition to smoldering fires in dock yards, the partial destruction of two school buildings is attributed to ignition of coal in the bins.

ST. LOUIS

The market continues inactive, with no demand for domestic or steam. Most unusually mild weather thus far and demoralized conditions have broken all precedents.

Continued mild weather keeps the local market in a most unsatisfactory condition. This is the first winter in nineteen years that has been so open and so mild. Anticipating weather somewhat on the order of a year ago, everybody stocked up with coal; and now, in many intances, there are days that fuel is really not essential for heating. Storage piles are catching fire, and this to some extent is forcing the use of this coal at once, but in other places the users are preferably burning their storage coal rather than buy on the market. This has a tendency to bring the prices down. The present figures, however, are as low as coal can be sold with profit, and in many instances it is a case of selling it at actual cost as far as Standard coal is concerned.

The amount of this coal moving into St. Louis at the present time is almost nothing for domestic and very little for steam. Fortunately the railroads came in the past week and bought considerable coal, and they as good as made their own price. This is helping conditions in the Standard field wonderfully, but how long it will continue is a question. Many mines are shutting down and work only one or two days a week, and those that are trying to work have unbilled coal every night.

There seems to be a little unrest among the miners. Their income is not as great as it used to be, and they figure that they ought to get a little more money out of the coal that is put on the market.

Conditions in the Mt. Olive field are somewhat better than those in the Standard field. The mines here seem to have better running time. Coal is moving north, with a fairly good railroad tonnage to help. Cars are plentiful and there is nothing in particular to worry the operators in this field, only, of course, that they have not got as much business as they would like to have. They have idle days on account of no orders.

In the Duquoin and Carterville fields it is apparent that operators are catching up with their orders. Several mines now have unbilled coal at night, and were it not for railroad business in this field many mines would be idle on account of no business. Car supply has not been as good in the past week as heretofore, and the movement is slowing up a little. In general conditions are satisfactory. Prices are being pretty well maintained in this field, whereas they are breaking in the other fields. In the St. Louis market Standard 2-in. lump is going as low as $1.75 to $1.85 and $1.90, the mine-run $1.60 to $1.65, and screenings about $1.40. Six-inch lump is going from $2 to $2.25, depending upon the quality.

Mt. Olive coal can be bought as low as $2.40 for the domestic sizes, and here and there is a break in the Carterville price to $2.40; but this is not general and was likely made on equipment that was restricted.

No Arkansas coals are coming in and there is no indication that anything from the east will come in for many months to come. There are about 80,000 tons of storage coal in the dealers' bins in St. Louis, and it is estimated that manufacturing plants here have 100,000 to 120,000 tons in reserve.

It is almost impossible to move local coke, and the fuel situation is not a satisfactory one from any viewpoint.

The Government maximum price here, with the exceptions above noted, is:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.55@2.75	$2.55@2.75	$2.40@2.70
3x6-in. egg	2.55@2.75	2.55@2.75	2.40@2.70
2x3-in. nut	2.55@2.75	2.55@2.75	2.40@2.70
Washed:			
No. 1	3.05@3.20	3.05@3.20	.....
No. 2	3.05@3.20	3.05@3.20	.....
No. 3	3.05@3.20	3.05@3.20	.....
Mine Run	2.35@2.50	2.35@2.50	2.20@2.30
Screenings	2.17@2.32	2.17@1.32	1.50@1.60

Special preparation on Carterville is 10 cents extra.
Williamson & Franklin Co. rate is $1.10.
Other fields 95 cents.

COAL AGE

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THE NEW YEAR

By FLOYD W. PARSONS

"I'm mighty glad to see you, Miss Liberty, and I don't deny you are the grandest lady on earth; but if you ever want to see me again, you'll have to turn around and face the other way."

Such was the comment of a soldier boy standing beside me on the deck of a steamer entering New York harbor the other day. The same thought was current in the minds of hundreds of other Americans returning from "over there."

If the war has done nothing else, it has caused several million Yankees to appreciate more properly this great land of freedom. Most of our soldiers will return home minus any desire to again cross the Atlantic. The horrors of this conflict in Europe have left an impression on human hearts that will not be effaced for generations. The boys will come back with a far deeper appreciation of law, order and justice. They will take good care that no elements of discontent in our population employ violence in their effort to realize radical aspirations.

Our returning soldiers know now how great is the waste and sorrow of war. They have learned that peace must be founded on high principles and be supported by great virtues; that deeds are silent, and that people who boast most generally fail most; that one affliction is better than a thousand exhortations; that it is easier to tear down than to build up; and that one may as well look for ground where no weed will thrive as for a human heart where no error will grow.

No benefits can ever justify war, but our losses and sacrifices have made the United States a nobler nation, a nation with an awakened conscience. The chief danger is that we may backslide. Nothing could be worse than for America to fail in her effort to champion the cause of oppressed peoples. The world would be set back beyond redemption, and the last embers of hope would die in the breast of civilized humanity.

We start the New Year with problems that have never before confronted us. Thousands of soldiers are returning to find industrial employment at a moment when our National pursuit ceases to be the business of making war. At the same time our promises must be kept, and we are obligated to feed millions of mouths in Europe. Consequently, food may be dear and employment slack during the early days of our reconstruction era.

Our duty is plain. Each individual must resolve to serve and save as never before. The end of the struggle spells the beginning of greater sacrifices. During the days of war prosperity, the average American workman has not let go the bridle. In the coming months of business readjustment the things that will count are caution and patience. We must do head work before hand work, and not forget that the edge of the shovel and the point of the plow are close kin to the meal-bag.

We might as well try to improve the rainbow by adding another hue as to expect that the wheels of industry will move without the force of our daily labor. The law of supply and demand will still be on the job 24 hours each day. As in times past fortune will smile on the fellow who conserves his time, grins at bad luck, exercises patience and discretion, and keeps everlastingly at it.

If there ever were a time for high resolves, it is right now, during these days of world convulsion. Let us stop theorizing and commence the New Year by settling on a course of old-fashioned, honest hustle, which alone has made America the grandest and the most prosperous land that lies under the sun.

The Consolidation Coal Company

BY GEORGE W. HARRIS
Editorial Staff *Coal Age*

FIFTEEN million tons of bituminous coal is a big annual shipment of fuel. The total estimated requirements of bituminous coal of the whole country for the current year is only about 42 times this amount. The only company exceeding a shipment of this magnitude and kind of coal—the Pittsburgh Coal Co.—loaded 18,709,926 tons for transportation in 1916, its year of highest production. The subsidiary companies of the United States Steel Corporation manufacturing beehive coke have mined an amount exceeding the Pittsburgh company's record, but they made the greater part of this tonnage into coke.

These achievements are cited principally to show the importance of a concern aspiring to a 15 million annual tonnage. The Consolidation Coal Co., with mines in four states, produced about 10¾ million tons of coal in 1915, its year of greatest output. During the first part of the present year, this company hoped to reach a tonnage somewhere near the capacity of its mines, but on account of shortage of railroad cars and labor, and lately the influenza epidemic in addition, its expectations will not be fulfilled—all these causes have contributed to a curtailment of production.



FIG. 1. STEEL TIPPLE UNDER CONSTRUCTION AT MINE NO. 87

The burning question is one of lack of railroad cars, and this situation has been aggravated by the advent of many small mines. There was practically no such thing as wagon mines in the Fairmont region before the war; now there are over 100 such mines operating in this region alone—they cannot load rail coal direct. In the last three years 90 per cent. of the wagon mines in this territory started up; there are said to be none in eastern Kentucky, but there are quite a few in the Maryland and Pennsylvania divisions of the Consolidation company. These small mines seem to increase the tonnage shipped, on first thought; but an analysis of the situation shows that less railroad coal is sent to market on account of the interference of these wagon mines.

The proposition is as follows: A small mine opens up and is given one car a day to load by the railroad company; if this car is loaded on time one car a day is allowed regularly to the mine—there is no demurrage in any event. Should the mine prove to have a capacity to load more cars, then they are supplied up to four in number daily. At this point it generally operates that greater tonnage is only secured by a siding or branch line being put in from the railroad, in which case the mine becomes a commercial shipping mine. Under this classification a railroad official rates the mine regularly as to its capacity to load coal, noting the various phases of its development and its equipment for handling coal from mine face to railroad car. Cars are distributed among the various operations along the line of the road, according to this annual rating.

Returning to the loading of coal by the wagon mines: Each mine receives a car a day and a time limit of two days is placed on its loading. Should it take two days to load this car, note is made of the fact on a list of such mines and the mine does not get another empty car until every other mine on the list is given one. In this extreme case at least 12 hours are saved on the part of the commercial mines; here cars placed in the morning are loaded and ready to be taken out not later than the next night. Furthermore, the large shipper is a simpler proposition for the railroad people; the cars to be handled are more concentrated, time is saved in making up trains and track arrangements are less complicated. There is no comparison between the efficiency of the small mine with its hand labor and the big plant equipped with modern machinery for handling coal. The small mines absorb many laborers working at comparatively low efficiency at a time when every man should count. The large producers often have been handicapped by shortage of labor and poor transportation from making the proper use of their equipment, which represents a large investment.

A further thought suggests itself in connection with the small mines. Operators and miners have been working to the limit to produce coal. However, the time



FIG. 2. BIRDSEYE VIEW OF MINE NO. 87

may come when changed market conditions will cause a return approaching the old competitive state of affairs. In that event what will be the fate of the small mine poorly equipped to mine coal in competition with the big plants? In the aggregate these small investments represent a significant sum which might have found better application at the time made and may constitute a considerable loss in the future. Advocates of directed expansion of the development of the country's resources might find an illustration of wasted effort in many of these small mines.

In 1915 the Consolidation Coal Co. shipped about 37 per cent. of the total production of Marion and Harrison Counties, West Virginia, for that year, and that performance holds good up to the present time. The location of the mines of this company in the Fairmont-Clarksburg region is shown in Fig. 4. In this section there are some fifty Consolidation mines, three-fifths of them, or the older plants, being on the main line between Fairmont and Clarksburg; the remainder and later operations are mainly on short branches. From this region comes half of the total tonnage of the company; about one-quarter of its annual coal shipment is produced in the Elkhorn, Ky., field and the balance mainly from the Somerset, Penn., and Georges Creek, Md., divisions.

This company began shipping coal in 1864, when it mined 37,678 tons from the Georges Creek operations; shipments increased from this region until in 1900 they amounted to 1,299,374 tons of coal. In 1901 the Fairmont Coal Co. was acquired by the Consolidation, which gave the combination an additional tonnage of about 2½ million; the following year the production of the Fairmont properties was doubled. The Somerset Coal Co. was purchased in 1902, and the mines of this company located in Pennsylvania contributed around 1½ million additional tons of coal. The Millers Creek and Elkhorn regions of Kentucky were opened up by the company in 1911 and 1912 respectively; the former contributes about half a million and the latter some two million tons of coal annually. The aggregate tonnage from all these mines was 11,722,384 tons in 1915, the year of greatest production of this company. Bare statistics are generally dry reading, but an additional fact, the total production of the company from 1864 to the end of 1917—188,054,220 tons—would be an impressive statement at any time, more especially so during times of great demand for fuel.

A coal man can hardly fail to find much that is of interest in the 54th annual report of the Consolidation Coal Co. Under "Capital Assets," coal land and other real estate are valued at $83,651,146 in round figures; deducting $9,019,472 as reserve for exhaustion, there remains $74,631,674. Under "Mining Plants and Equipment" there are a number of matters of especial interest; accordingly the main items of this account are given in the accompanying table under that head. The remaining or less important items are grouped under "Other Plant and Equipment." (See table I).

In the inventory of Consolidation plant and equipment, the most prominent item is "Mine Openings and Gradings"—a sum exceeding five million dollars is invested in underground development. This is an improvement which cannot be made available at short



FIG. 3. TYPICAL MINERS' HOMES—PENNSYLVANIA DIVISION OF CONSOLIDATION COAL COMPANY

notice—it takes time to drive entries, grade haulage roads and open up territory. If such improvements (narrow work) are kept well in advance of roomwork, the productive capacity of the mine can be greatly and quickly increased, which means more cars to load at the tipple. Steel rails represent a large investment to an operation, in this case considerably over 1½ million dollars. Heavy rails on main haulage roads tie up large sums but prove an extremely good investment. Nearly a million dollars is represented in the case of tipples and an equal sum in mine cars. This company at present is engaged in some extensive improvements, over

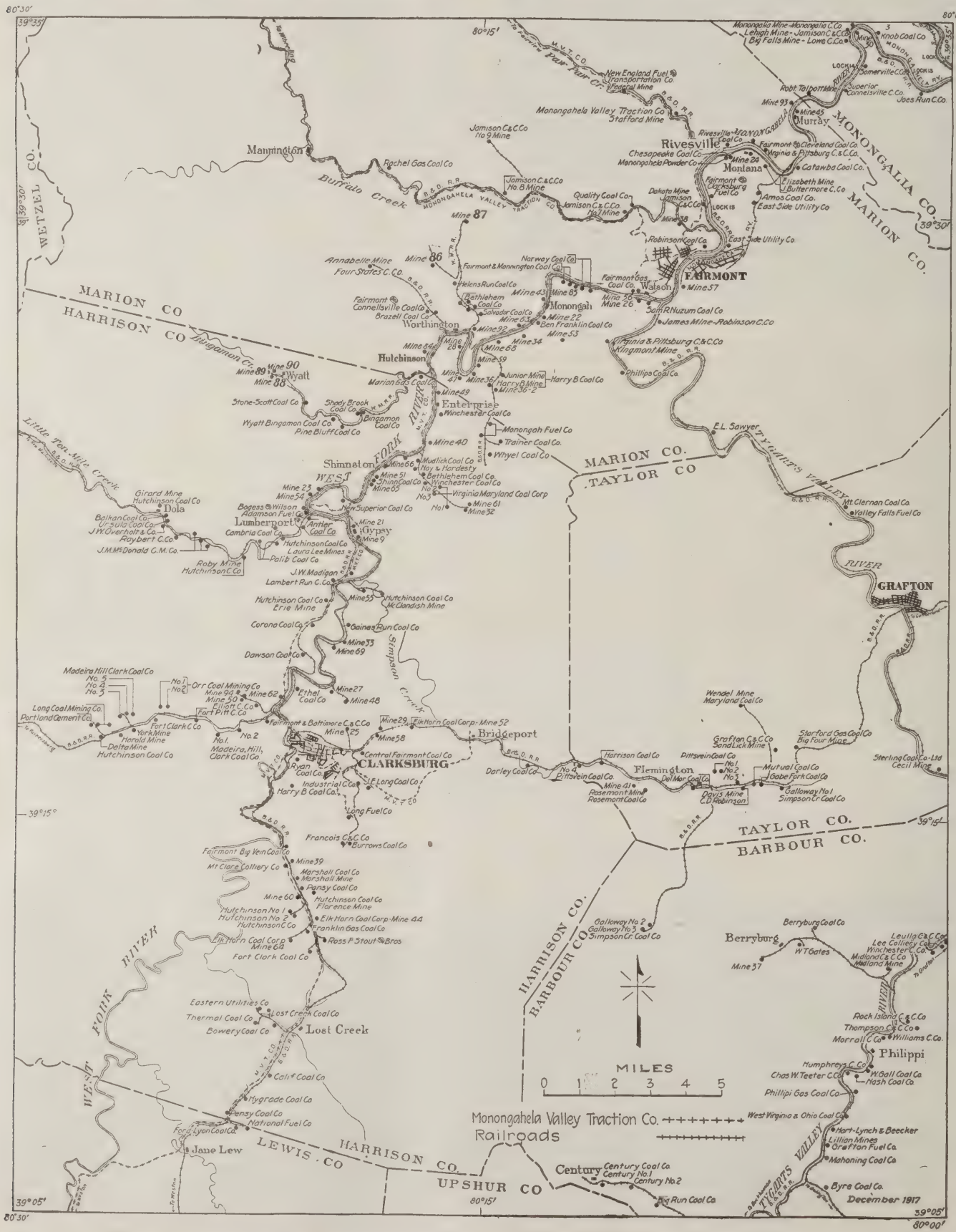


FIG. 4. LOCATION OF CONSOLIDATION MINES IN FAIRMONT REGION OF WEST VIRGINIA
Consolidation mines are indicated by number—as Mine 86

two million dollars being assigned to new work (not completed) in the West Virginia division and something over half this amount to the Pennsylvania division. In West Virginia some fine modern plants are under way. Mines Nos. 86 and 87, on a branch from the main line and about seven miles due west from Fairmont, are about completed. A view of the steel tipple at No. 87 taken while under construction is shown in Fig. 1. A later view of this plant (a shaft proposition) is shown in Fig. 2. On another branch at Wyatt (seven miles southwest of mines Nos. 86 and 87) is another big plant under development. Here three drift mines, Nos. 88, 89 and 90, will send coal to one tipple for preparation.

The various items entering into haulage—locomotives, trolley wire and equipment—represent another million dollars; mining machines are charged up at over half a million and power plants, substation and equipment at two million more. The electric end of the Consolidation equipment is valued at nearly four million dollars. An equal amount has been expended on tenement houses. Miners' houses, or "homes" as they should be termed in the case of this company, are shown in Fig. 3. This is a typical mining village of the better class.

The setting given the scene by the background of trees and the trees among the houses have considerably more than an artistic value. In the case of many towns and municipalities throughout the country officers or commissions are maintained to look after the trees to protect them from injury and replace them when necessary. Many times when a mining town is laid out with no more expense for shade than the care of existing trees, abundant shade can be secured which will add greatly to the comfort and pleasure of future occupants of the houses of such towns. This idea seems to have been followed in the case of the village illustrated.

A further illustration is afforded in the view given in Fig. 7 of the benefit of preserving natural beauties about the sites of homes and other buildings. This company has gone to considerable expense in developing the new Elkhorn, Ky., field to provide many advantages for its employees. This section is remote from large towns, and many of the privileges enjoyed by those living in or near municipalities can be participated in by not only the Elkhorn but also the employees of the company in other divisions as well. The company's statement referred to previously shows that over one hundred thousand dollars have been expended in recreation and amusement buildings and equipment alone. The amount spent in town improvement is not brought out as a distinct item.



FIG. 5. GROUP OF MINERS AT CONSOLIDATION COAL COMPANY OPERATION

Many nationalities and diverse elements are represented in the typical group of miners shown in Fig. 5. These men were photographed at the entrance to Mine No. 36, in the Fairmont region of West Virginia. If the capacity of a boiler plant can be judged by the amount of fuel fed to it, then some of these workers should be quantity coal loaders, judging from the size of the dinner pails carried, supplemented by other indications of huskiness. These men surely do not come out of the mine at noon when they can load coal.

It is to be regretted that the mines in northern West Virginia have no better transportation service to move coal from the tipple to market. At present the region is on a little better than half-time work. Some ten to eleven hundred railroad cars furnish daily transportation to eastern points; of this tonnage part goes via Connellsville over the Western Maryland. President J. H. Wheelwright of the company stated that the tonnage output for 1917 was over 1½ million tons less than for

TABLE I. MINING PLANTS AND EQUIPMENT

Mine openings and gradings	$5,240,407
Tipples and equipment	947,007
Power plant and substation buildings	417,122
Power plant and substation equipment	1,610,492
Ventilating equipment	319,555
Haulage equipment	336,531
Steel rails	1,693,331
Mine pumps and motors	253,692
Copper wire	269,794
Trolley wire and equipment	223,322
Mining machines	558,781
Locomotives	493,788
Mine cars	946,947
Water-works	441,512
Coke ovens	224,174
Tenement houses	3,904,805
Recreation and amusement buildings	86,451
Recreation and amusement equipment	17,265
Store buildings	438,217
Outside operations—buildings	102,642
Outside operations—equipment	509,024
Branch office equipment	352,709
Drainage tunnel	289,123
Other plant and equipment	1,755,424
IMPROVEMENTS (Not Completed)	
Maryland division	$15,287
West Virginia division	2,047,524
Pennsylvania division	1,182,740
Millers Creek, Ky., division	70,331
Elkhorn, Ky., division	285,370
Fairmont Mining Machinery Co.	83,714
Total	$25,117,071
Depreciation to Dec. 31, 1917	8,598,878
	$16,518,193

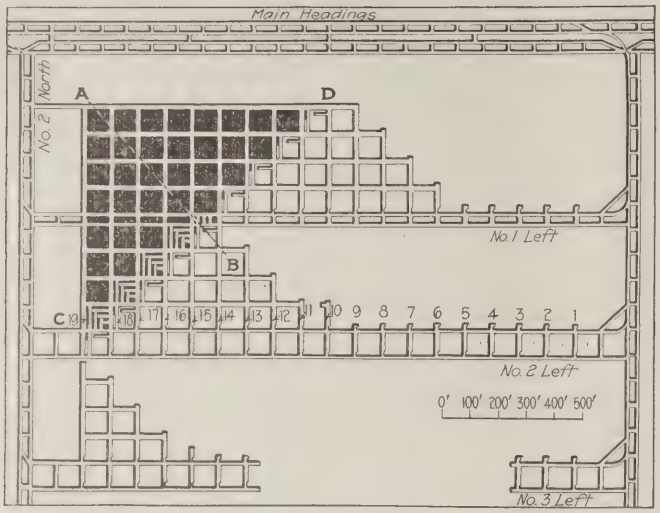


FIG. 6. GENERAL PLAN OF BLOCK SYSTEM OF MINING USED BY CONSOLIDATION COAL COMPANY

the preceding year. That this reduction in the production was caused by the failure of the railroad companies to furnish necessary transportation, which was very disappointing, especially in view of the large expenditures which had been made in opening and equipping new mines, and for additions and betterments in the extension of mines already in operation.

Prominent among the changes made by the Consolidation in betterments and methods at its mines is the adoption of the room-and-pillar panel method of mining on the block system. C. H. Tarleton, the manager of the West Virginia division of the company, is closely identified with this method as used today and states that it has the following pronounced advantages: (1) Absolute protection against squeeze and creep. (2) Greater safety to the miner while extracting pillar coal. (3) More economy in haulage, including track used; also economy in timber. (4) It permits of a more flexible method of removing or mining pillars. A comprehensive general plan of this method is shown in Fig. 6 and in detail in Fig. 8. Here the rooms are turned on 100-ft. centers and are driven 16 ft. wide and 400 ft. long from butt entries; rooms are connected every 100 ft. of advance by crosscuts which leave roof supports 80 ft. square. Never less than two pairs of butt entries are included in a panel, and where it is possible the panel is extended to cover three or four pairs of butts. The larger number of butt entries is preferred, as it is difficult to recover the barrier pillars left between panels as the coal is drawn from adjacent pillars down to it.

The block system permits of concentration of pillar work, which is well kept up as the rooms advance economically and safely. One of the greatest mistakes in mining is made by not removing pillars in time. Many cases could be cited of mines where cross or butt entries were driven to the limit before a single pillar was drawn on a pair of entries; this being true when rooms where turned and worked on a half to a mile of entry before robbing of the pillars commenced. This was supposed to be necessary in order to begin robbing at the room pillar next to the face of the entry. This plan has so many well known disadvantages as to need no special comment. A squeeze may develop where pillars stand for a year or so; top rock falling buries track unless it is removed in time; timber deteriorates, and so on. In the plan noted in Fig. 6, robbing of pillars commences as soon as a room is driven to the limit; the break in the top rock follows a diagonal line across the rooms where the work is carried out systematically.

In mining by the block system little timber is used in advancing. The track is carried along the rib which will be first extracted, and one row of props is placed on the other side; in a wider room two or three rows of props would be used. Refuse is stored in space which will never have to be used for other purposes. When a room is finished the pillar block nearest the face is attacked and robbing proceeds as indicated on the detail map, Fig. 8. This plan does not show different blocks in relation to each other, but illustrates the same 80-ft. block at different stages of working. With this plan the amount of work on the face of the coal should be about 57 per cent., the amount of solid work in each block about 72 per cent. and the amount of pillar work 28 per cent.

In this plan of robbing 13-ft. openings are driven in the block from two points and the 7-ft. strips of coal next to the gob are recovered as noted; these narrow strips of coal are shown hatched when they are drawn. In case gas is encountered it is simply necessary to use a little canvas, the same as in any other method. In the room-and-pillar work steel ties and light rails are



FIG. 7. EMPLOYEES' CLUB AND OFFICIALS' HOMES AT JENKINS, IN THE ELKHORN (KY.) DIVISION OF THE CONSOLIDATION COAL COMPANY

used; this constitutes flexible track and one easily laid by the miner. The timber used while robbing progresses is saved where practicable. The Sylat mechanical post puller manufactured by W. Sylvester, Parkersburg, W. Va., is used for recovering props, and it is also found handy to get cars on the track again; it is also used in the shop on car work.

A special modification of the method of robbing described has been found to greatly facilitate the drawing both of the barrier pillars between the panels and also the room stumps. The fracture of the top works out better and the work is more concentrated in the case of this modified method. Mr. Tarleton states in explanation of this matter that instead of the roof break following the line *CBD*, Fig. 6, the blocks are attacked so that the roof fracture follows the line *CBA* in robbing. In general in the Pittsburgh seam it is often stated that about 95 per cent. of the coal is recovered,

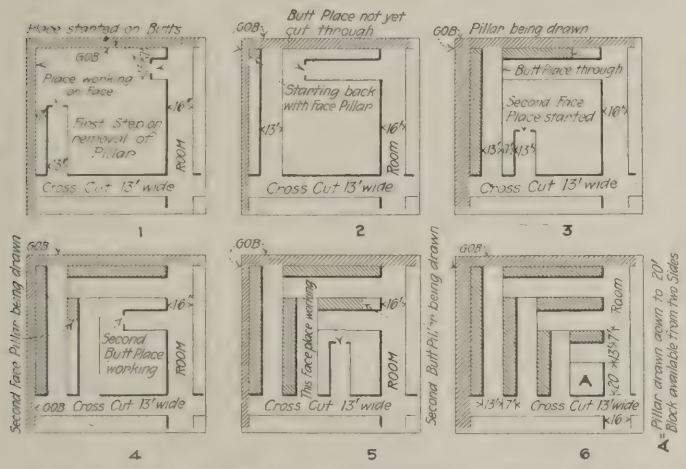


FIG. 8. DETAIL PLAN OF WORKING 80-FOOT BLOCK SYSTEM OF MINING

but some authorities who have given the matter considerable attention question whether such a high percentage of extraction is possible. It is thought by some that 85 per cent. recovery of coal is a more reasonable and practicable estimate. This is in view of the nature of the occurrence of the Pittsburgh seam; it is not all good coal to start with. There is usually a drawslate top over the main part of the seam; above this slate is a varying amount of coal of questionable value. Accordingly it is customary, where the drawslate tends to give trouble, to leave up from 4 to 8 in. of coal at a well defined parting to serve as a roof. In addition to the loss of much of this top coal, sometimes a slab of coal has to be left to hold back the gob in the robbed-out area. In view of all this, 85 per cent. is thought to be the actual amount of coal recovered.

The Consolidation Coal Co. has attained prominence not alone by virtue of the size of its annual shipments but by the excellence of the several products of its mines as well. The coals shipped to market by this company are the following well known fuels: The Georges Creek "Big Vein Cumberland," from Maryland; the Fairmont gas, locomotive and domestic, of northern West Virginia; the Millers Creek block and the Elkhorn coking, byproduct and gas coals of Kentucky, and the Somerset smokeless steam coals of Pennsylvania. These fuels took the highest award—the gold medal of honor—at the Panama-Pacific exposition.

The operating headquarters of this company is at Fairmont, W. Va., and executive offices at Baltimore, Md.; division offices are maintained at Fairmont, Frostburg, Md., Somerset, Penn., and at Jenkins and Van Lear, Ky. Sales offices have been established at Baltimore, New York, Philadelphia, Boston, Washington, Chicago, St. Louis, Detroit, Cincinnati, Louisville and Cumberland, and foreign offices at London and Genoa. The company has a controlling interest in the Northwestern Fuel Co., of St. Paul, Minn., the Metropolitan Coal Co. of Boston, and the Consolidation Coastwise Co., the last named corporation operating steamers and barges between ports on the Atlantic coast.

Anthracite Shipments in November

The effect of the influenza epidemic in the anthracite region is shown in the decrease of more than a million tons in the shipments for November compared with the preceding month, as reported to the Anthracite Bureau of Information in Philadelphia.

The shipments during November amounted to 5,276,659 tons as compared with 6,286,366 tons in October, a decrease of approximately 1,010,000 tons. As compared with shipments during November, 1917, which amounted to 6,545,313 tons, the shipments last month show a decrease of 1,268,654 tons. Shipments last month were the smallest since February, 1917.

Conditions in the region have been much improved since December came in, the force of the epidemic having largely spent itself; but in addition to this there has been an increase in the supply of labor due to the return of men from the service and other occupations.

The shipments by companies were as follows:

	November, 1918	November, 1917	Coal Year, 1918	Coal Year, 1917
P. & R. Ry	1,137,170	1,329,259	10,248,539	10,317,398
L. V. R.R.	973,865	1,158,158	9,884,413	9,844,000
C. R.R. of N. J.	450,360	557,090	4,626,285	4,698,230
D., L. & W. R.R.	776,506	1,012,330	7,831,046	8,380,629
D. & H. Co.	624,335	786,381	6,138,879	6,070,952
Penna. R.R.	364,193	457,970	3,624,634	3,758,277
Erie R.R.	554,026	720,308	5,873,373	6,069,673
N. Y., O. & W. Ry.	124,700	161,615	1,334,931	1,359,028
L. & N. E. R.R.	271,504	362,202	2,624,316	2,827,941
Total	5,276,659	6,545,313	52,186,416	53,326,128

Coal Trade in Venice

In 1913 Venice imported 13,004,619 quintals (a quintal equals 220.46 lb.) of coal, more than twelve-thirteenths of which came from Great Britain. The sources of supply and quantities were: Great Britain, 12,040,145 quintals; Holland, 573,756 quintals; Austria, 354,386 quintals, and Germany, 35,882 quintals. This represents a year's supply under normal conditions. In 1914 the import was smaller, the total being only 10,311,070 quintals. More than nine-tenths of this, or 9,156,080 quintals, was supplied by England; Germany was the second source of supply, with 673,000 quintals; the United States, entering the market for the first time, was third, with 379,550 quintals; and Austria was fourth, with 102,440 quintals. In 1915 Great Britain was the sole source of supply and the entire import was only 2,076,330 quintals; and in 1916 the supply that entered by sea, entirely for naval use, was only 94,950 quintals. For military reasons no figures are available for 1917; importation was made entirely by the Government, which allowed certain industries to purchase a fractional quantity of the amount they needed.

Coal—How Analyzed

By FREDERICK L. SERVISS
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SYNOPSIS—*Some terms used in coal specifications are as a rule but vaguely understood. The determination of the moisture, volatile matter, fixed carbon and ash are simple operations, but the determination of the sulphur and phosphorus content is much more complicated. The thermal content of a coal may be calculated, but a much better plan is to ascertain it exactly by burning a sample in a bomb calorimeter.*

IT IS sometimes surprising to the technical man to note how few coal operators are familiar with the tests to which their product is subjected by many purchasers. They are bewildered when they read the report of such an analysis. Volatile matter, fixed carbon, sulphur and ash are vaguely understood, but an "air dry," "as received," "moisture free," or "moisture and ash free" basis of analysis means little or nothing to them.

Undoubtedly a short, simple explanation of these several tests will be of interest and value to the practical man. This article was written with that idea in view. Short, definite explanations are given wherever necessary, in order to insure a thorough understanding of the subject. No long involved chemical or technical processes are discussed, other than those required, and these are then made plain in simple language.

Coal when received in sample lots at the laboratory has been prepared in a systematic manner. The sampling of anything to be analyzed is as important as the analysis itself, and must be carefully and conscientiously carried out in order to insure correct results. In preparing a laboratory sample, a large quantity of coal is started with. This is reduced to approximately the same size and thoroughly mixed. In mixing, care must be taken to have each portion a representative of the whole. If too bulky, the sample is reduced by quartering. The ordinary laboratory-size sample is about one pound, or nearly 450 grams, the gram being the unit of weight employed in analysis.

The sample is next crushed so as to pass through a 60-mesh screen, either by rotating it in an air-tight ball mill or otherwise. After being crushed, the coal is passed through an automatic sampler which reduces the size of the sample by halving it, until a small sample of about 50 grams is obtained. From this it is easily seen why special care must be taken to insure an intimate mixture at the start. This 50-gram sample is passed through a 60-mesh sieve, any larger lumps are removed, crushed by hand, and added to the sifted portion.

Should the analysis be made upon an "as received" basis, the sample is placed in a bottle and sealed. This bottle is large enough so that the coal will not fill it more than two-thirds full. It is then agitated either mechanically or by hand until it is certain that the coal is thoroughly mixed. It is now ready for the analyst.

Assuming that the analysis is to be made on the basis of "air dry," the coal when received at the laboratory, the 60-mesh sample, is first weighed and then placed in a drying oven and dried at about 95 deg. F. for 8 hours, after which it is again weighed. The loss in weight is known as the "air drying loss," but must not be regarded as accurate, or that a high loss is indicative of poor coal. In coal analysis, the following constituents are determined: Moisture, ash, volatile matter, fixed carbon, sulphur, phosphorus, calorific or heating value, specific gravity, true and approximate.

The use to which the coal is to be put determines whether or not all or only certain of the foregoing constituents shall be determined. In the iron and steel industry there are certain elements in the coal which, if not determined accurately, will affect the resulting product. Phosphorus and sulphur are most detrimental and must be carefully checked. The ash content is determined accurately for this kind of work, in order that the calculations for the amount of limestone to flux the ash may be made. Coke is almost universally used in the iron industry, but the same analysis will apply to coke as to coal.

Efficiency of Coal Reduced by Moisture

Moisture in a coal reduces its heating efficiency. One per cent. of moisture averages a loss of 13 B.t.u. for each pound of coal burned, or at a rate of 26,000 B.t.u. per ton. From this it is evident that moisture is detrimental, even in small amounts; besides it also reduces the rate of combustion.

Ash, or earthy matter, in a fuel is of considerable importance in determining the heat value of a coal. Moisture is determined by drying one gram of the coal, "as received," in a weighed crucible. The crucible is heated to 230 deg. F. for an hour. It is then cooled in an air-tight container to prevent reabsorption of moisture from the air, and weighed when it reaches room temperature. Where great accuracy is desired, the moisture content analysis must be made upon samples of coarse as well as finely ground coal. When, as is usually the case, more moisture is found in the coarse sample, a correction must be applied to the results but the determination of this factor is of interest to the analyst alone and need not be taken up here.

The ash is determined by burning a weighed amount of coal, usually a gram, from the previously prepared air-dried sample, in a small crucible over a low gas flame, until the coal is free from carbon and all the volatile matter driven off. Slow heating is necessary in order to prevent coking and render the coal more easily burned to ash. The crucible is finally heated to bright redness until all black material is burned out.

The crucible with its contents is cooled to room temperature and weighed. It is heated to redness again for 30 min., cooled and weighed again, and so continued until the difference between two successive weights is 0.005 gram or less. The residue left in the crucible represents the ash content of the coal and is expressed in per cent.

Volatile matter is determined by placing one gram of the undried powdered coal in a weighed crucible having a closely fitting cover. This is heated over the free flame of a bunsen burner for 7 min., cooled and weighed. The loss in weight minus the moisture content of one gram represents volatile matter and is expressed in per cent. Fixed carbon is found as follows: 100 minus the sum of the ash moisture and volatile matter is known as fixed carbon and is also expressed in per cent.

The determination of sulphur is more exact, and to understand it a certain knowledge of chemistry is desirable. Sulphur in coal exists in many forms, among which are pyrite or iron sulphide, organic sulphur and compounds of sulphur known as sulphates. By heating a weighed amount of the coal in a crucible with a definite mixture of magnesium oxide and sodium carbonate, with access of air, the sulphur and its compounds are changed to alkaline salts which are dissolved by boiling in distilled water. This is now filtered to separate the solution from the solid matter.

How to Determine Sulphur Content

Bromine water and hydrochloric acid are added to the clear solution, which is again boiled; after boiling for a few minutes to expel the bromine, a solution of barium chloride is added slowly, drop by drop. Upon the addition of the barium chloride a cloudy, white precipitate is formed, which is insoluble. After allowing this precipitate of barium sulphate to settle, it is filtered and washed with hot water, then dried. When dry it is ignited and burned until white, after which it is cooled and weighed. From the weighed barium sulphate the sulphur content of the coal may be figured by multiplying it by 0.1374.

The determination of phosphorus, like that of sulphur, must be accurate and great care must be taken in the analysis. Phosphorus may be determined in several ways, but the most used is what is known as weighing the "yellow precipitate." The ash from burning ten grams of coal is fused with a mixture of sodium carbonate and sodium nitrate, dissolved in water, acidified with hydrochloric acid evaporated to dryness, and hydrochloric acid and water again added. The insoluble matter is filtered off and the clear solution treated as follows: Nitric acid is added and the solution boiled down rapidly to a small volume, ammonium hydroxide is added until a permanent precipitate forms, then nitric acid is added until the precipitate dissolves, and a few drops are added in excess. The solution should be heated to near boiling, then a measured amount of a previously prepared molybdic acid solution is added, and the whole shaken for 15 min. The yellow precipitate which results is known as ammonium-phospho-molybdate. This is then carefully dried at 220 deg. F. and weighed. The phosphorus may be determined by multiplying the weight of this precipitate by the proper factor.

The heating power of a coal is understood to mean the total amount of heat liberated by the complete combustion of a unit weight of the fuel. It is customary to select the pound as the unit of weight, which with the Fahrenheit scale of temperature results in the British thermal unit, or B.t.u. The heating power of a coal or coke may be calculated with fair accuracy for many purposes from Dulong's or other formulas. The results thus obtained, however, are only approximate, and for accurate results the direct combustion of the fuel in a bomb calorimeter is used. The manipulation is as follows. There are many styles of calorimeters, but the principle is the same, and the method here explained will apply to almost any type.

A weighed sample of the 60-mesh coal is placed in a platinum tray. One terminal of the igniting circuit is connected to this dish, which is placed in the bomb, or heavy steel tube fitted with a tightly screwed-on cap. The cap is put securely in place. To insure ignition of the coal in the bomb a piece of fine iron wire is connected to the other terminal of the firing circuit, and placed so as to touch the coal sample in the tray.

After screwing on the cap, oxygen is pumped into the bomb until a pressure of 20 atmospheres, or about 280 lb. per square inch, is reached. The needle valve through which the gas was pumped is closed so as to allow no escape of gas. The bomb is now placed in a polished copper pail, containing a weighed amount of water, enough to cover the bomb about an inch above the top, and this pail is placed in an insulating jacket. The firing terminals are connected to the switch and the temperature of the water read accurately, often to 0.001 deg. C. The switch is then thrown, combustion takes place within the bomb, and the resulting rise in temperature of the water is noted. From the temperatures read, knowing the weight of water used and the specific heat of the bomb and the copper pail, the heat value of the coal may be determined and expressed in B.t.u.

Easy to Determine Specific Gravity

Frequently specific gravity, both true and apparent, is asked for and may be found with ease. Select a lump of the coal (one weighing about half a pound will do nicely) and weigh it. Call this weight A. Place the lump in a glass of distilled water for a few minutes, remove it and carefully wipe off the excess water, and weigh again. Call this weight B; then the increase in weight B-A, we will call C. Weigh the lump while suspended in a glass of water. Call this weight D. Then,

$$\frac{A}{(A-D)} = \textit{true specific gravity}$$

while

$$\frac{A}{A-(D-C)} = \textit{apparent specific gravity.}$$

The heating value of the coal as determined by the combustion of a sample in an atmosphere of oxygen does not give the real commercial power, since this is dependent upon the character of the furnace and its operation, as well as on the composition of the coal. Where a number of grades of different fuels are available (for say steaming purposes), it is found best to conduct a series of tests upon these fuels and determine which will evaporate the most water under operating conditions for the least money; and that which is found to be the cheapest is nearly always chosen. However, it is advantageous for a plant operator to know the heat content of the coal he uses. The evaporation of so many pounds of water by so much coal is not indicative of efficiency, therefore a determination of the heat units contained in the coal is essential to a thorough knowledge of its value.

Some Characteristics of American Coals in Byproduct Coking Practice—III

By F. W. SPERR, JR.
Chief Chemist, The Koppers Co., Pittsburgh, Penn.

SYNOPSIS—*There was a time when the analysis of a coal gave little indication as to its coking qualities; its physical appearance was supposed by be a safer guide in this connection. This was true of beehive oven practice. With the extension of the byproduct coke oven and a more intimate acquaintance with the various coals new theories have been adopted.*

THE geological age of a coal is no criterion as to its coking quality. As good byproduct yields and as good coke are obtained from the comparatively recent coals of Colorado as from the early carboniferous strata of Pennsylvania. The coking properties of the Lower Kittanning seam undergo most remarkable changes parallel with the extent of devolatilization southeastward from Allegheny and Fayette Counties, Pennsylvania, to the Potomac basin in Maryland. The phenomena of prime importance seem to be those of deoxidation rather than of devolatilization. The highly oxygenated coals of Illinois may have less volatile matter than coal from a portion of the Pittsburgh seam and yet produce a much inferior coke. In fact, the best basis we have for differentiation, with respect to coking quality, seems to have close relation to high- or low-oxygen content. We might make the above com-

Examples	Low-Oxygen Coking Coals: Appalachian Bituminous Coal Fields	High-Oxygen Coking Coals: Illinois, Indiana, Washington
Shape	Blocky	Slender, tapered, fingery
Hardness	Hard	Soft
Exterior surfaces	Even	Sometimes smooth; but often having transverse seams or sometimes even masses of pebbly carbon
Cell-structure	Regular—usually rather heavy cell walls	Irregular—thin cell walls
Byproducts: Gas	High yield—rich—little CO or CO_2	Low yield—lean—much CO and CO_2
Tar	High yield—thicker—high specific gravity—less tar acids	Low yield—thin—lower specific gravity—more tar acids
Ammonia	Normal	Often higher
Benzol	Normal	Irregular
Combined water	Low	High
Rate of coking	Normal	Slow
	The excess of fusible bituminous matter accumulates in the upper center of the oven, forming a wedge-shaped, honeycombed mass, called "sponge"	Any excess of fusible bituminous material forms pebbly masses more or less loosely agglomerated and not always confined to the center of the oven

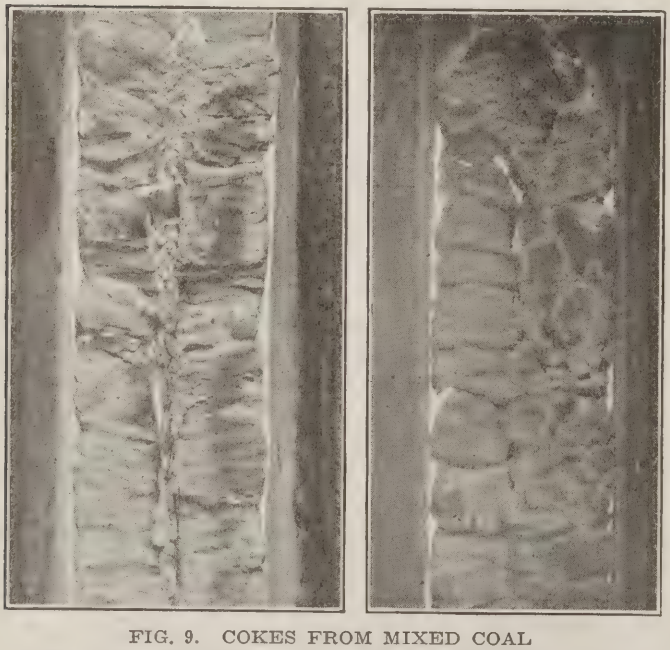


FIG. 9. COKES FROM MIXED COAL

Left—Coke from mixture of 85 per cent. Pittsburgh + 15 per cent. Pocahontas coals; made slowly in wide oven; thirty hours' coking time; appearance in oven. Right—Coke from mixed coal: 85 per cent. Pittsburgh + 15 per cent. Pocahontas; made rapidly in wide oven; sixteen hours' cooking time; appearance in oven; note sponge in upper part.

TABLE V. SULPHUR ELIMINATION IN COKING COALS IN KOPPERS OVENS

State	County	Seam	Coking Time, Hours	Coke Yield, Per Cent.	Sulphur: Per Cent. in Coal	Sulphur: Per Cent. in Coke	Sulphur: Per Cent. of Total Eliminated	Sulphur: Per Cent. of Total Retained
Colorado	Pueblo and Gunnison		21.5	74.0	0.68	0.57	38.0	62.0
Colorado	Pueblo and Gunnison		19.0	74.0	0.58	0.52	34.0	66.0
Colorado	Pueblo and Gunnison		19.5	73.0	0.51	0.47	32.7	67.3
Colorado	Pueblo and Gunnison		20.0	75.5	0.58	0.53	31.4	68.6
Colorado	Pueblo and Gunnison		18.0	73.0	0.58	0.54	32.0	68.0
Colorado	Pueblo and Gunnison		19.5	74.0	0.63	0.40	53.0	47.0
Alabama	Jefferson		18.0	75.0	0.99	0.84	36.4	63.6
Alabama	Jefferson		18.0	75.0	1.07	0.92	35.5	64.5
Alabama	Jefferson		18.0	75.0	0.99	0.99	25.0	75.0
Alabama	Jefferson		17.0	75.0	0.79	0.64	32.3	60.7
Alabama	Jefferson		18.0	75.0	1.39	1.17	36.8	63.2
Alabama	Jefferson		18.0	75.0	1.17	1.06	32.0	68.0
Alabama	Jefferson		18.0	71.0	1.25	1.23	30.2	69.8
Pennsylvania	Allegheny	Pittsburgh	20.0	70.0	1.12	0.84	47.5	52.5
Pennsylvania	Fayette	Pittsburgh (Klondike)	17.0	68.0	1.03	0.95	37.3	62.7
Pennsylvania	Fayette	Pittsburgh (Klondike)	19.0	68.0	1.03	1.00	34.0	66.0
Pennsylvania	Westmoreland	Pittsburgh	19.5	71.0	1.85	1.50	42.4	57.6
Pennsylvania	Washington	Pittsburgh	20.0	72.0	1.06	0.76	48.3	51.7
Pennsylvania	Fayette	Lower Kittanning	19.0	75.0	0.87	0.75	35.3	64.7
Washington	Pierce	No. 6	17.5	70.0	0.60	0.58	32.2	67.8
Washington	Pierce	Mostly No. 6	19.0	70.0	0.53	0.46	39.3	60.7
Washington	Pierce	No. 7	19.0	76.0	1.70	1.57	29.8	70.2
Washington	Pierce	No. 8	19.0	72.0	0.46	0.49	35.8	64.2
Washington	Pierce	No. 8	17.5	72.0	0.54	0.51	32.0	68.0
West Virginia	Preston	Lower Kittanning	17.5	70.0	1.84	1.56	40.6	59.4
West Virginia	Marion	Pittsburgh	16.5	68.0	1.48	1.56	28.3	71.7
West Virginia	Marion	Pittsburgh	16.5	68.0	1.62	1.63	31.6	68.4
	Mixtures with Pocahontas Coal							
Illinois	20 per cent. Illinois + 80 per cent. Pocahontas		18.0	84.0	0.87	0.75	27.7	72.3
Pennsylvania	85 per cent. Pittsburgh (Allegheny Co.)		20.0	71.0	0.90	0.72	43.3	59.7
Pennsylvania	60 per cent. Pittsburgh (Allegheny Co.)		20.0	75.0	0.77	0.67	34.8	65.2
Pennsylvania	60 per cent. Pittsburgh (Allegheny Co.)		22.0	78.0	1.05	0.96	28.7	71.3
Pennsylvania	85 per cent. Pittsburgh (Fayette Co.)		21.0	71.0	1.07	0.81	46.4	53.6
Pennsylvania	70 per cent. Pittsburgh (Fayette Co.)		20.0	73.0	1.05	0.79	45.1	54.9
Pennsylvania	60 per cent. Pittsburgh (Fayette Co.)		20.0	73.0	1.03	0.76	46.2	53.8
Pennsylvania	20 per cent. Pittsburgh (Fayette Co.)		18.0	84.0	0.79	0.69	46.7	73.3
Kentucky	75 per cent. Pond Creek		20.0	75.0	0.55	0.49	33.2	66.8
Kentucky	75 per cent. Pond Creek		22.0	76.0	0.64	0.67	20.4	79.6
Kentucky	30 per cent. Elkhorn		20.0	80.0	0.69	0.68	21.2	78.8
Kentucky	75 per cent. Pond Creek		20.0	75.0	0.52	0.48	30.9	69.1



FIG. 10. COKE FROM MIXTURE OF 85 PER CENT. PITTSBURGH + 15 PER CENT. POCAHONTAS COALS
Made slowly in wide oven; thirty hours' coking time; appearance on bench

parisons of these two kinds of coal with approximately the same percentage of volatile matter.

It would be very interesting to compare the results of normal geological deoxidation, such as has occurred in parallel undisturbed strata, like the Freeport, Kittanning and Pittsburgh seams in Allegheny County, Pennsylvania, with what one might term "accelerated deoxidation," such as has occurred from the western to the eastern portions of the Lower Kittanning seam. Additional data must, however, be accumulated before we can begin to generalize on this subject. The famous Pittsburgh seam is the most regular and dependable of any with which we have to deal. Even in this seam, however, the percentage of volatile matter drops gradually from about 37 per cent. in the western portion to about 27 per cent. in portions of the Connellsville basin. Attention has heretofore been given principally to this phenomenon of devolatilization, and it would be interesting to study the variation in coking quality from the standpoint of deoxidation. Here the differences in oxygen content are relatively smaller, and, in spite of the considerable range of volatile matter, we actually find comparatively small differences in the coking quality of different parts of the seam.

Fig. 9 shows coke made from Pittsburgh coal + 15 per cent. Pocahontas in ovens of 20 in. average width, coked 17 hours and 30 hours respectively, heats having been adjusted to the coking time. Figs. 10 and 11 show the cokes from these ovens on the bench. Please note the difference in the amount of sponge, which is quite characteristic. The 17-hour coke, although it is smaller sized and more cross fractured, is stated to give excellent results in the blast furnace. In ovens somewhat narrower, such as those at St. Paul, and with a coking time of 19 hours, the Pittsburgh coal gives very little sponge.

The Elkhorn coal, the development of which in the last few years has been one of the prominent events in the coal industry, appears to occupy a position midway between the eastern high-volatile coals and the more highly oxygenated coals of Illinois and Indiana. Its low ash and sulphur content and high byproduct yields place it in the first rank of our best coking coals. It makes no sponge; but the coke shows some pebbly carbon like that characteristic of Illinois coals.

The data (Table V) showing the elimination of sulphur in coking various coals in byproduct ovens are of considerable practical importance. The figures for Alabama coals and for mixtures of Pennsylvania with West Virginia, and Pennsylvania with Kentucky coals



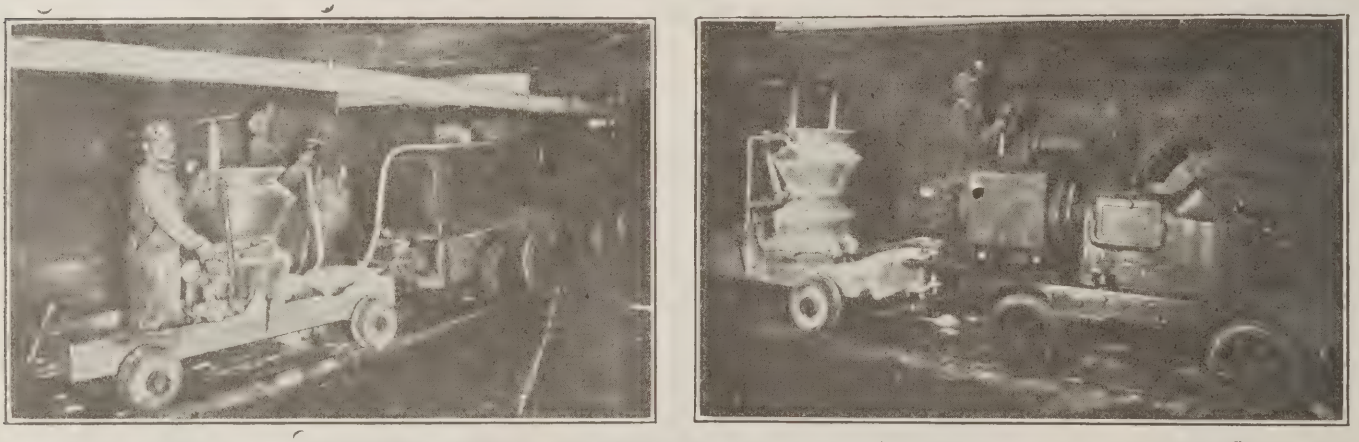
FIG. 11. COKE FROM MIXED COAL; 85 PER CENT. PITTSBURGH + 15 PER CENT. POCAHONTAS
Made rapidly in wide oven; sixteen hours' coking time; appearance on bench

are each averaged from a large number of tests; the other figures are from individual tests. Please note the high percentage expelled in coking Pittsburgh coal and the lower percentage from the higher oxygen coals of Washington and Kentucky. J. R. Campbell[1] has observed the higher percentage of sulphur elimination in the byproduct oven, and states that in beehive practice they figure on about 20 per cent. elimination.

Use of the Cement Gun in a Bituminous Coal Mine

By M. S. Sloman
Pittsburgh, Penn.

Numerous experiments have been made and exhaustive tests conducted by the Bureau of Mines and various coal companies in the bituminous fields on the application of a cement coating on roofs and ribs to prevent weathering and the costly falls of rock arising from this cause. While considerable work has been done in this direction, the results obtained have, until recently, been considered of rather questionable value by some who have been waiting to see the condition of the coating after it had been applied for a considerable length of time. The United Coal Corporation, of Pittsburgh, Penn., with several large operations, was one of the first to become interested in this subject, and the results obtained by it seem to prove conclusively that a cement coating, properly applied, will form a permanent barrier to the action of weathering on roofs susceptible to air slacking.



TWO VIEWS OF THE CEMENT GUN AT WORK IN THE EDNA MINE

The work has been carried on at the Edna No. 1 mine, located at Adamsburg, Westmoreland County, Penn., near Pittsburgh, where it is working the Pittsburgh seam, averaging 6 ft. in thickness, with the characteristic roof coal of about 12 in. and above that a slate and clay composition containing limestone which is readily disintegrated by contact with air. Without question this cement-gun coating was applied under adverse conditions. The coal is taken from the mine through a main slope, first started some 18 years ago, and driven in 6500 ft. Trouble has been encountered from the start due to falls of roof, as evidenced by the average distance from the coal to the roof, which is about 12 ft.—frequently the road was completely blocked by such falls, necessitating the closing of the mine on an average of three or four days every summer. Owing to the risk involved, no man-trip could be run and the miners were obliged to walk in and out from work. It was on this slope that the work was started on Nov. 1, 1917.

The equipment consisted of a "N-1" cement gun. Essentially this consists of a hopper with control valves for mixing the material and a nozzle at the end of a hose, where the dry sand and cement, conducted under air pressure, are mixed with water and directed at high velocity onto the surface to be coated. This apparatus is mounted on wheels of suitable track gage, making it entirely portable.

In this mine, as in many others electrically equipped, there is no supply of compressed air available. To meet demands of this nature, a Sullivan electrically operated portable air compressor was developed. This can be conveniently taken into the mine to the location of the work.

Since there was no supply of water under pressure available for this use at the Edna mine, an ingenious system was used. A large tank, of a size to hold sufficient water for a shift, was mounted on a mine car; a connection was made with the air receiver and this water, brought under pressure, was forced up to the spraying nozzle.

The work is done at night by a crew consisting of from 5 to 8 men. One man operates the gun, one the compressor (also serves as general mechanic), two others mix the material and one operates the nozzle; in addition, the following men are employed outside for part of their time: One hauls material, one dries sand and one handles the hoisting rope when the machine is working on the grades.

It was found that the mixing could best be done outside the hopper, and accordingly wooden boxes are used for that purpose and the mix dumped into the hopper. The mix consists of three parts fine sand (and this must be thoroughly dry) to one part Portland cement. The air pressure for the most effective work should be from 40 to 60 lb., while the water should be under a pressure about 20 lb. higher if possible.

The surface to be coated is first thoroughly cleaned and scaled. This is most essential. It is the opinion of Mr. Maize, the local superintendent, that where possible the use of a stream of water would prove very effective. No wire or reinforcement of any kind is used in coating the bare roof and side walls, and the coating is applied direct, averaging ½ in. in thickness.

[1]Trans. American Institute Mining Engineers, 1916, liv, p. 181.

Pieces of coating afterward broken off show a perfect bond existing between the cement and the substance composing the surface, whether it be coal or rock. In coating the timbers, ½ in. wire mesh is first stretched and secured to the surface before the cement is applied.

An accurate record of progress and costs has been kept from the start and these figures will no doubt prove interesting. The total cost of coating 6250 ft. of slope, averaging 12 ft. in width and 12 ft. in height on sides, has been $7488.58. This figures a net cost of 30c. per square yard.

The following figures taken at random show detailed costs on a length of 900 ft. of slope which was completed in 13½ shifts of 8 hours each.

1 mechanic	$71.85
1 engineer for rope hoist	65.48
1 operator cement gun	71.85
2 mixers at $63.45	126.90
1 man at nozzle	63.45
1 man drying sand	61.40
1 man haul material part time	23.50
540 sacks cement at 60c	324.00
1620 sacks sand at 12c	194.40
Total	$1002.83

This section figured about 36 sq.ft. per foot of advance, making the actual cost on this work 27c. per square yard of surface coated. This cost, as will be noted, included the outside engineer, which charge would not be necessary in most cases. It is interesting to note the progress made, which approximated 90 sq.yd. per shift of 8 hours.

In addition to the main slope, the entries and breakthroughs are coated. The "gun" has also been used with success in making stoppings air-tight and in building up permanent stoppings.

This can be done by building up a wall of loose rock and then applying a thick coating of cement. An excellent air-tight stopping is the result.

It would seem that the coating has stood a sufficient length of time on the slope to enable one to judge as to its permanence. A large part of the coating has withstood the rigors of the coldest winter yet experienced, and the heat of an extremely hot summer. It is today in excellent condition and looks as strong and unbroken as when first applied. In a few exceptional cases only, and these confined to small areas, has any spalling of the coating occurred. This was attributed entirely to improper cleaning of the wall before the coating was applied. The beneficial results obtained at this mine have been such as to more than offset already the initial cost of the equipment and the cost of the work. Not a single fall of roof has taken place in sections coated and, consequently, there has been no forced closing of the mine as was previously the case. This saving alone can be computed in dollars and cents. A regular man-trip is now run in and out of the mine and the elimination of the long walk on the part of the miners has done much to make them more contented and efficient during times of maximum production.—*Mine and Quarry.*

Coal Roof Support

An operator possessing a thick seam of coal at times has some of the advantages and disadvantages of a person with a fat wallet. He is fortunate in having surplus coal to spare if demanded, but when used for purposes where recovery later is doubtful, it might be an advantage if the seam was not of sufficient height to permit of its being so used. This thought was suggested by the accompanying illustration, which shows an entry in the Pittsburgh seam in the northern part of West Virginia.

At the mine where this photograph was taken this coal seam runs about 7 to 8 ft. in thickness. Immediately above the main portion of the bed there is often a bad drawslate, on top of which generally is a bench of inferior coal. It has been found safer and more economical under such circumstances to leave up from 4 to 8 in. of coal to serve as a top. The unfortunate part of this plan is that this top coal is generally lost. From a conservation standpoint it is a waste.

An experiment has been tried in recent years to supplement the coal roof noted by arches of coal in entries. Over a mile of straight entry was thus driven and a good opportunity given to note the results of this method of roof treatment. In the illustration a curved arch is shown starting just beyond the patent mine door, which is standing open temporarily. Another form of arch was also tried in which the lines of the arch are straight, the corners at the top being diagonal, along the lines a brace would take if used in timbering. This latter form was called a "box" arch. In shooting the coal at the entry face three shots were placed—a center shot and one on either side—all near the top. The arch was then trimmed up by pick to the shape desired. The arch is not favored by the company operating the mine where the photograph was taken, one reason being given



CURVED-ARCH COAL TOP AND PATENT DOOR

that when electric wires are strung along the top the arch coal must be taken down. It is most desirable to avoid the use of timber props on haulageways, and a number of substitutes have been tried to hold up the roof, among such being a coal arch. The entry illustrated is from 10 to 11 ft. wide and the arch support was an interesting experiment.

It was fortunate that a photograph of the entry showing the coal roof support includes a view of a Canton automatic mine door, made by the American Mine Door Co., of Canton, Ohio. The details of this equipment are more clearly indicated on account of the door being open. The operation and advantages of this device are so well known to coal men as to need little comment. By its use the human element is done away with, and with its elimination the great danger to the trapper attending the oldtime door. It has been appropriately stated that even a runaway car or trip passes through this automatic door as safely as a slow mule. The door is the result of years of experimentation.

The Fuel Problem of Brazil

Prepared for *Commerce Reports* by the Latin American Division, Bureau of Foreign and Domestic Commerce

SYNOPSIS — *Rich in vast tracts of land suitable for agricultural and grazing purposes, Brazil is handicapped by the lack of fuel. During the war the country was forced to depend mainly on her own resources for fuel. An analysis of Brazilian coals shows that when used with the steam engine they deliver more horsepower per pound of coal than do the best grades of Pocahontas or New River. Federal Government aids development by making loans.*

THE war has served to accentuate sharply the absence of adequate supplies of native fuel in Brazil. The restriction of imports, first from Europe and now from the United States as well, has forced the Republic for the first time in its history to depend upon its own resources. Recent Latin American circulars issued by the Bureau of Foreign and Domestic Commerce on the Brazilian trade balance and foreign exchange and on the war and Brazilian foodstuffs summarize briefly the rapid strides which Brazil is making toward economic independence and the diversification of her agricultural products. Rich in vast tracts of fertile land suitable for agricultural and grazing purposes, possessing roughly some 1,500,000 square miles of timberland, and the fortunate owner of extensive deposits of iron and manganese, Brazil is finding itself hampered at every turn by the shortage of one prime necessity—fuel.

A coal commission, appointed by the Federal Government, made an extensive examination of the coal fields of the country during 1904 and 1905 and reported the existence of coal suitable for briquetting in the three southernmost states—Rio Grande do Sul, Santa Catherina and Parana. Thin coal seams of inferior quality were also reported in Sao Paulo and lignitic coal has been discovered along the tributaries of the Amazon in the States of Para and Amazonas. The oil resources of the Republic are apparently confined to the oil of the Bahia region, and a rather indeterminate area of scattered indications in the interior. Wood is the native fuel which is abundant in all parts of the country. No list of Brazilian fuel resources is complete, however, without a mention of the hydroelectric possibilities of the many powerful waterfalls and cascades which are fortunately prevalent in the accessible coastal highlands and along the edges of the interior plateau. In fact, the recent industrial development of Rio de Janeiro and Sao Paulo is largely due to the availability of ample water power.

Before the war it was easier and cheaper to import coal than to attempt the mining of the native product, which was inaccessible and of inferior quality. Fuel oil was apparently in little demand before 1913. Wood was used where coal could not be obtained, but proved an expensive and wasteful fuel. Comparatively little capital was used for the equipment necessary to generate and utilize hydroelectric power. Hence, prior to 1914, with the exception of wood, the greater part of the fuel used in Brazil was imported.

The restrictions placed upon exports of fuel by the allies since the beginning of the war and the accompanying high prices have forced Brazil, temporarily at least, to resort in part to native fuel. Under this stimulus Brazil is beginning to exploit her native coal fields and is experimenting with oil extracted from the Bahia shale. For the most part, however, the present shortage is being relieved by the increased use of wood. Although the import figures for the war years 1914-1917 can not be said to equal the consumption as the import figures for prewar years do, it is nevertheless true that only a small per cent. of the shortage occasioned by the decreased imports has been met by native fuel.

The accompanying tables show the steady increase in the quantities of fuel imported during the four-year period immediately preceding the war and the steady decrease during the four-year period of the war, coupled with the increase in cost.

The following table, compiled from official Brazilian statistics, contrasts the steady increase in the quantities of fuel imported during the four-year period immediately preceding the war with the steady decrease during the four-year period of the war. Bitumen, the last article listed in the tables, includes coal tar and oil for manufacture of gas:

Fuel	Prewar Imports				War Imports			
	1910 Metric Tons	1911 Metric Tons	1912 Metric Tons	1913 Metric Tons	1914 Metric Tons	1915 Metric Tons	1916 Metric Tons	1917 Metric Tons
Coal	1,581,718	1,736,213	2,098,842	2,262,347	1,540,126	1,163,760	1,024,486	818,327
Briquets	181,620	220,136	206,804	230,049	241,977	108,706	64,351	5,908
Coke	9,954	12,584	12,563	17,164	9,128	3,820	2,484	1,703
Mineral fuel oil	.....	.....	.....	9,680	35,058	61,465	100,623	51,154
Bitumen	848	698	1,599	1,907	454	448	441	583
Total	1,774,140	1,969,631	2,319,808	2,530,156	826,743	1,338,199	1,192,385	877,675

The war period has been characterized by two important factors in the increase in price of imported fuel and the shifting of the chief source of supply from England to the United States.

An analysis of the 1913 imports shows that England supplied over 1,900,000 metric tons of coal, 237,000 tons of patent fuel, 14,000 tons of coke, and 900 tons of bitumen, or about 86 per cent. of the total fuel imports for the year, while the United States only supplied 274,789 tons of coal, 2200 tons of fuel oil, and 100 tons of bitumen, or about 11 per cent. of the total fuel imports for the year.

In 1917 the United States supplied 642,428 tons of coal, the principal item of import, or 78.5 per cent. of the total amount imported during the year, while England only supplied 172,866 tons, or 21 per cent. of the

total imports. The imports of all forms of fuel have been decreasing since the war, with the one exception of fuel oil, which has been increasing. No statistics are available showing the origin of imports of oil for 1917, but during 1916 the total imports amounted to $1,375,154, of which $1,024,627 came from Mexico and $169,446 from the United States.

According to the Retrospecto Commercial, a ton of best quality Cardiff coal, which sold for 48 milreis before the war, was worth 110 milreis in 1916, an increase of 129.16 per cent. This increase must, of course, be attributed in part to the decline in the value of the Brazilian paper currency as well as to the increased cost of coal itself and increased cost of transportation. The following table shows the enormous increase in the cost of imported fuel during the period 1913-1917. The prices are quoted in paper milreis, per metric ton, c. i. f. Brazil:

Fuel	1913, Milreis	1914, Milreis	1916, Milreis	1917, Milreis
Coal	27	27	76	114
Briquets	34	31	77	93
Coke	37	34	133	194
Mineral fuel oil	66	43	57	91
Bitumen	115	140	272	299

Only a small per cent. of the enormous deficit of 1,600,000 tons shown in the 1917 imports as compared with the 1913 imports has been supplied by the increased production of native fuel. Obviously, there is no possible means of determining this per cent., but the following paragraphs at least give some idea of the fuel now being produced in Brazil.

Government Encourages Use of Native Coal

The Federal Government is anxious to encourage the production of native coal and has agreed to give it preference whenever possible, considering its prices and quality. Aid is to be given in the construction of railroads for transportation purposes and Government-owned ships are to carry native coal, coke, pitch and the pyrites and residue from which sulphur may be made at the lowest possible rates. A Federal decree of Mar. 30, 1918, authorizes the making of loans to coal-mining companies under certain imposed conditions.

A detailed analysis of tests made in the United States and Germany from samples of Brazilian coal is included in an article entitled "Coals of Brazil," by I. C. White, published in *Proceedings* of the Second Pan American Scientific Congress, Volume VIII (Washington, 1917). The Santa Catherina and Rio Grande do Sul coal averages about 35 per cent. ash, of which approximately 6 per cent. is sulphur in the form of nuggets of iron pyrites. By crushing and washing operations this ash may be reduced to about 14 per cent. and the sulphur to six-tenths of 1 per cent. in perhaps 33 per cent. of this coal, which may then be successfully briquetted. In an additional 42 per cent. the ash may be reduced to about 25 per cent. and the excess sulphur eliminated, thus yielding a fair grade of slack. From the remaining 25 per cent. of waste material the iron pyrites may be utilized for the manufacture of sulphuric acid as a byproduct.

The following table, included in Mr. White's article, "Coals of Brazil," gives the results of the analyses of 21 samples of Brazilian coal collected by the commission in the field. The samples selected include varieties of coal found in the fields of Rio Grande do Sul, Santa Catherina and Parana:

Sample No.	Moisture	Volatile Matter	Fixed Carbon	Ash	Sulphur	Phosphorus	B.t.u.
1	1.64	14.25	38.17	54.94	3.05	0.019	8,731
2	1.25	19.46	39.59	39.42	5.40	0.019	10,083
3	1.24	19.98	44.34	34.44	3.60	0.018	10,296
4	1.05	19.17	35.45	44.33	3.34	0.015	9,351
5	0.79	17.50	32.55	49.16	5.49	0.019	8,281
6	1.18	17.45	33.08	48.29	2.68	0.021	8,483
7	1.34	25.76	38.87	34.03	12.99	0.019	9,893
8	1.44	24.84	35.34	38.38	10.49	0.018	9,599
9	1.02	25.22	38.98	34.78	2.28	0.015	10,420
10	1.01	15.80	50.94	32.25	11.42	0.011	9,862
11	1.21	26.00	47.88	24.88	6.41	0.020	11,970
12	1.06	7.64	54.63	36.67	1.58	0.030	9,397
13	5.34	29.68	38.71	26.23	3.90	0.025	9,692
14	0.46	25.73	41.27	32.54	8.90	0.023	10,157
15	3.43	27.28	37.52	31.77	12.96	0.053	10,095
16	4.87	27.89	44.20	23.04	0.60	0.014	11,117
17	6.05	29.09	41.33	23.53	4.00	0.017	10,715
18	2.62	29.54	38.62	29.22	11.80	0.012	10,420
19	2.40	32.95	43.86	20.79	8.66	0.020	10,808
20	7.68	17.62	48.94	25.76	3.14	0.002	8,098
21	2.37	15.83	58.66	23.14	7.95	0.000	10,711

Analyses of briquets made from the purified Brazilian coal show that while their fuel value is slightly inferior to that of the best grade (Crown) Cardiff briquets, it is equal or even superior to that of the Anchor brand, which is extensively used in Brazil.

The coal fields now being exploited are located in the Jacuhy River Valley, in Rio Grande do Sul, and in the Tubarao district in Santa Catherina. The most important mine in Brazil is located at Sao Jeronymo, about 20 kilometers south of the Jacuhy River, near Porto Alegre. This mine is reported to be owned by Dr. Luis Beten Paes Leme, a Brazilian engineer, and is operated by the Sao Jeronymo Mines and Railway Co. The output is carried down to the river by the company's privately owned railroad and is marketed from Porto Alegre, at the mouth of the river, from Pelotas and from Rio Grande do Sul. Two shafts are now being worked, with a total average daily production of about 650 tons, and a third shaft is being sunk, which will probably increase the daily production to between 1000 and 1200 tons. Over 40,000 tons were shipped to Rio de Janeiro during the three months ending July 15, 1918. The product from this mine is a deep-mined coal, high in volatile matter, and supplies Pelotas with good gas and salable coke.

In March of the present year Sao Jeronymo coal was selling for 60 milreis (about $15) per ton at Pelotas and at the port of Rio Grande do Sul. A government loan amounting to $325,000 American currency was recently made to this company, the security being a mortgage on the property of the company.

An analysis of some 20-odd tons of the Sao Jeronymo coal was made by the United States Geological Survey, with the following results: Moisture, 11.52 per cent.; volatile combustible, 26.75; fixed carbon, 40; ash, 21.93. Tests were made in the manufacture of producer gas for the gas engine and these were said to show that the fuel would develop more horsepower per pound of coal than could be obtained by the best grades of Pocahontas or New River fuel when used in connection with the steam engine.

Near the head of the Jacuhy River, in the northern part of Rio Grande do Sul, a large mine is being worked by the Jacuhy Co. This mine is understood to be partially owned by the government, which is aiding in its development with loans and is building 60 kilometers of railway line to connect it with the River Jacuhy. A consular report states that this mine had reached a depth of 60 meters in January of the present year. By

July the production was expected to be between 6000 and 12,000 tons per month, and these amounts were to be increased by the end of the year.

In addition to these two large mines now being worked in Rio Grande do Sul operations are being initiated in the Jaguarao River Valley, in the southern part of the state, near Rio Negro, Candiota and Santa Rosa. This coal is of the surface variety and is poorer quality than the Sao Jeronymo product. It sells for about 15 to 20 milreis (about $3.75 to $5) per ton at the place of extraction. Abundant evidence of favorable outcroppings in the Jacuhy Valley indicates deposits besides those now being developed.

The chief coal deposits of the State of Santa Catherina are located in four river valleys situated near the coast in the southern corner of the state. A short line, part of the Sao Paulo-Rio Grande system, runs inland from the port of Imbituba and Laguna to Minas, or Lauro Muller Station, as it is now called, and the Government has contracted with the company for the construction of two additional branches to serve the coal mines of this region. One of these branches is to extend from the Tubarao River south 80 kilometers to Arangua and the second from a convenient point on the Paranapanema branch through Barra Bonita to the coal mines at Rio do Peixe.

The firm of Lage Irmaos, which operated in the Tubarao district, is reported to be producing from 60 to 70 tons daily and is desirous of developing its properties further. At present the company is hampered by lack of rails for railroad construction and is transporting its output by oxen. With sufficient railway facilities, it is reported the output could be increased to between 300 and 400 tons per day. The Barra Bonita Mining Co. was organized June 12, 1918, under the laws of Brazil, with a capital of 2,800 contos of reis (about $700,000), represented by 14,000 shares of 200 milreis each (about $50), all of which has been fully paid up. The majority of the stock is owned by the Federal Real Estate and Mortgage Company.

The Companhia Industrial de Gamdarella, a corporation with headquarters at Rio de Janeiro, has just been incorporated for the purpose of exploiting deposits of coal, iron, manganese, and other minerals in the "Gandarella" property in the municipality of Santa Barbara, State of Minas Geraes. The company is incorporated for 3000 contos ($750,000), which may be increased to 5000 contos ($1,250,000). Of the initial capital stock 2500 contos ($625,000) is represented by property and 500 contos ($125,000) by cash subscribed. The stockholders are all Brazilians. The Carbonifera Riograndense Companhia has received Government loans amounting to $375,000. No definite information concerning this company's operations is available.

To enter a mine after a disaster the compartment of the shaft that can be quickest used for descent should be chosen, but the choice of a compartment will be governed by the facilities at hand for lowering and hoisting. If an auxiliary hoisting engine is in place, much time may be saved by employing it. A crown pulley or sheave wheel may have to be placed above the shaft. The pulley should have a diameter at least 30 times that of the rope or cable used.

Legal Department

INJURY TO TIMBERMAN — Plaintiff, a miner of 15 or 16 years' experience, was employed as an independent contractor to drive an air course in defendant's mine. Two weeks later he was injured through a fall of roof while working as an ordinary employee in the same place, under general orders to timber. At the particular place he had sounded the rock just before the accident, and regarded it as safe. On these facts, the Alabama Court of Appeals holds in the case of Thrasher vs. Red Eagle Coal Co., 78 Southern Reporter, 718, that defendant operator was not liable in damages on account of the accident, on the theory of negligence in failing to discover and guard against the defective condition of the roof before ordering plaintiff to work at that point.

TERMINATION OF MINING LEASES — Plaintiff sued to recover $1000, as a minimum annual royalty under an Iowa coal-mining lease. Defendant denied liability on the ground that plaintiff's right to royalty had ceased under the terms of the contract, which was to run for twenty years, unless the coal should be sooner removed; asserting that all minable coal had been removed and the royalty thereon paid prior to the term for which the plaintiff sued. Deciding the case in favor of plaintiff lessor, the Iowa Supreme Court holds that the defense failed because defendant failed to prove a surrender of the lease with appropriate notice to the lessor of intention to surrender on the ground that all the minable coal had been removed—a controverted fact. The court said: "As long as the lessee held any right under such lease it operated as a continuing incumbrance upon the property of the lessor. It also saved to the lessee the speculative chances of the future and deprived the lessor thereof accordingly. It would seem therefore elementary justice that as long as the lessee claimed any of the benefit of the lease it should be subject to the burden. On its face the lease was valid and binding upon both parties until one or the other should elect to terminate it according to its terms. If the lessee desired absolution from further payment of the minimum royalty it fairly devolved upon it to take an irrevocable position to that end and to so notify the lessor. An acceptance by the lessor would indisputably terminate the lease. A refusal by the lessor would make an issue which could be litigated if necessary." (Fisher vs. Maple Block Coal Co., 168 Northwestern Reporter, 110.)

ALABAMA VENTILATION LAW INTERPRETED—In an action for death of a miner due to an explosion of gas in an Alabama mine—Segrest vs. Roden Coal Co., 78 Southern Reporter, 756—the Alabama Supreme Court lately applied the statute of that state, enacted in 1911 and providing that the minimum amount of air to be supplied to a mine shall be 100 cu.ft. per minute per man and 500 cu.ft. per mule or horse. Holding that this statute is designed to protect miners against dangers incident to both noxious and explosive gas, and requires gas to be so diluted as to render it harmless, the court said: "We still think that it was the intent of the Legislature to protect the miner from the danger of noxious and explosive gases generated in the mine, and that this is a non-delegable duty. . . . Had the Legislature provided merely the supplying of a certain amount of air, instead of requiring that the gas be diluted, carried off, and rendered harmless, the mine owner would, no doubt, meet the statutory requirement by supplying the requisite amount. But this was not done, and the amount of air provided is a legislative ascertainment that nothing short of the amount of air so prescribed will accomplish the purpose. The result is the law requires the mine owner, or superintendent, to see that all noxious and explosive gases generated in the mine are so diluted or carried out as to render the same harmless, and that nothing less than air to the extent of 100 cu.ft. per man per minute and 500 cu.ft. for mule or horse will accomplish the purpose."

Boiler-Scale Prevention

Illinois recently had a "Scale Prevention Week." In every plant scale prevention may be studied with profit. The following open letter from the Fuel Conservation Engineer of the United States Fuel Administration presents the subject well

THE importance of this subject can be appreciated better when it is realized that no boiler is without scale and that all scale results in fuel loss. Exceptions to this rule are so few as to be negligible.

The very fact that it is necessary to use a tube cleaner or turbine is sufficient evidence to prove that there is scale in your boiler. It makes no difference whether the boilers are turbined once a week or once a year, the average thickness of scale is equal to one-half the thickness at the time of removal. Another thing that must not be overlooked is that the only proper place to remove the scale-forming elements is before the water enters the boiler. This is easily done and is the economical thing to do.

Careful and extensive experimentation in this matter has been conducted by Professor Schmidt, at the University of Illinois. Table I is based on the results of his researches.

TABLE I. LOSS OF EFFICIENCY FROM SCALE

Character of Scale	Thickness, In.	Composition	Loss of Eff., Per Cent.
Hard	1/50	Mostly carbonate	5.4
Soft	1/32	Mostly carbonate	7.2
Hard	1/32	Mostly carbonate	8.5
Soft	1/25	Mostly carbonate	8.0
Hard	1/25	Mostly sulphate	9.3
Hard	1/20	Mostly sulphate	11.1
Soft	1/16	Mostly sulphate	10.8
Soft	1/16	Mostly carbonate	11.0
Soft	1/16	Mostly carbonate	12.4
Hard	1/16	Mostly carbonate	12.6
Soft	1/11	Mostly carbonate	15.0
Hard	1/9	Mostly sulphate	15.9

Do not be content with the thought that you are having no trouble with the scale. You will have no trouble only when you have no scale. Why wait until you have bagged the boiler, burned out the tubes or wasted a lot of coal before taking action in this matter? Impress upon your memory the fact that the first thin layer of scale is the most injurious. Stated somewhat more scientifically, the rule is that the insulating effect of scale varies as the square root of its thickness. Thus, the insulating effect of scale of thicknesses proportional to 4, 9 and 16 is in the ratio between 2, 3 and 4. To give this matter point and talk in terms of coal, Table II is given.

TABLE II. COAL WASTED BY SCALE

Average Thickness of Scale, In.	Coal Wasted from Every Ton Fired, Lb.
1/50	100
1/32	140
1/25	180
1/20	200
1/16	220
1/11	300
1/9	320

The use of boiler compounds is unquestionably better than no treatment at all, but it seldom, if ever, accomplishes really satisfactory results. If the compound is a chemical and reacts with the scale-forming material in the water, it can only change this material to something else, which is commonly known as "sludge." When this forms it is deposited on heating surfaces of the boiler as a soft mud-like substance which is not scale, but which has an insulating effect and which, if excessive, may actually result in the plates of the boiler being burned. To avoid the sludge accumulating in excessive quantity the boiler is blown down frequently, which causes a direct loss of heat and waste of coal.

It will be observed from the foregoing that no middle ground is taken in this matter. There is only one right condition and that is perfect cleanliness. If it is thought that there is an objection to properly softening the feed water before pumping it into the boilers, due to the cost of the installation necessary, look over Table II and figure out what it costs now per year with the present water and its consequent scale. In all probability it will be found that the cost of proper water treatment would be paid for within two years, including the cost of operation. Water as pure as that in Lake Michigan comes in this class.

In conclusion, remember that it is possible to so purify the water that no scale will form in the boilers.

British Mine Accidents and Their Causes

SPECIAL CORRESPONDENCE

SYNOPSIS — *This article is an analysis and commentary on the report of the mine inspectors of the United Kingdom. In Britain, as elsewhere, the majority of fatalities arise from falls of roof and top rock; some result from falling coal, some from explosives, explosions and other causes. Downright carelessness is the source of not a few fatalities.*

AT THE mines in the United Kingdom 1,023,400 persons were employed in the year 1917. The coal raised amounted to 248,473,119 long tons and there were 1370 deaths from accident. In round numbers this represents a production of 243⅓ tons per person employed, a death rate of 1.34 per thousand persons, or 5.5 per million tons of coal mined.

Of the deaths 174 occurred in Scotland, 218 in the Northern Division, 335 in the York and North Midland Division, 153 in the Lancashire, North Wales and Ireland Division, 366 in South Wales and 124 in the Midland and Southern Division. Arranged according to cause, 20 deaths were due to explosions of firedamp or coal dust; 724 to falls of ground; 62 to shaft accidents; 408 to miscellaneous underground accidents; 156 to accidents on the surface.

It will be seen that falls of ground were responsible for nearly 53 per cent. of the deaths.

Proportion of Preventable Accidents

Mines Inspector H. Walker (Scotland Division) refers to 21 deaths due to falls of side rib, or face, and expresses the opinion that 11 of them were entirely due to failure to set sprags and rances (props set against face). In this division there were 73 deaths due to falls of roof. The inspector says that five of them could have been prevented by the setting of temporary supports, two by the systematic setting of straps (boards resting on props) and four by a stricter observance of the timbering rules as laid down for the beds in which the accidents occurred. This means that of 94 deaths, 22 or nearly a quarter, were entirely preventable.

Mr. Walker emphasizes the fact that the question of adequate support being given to roof and sides is, after an efficient system has been arranged, one of discipline. Arriving at an efficient system suitable to the conditions existing in any coal bed is the duty of the manager of each mine, aided by the officials.

Having decided upon a system of support the inspector says that models of the method should be made and set up on the surface. Sketches he considers of little value, but full sized models that a miner could inspect at his leisure would show him exactly the manner in which the supports were to be set and advanced. However perfect the system, it is of small value unless compliance with it is rigidly enforced and this is where the necessity for strict discipline arises.

It would be thought that the man who was likely to be killed or injured would be the person most anxious to take steps to prevent an accident. A miner, however, *will* take risks and this factor must be taken into account. Inspection should be made at frequent intervals and visits to the various parts of the mine assigned to him should not be carried out by the official or any routine plan. Mr. Walker urges that uncertainty as to the time of the official's visit would prove beneficial and would result in a saving of life and limb where the system of support is rigidly enforced.

The inspector of the Northern Division, J. R. R. Wilson, regrets to have to repeat year after year that a large number of accidents should never have occurred. So long as men are reckless or thoughtless fatalities are bound to happen. In this division (Durham, Northumberland, etc.) accidents caused the loss of 218 lives. Of these the inspector says 93, a serious proportion, exceeding 42 per cent., might reasonably have been avoided.

Mr. Wilson reports: "There is a tendency to omit setting temporary supports, particularly when withdrawing timber. In this connection too there are frequent errors of judgment; and men seem to prefer when taking out timber to use a pick or an ax rather than a safety appliance."

Mr. Wilson does not hold the men solely blamable for this condition, for better discipline and supervision and a keener appreciation of the value of safety appliances by officials would certainly tend to reduce the number of accidents.

Accidents from falls of ground are commented upon by other British mine inspectors. J. Dyer Lewis (South Wales Division) declares that the only hope of reducing the number of accidents lies in the constant vigilance of officials and workmen. Mr. W. Walker (Midland and Southern Division) directs the attention of all concerned in the working of mines to the advantage of setting foresets or temporary supports wherever possible, until there is room for the permanent timber. He also impresses upon officials and workmen alike the necessity for stricter observance of timbering rules, as inspectors when visiting the collieries have frequently to call attention to places where the maximum prescribed distances have been exceeded.

Exclusive Use of Safety Lamps Advocated

In Scotland accidents due to accumulations of inflammable gas are numerous. Mr. H. Walker says that so long as they continue the ventilation of the mines cannot be considered as satisfactory. He advocates the universal use of safety lamps for, in his opinion, after their introduction a considerable proportion of such explosions would cease to occur. In Scotland miners and employers are much averse to the use of safety lamps. Apparently the opposition to them is so strong that it seems unlikely that they will be removed. The inspector says, therefore, that if naked lights are to continue in use adequate precautions must be taken. He would regard all mines as being equally dangerous and take steps to ventilate all holes in the roof, the face of all brushings, the high side of fast places; he would

use no lamps or lights other than safety lamps, when a new seam or district of a seam is being opened or when working near a whin or near a fault in the strata. Such precautions are simple, and the hope is expressed that the employers and also the miners who are liable to be injured should an explosion occur, will see that they are carried out.

In recent years more attention has been paid to ventilation and Mr. Wilson finds that frequent suggestions coupled with a readiness to take air samples for analysis have their effect upon the most backward officials. In such a district as South Wales, where large quantities of firedamp are daily drawn from the mines, Inspector Lewis says it is most essential that the volume of air in circulation should be sufficient to dilute and render the firedamp harmless.

The coal-dust problem is a subject of discussion wherever coal is extracted. In his report Mr. H. Walker points out that dry-stone walls or packs along the side of roadways form ready places for the settling of coal-dust. A liberal application from time to time of inert dust to the surfaces and crevices of such walls would, he says, prevent the settlement of more dust on and in them and at the same time furnish a guard against the danger latent in the dust already deposited there.

In Great Britain the local Mines Act requires that arrangements shall be made to prevent as far as possible the dust from the screen from entering the downcast shaft, and at all newly opened mines the preparation equipment must not be situated within 80 yd. of the shaft. The floor, roof and sides of the roads have to be systematically cleaned to prevent as far as possible accumulations of coal dust while systematic steps, such as watering, must be taken to prevent explosions of coal dust from occurring or, if they occur, from being carried along the roads. A precaution that came into operation on Jan. 1, 1917, requires that the cars shall be so constructed and maintained as to prevent, as far as practicable, coal dust from escaping through their sides, ends or floor.

The Lancashire inspector, A. D. Nicholson, refers to the difficulty experienced in keeping iron cars dustproof. This is causing some collieries to return to slightly improved types of wooden cars. He observes, however, that in deep and therefore warm mines this type of car is also difficult to keep dustproof.

In the Scotland report reference is made to five fatal firedamp explosions in which eight persons lost their lives. In connection with the most serious of these accidents the inspector says that "had obvious precautions been taken it would not have occurred." In the second case the fireboss was carrying both a naked light and a safety lamp when making an inspection. In the third and fourth cases the miners had gone into places which were fenced off. In the fifth case a brattice had been broken down by a fall, and two men were allowed to continue working before the brattice was rehung.

Commenting upon accidents with explosives, Inspector H. Walker says one course to adopt if a shot is not definitely heard to explode within a reasonable time is to regard it as a misfire and treat it accordingly. Another would be not to allow any person to have explosives in more than one hole at the same time when fuse is the medium through which the charge is fired. The inspector, in view of the numerous accidents, goes so far as to recommend that serious consideration be given to the prohibition of the use of fuse.

A man had his hip pierced by a nail and died. Inspector H. Walker says that too little attention is paid underground to the recovery of nails of all descriptions.

The use of glass bottles underground should be forbidden unless they are protected by suitable metal cases. In almost any mine, says the inspector, one can see broken bottles and when it is remembered that much traveling is done on hands and knees the danger is obvious. When nails are allowed to project from pieces of wood and when broken glass is strewn along the roads horses are subjected to serious hazards.

Many officials and workmen have been convicted of violation of the law. Among the more common contraventions of rules are those relating to matches and smoking.

Mr. Walker suggests that at each mine a committee of officials and workmen should be appointed. To it should be placed communicated details of every accident which occurs at the mine. It should have power to make recommendations for the prevention of similar accidents. Objection would doubtless be raised to the setting up of such committees on the ground that they would be likely to overstep their functions. If a good feeling is maintained and the object of their appointment is kept before them, the committees should do much to eliminate accidents. Perhaps some scheme of referring recommendations to an arbiter before they are put into effect would serve to make the operation of these committees more harmonious and beneficial.

Development of Lignite Mines in Greece Brought About by the War

With the stoppage of coal importation into Greece, it became absolutely necessary for that country to find some substitute, and the lignite mines at Kymi, Psachna, Aliveri and Oropes were exploited. These deposits were hitherto known, but inasmuch as the best Welsh and English coal could be obtained before the war as cheaply in Piræus as in the United States, it was not commercially practicable to work them. This unusual situation was due to the fact that steamers bound for Black Sea ports for grain brought out coal as ballast, discharging at Piræus.

More than 100,000 tons of lignite are said to have been mined from these deposits during 1917. A project is now afoot, which has the hearty approval of the Greek Government, to manufacture this lignite into briquets, which for many purposes will be equal, it is thought, to coal. It is hoped that through this means it may become possible to restore gas to Athens and Piræus. For cooking and heating purposes wood must now be used at very high prices, if one is unable to afford the charcoal which is vended from house to house in strictly limited amounts.

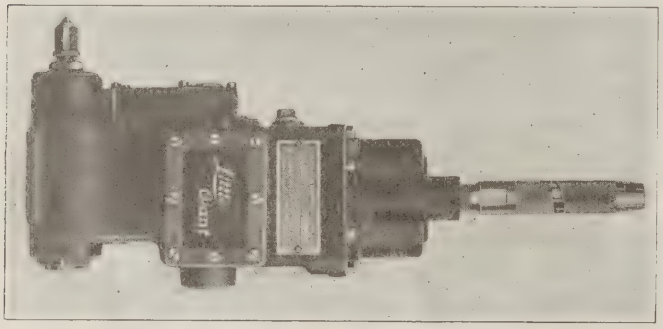
Erratum

In the issue of *Coal Age* for Dec. 12, 1918, page 1078, the sentence in the second column and seventh line below the small table reads: "The result was 35.86 per cent., or approximately 37 per cent. ash." Obviously this should have read "approximately 36 per cent. ash."

New Apparatus and Equipment

Little Giant Corner Drills

The Little Giant corner or close quarter drill, manufactured by the Chicago Pneumatic Tool Co., of Chicago, Ill., has been designed to overcome the objection arising from the intermittent action of ratchet levers in the rotation of the spindle. In this drill steady, uninterrupted revolution of the drill spindle is accomplished by means of a train of gears, thus retaining all the advantages of the ratchet type and permitting the drill



LITTLE GIANT CLOSE-QUARTER DRILL

to be used in the same narrow space, or within $1\frac{7}{16}$ in. of the end wall or corner.

In this drill the power of the motor is transmitted to the spindle without vibration, resulting in a steady, even pull with minimum wear and tear on the machine itself.

In the stub tooth gears which are employed, the root of the gear tooth is much thicker than in the standard involute tooth. The tooth itself is shorter, hence it will withstand a harder pull. The special alloy steel used in these gears makes them highly resistant to wear.

Removable Truck Safety Switchboard Units

The removable truck-type safety switchboard units here shown are eminently fitted for use in electric power plants. They can be obtained for the control of generator, motor and feeder circuits, and are particularly adapted to plants where electrical distribution is made from a centrally located distribution center. The construction is such that extensions can be readily effected or the units moved to other locations to meet new or changed conditions. All current-carrying parts are inclosed, and the opportunity for an operator to come in contact with the circuit is practically eliminated.

A spare removable unit can be used to reduce the time of shutdown for inspection or repair. Busbars need not be killed, disconnecting switches need not be opened, leads and small wiring are not disturbed. The oil switches, buses and all live parts are placed in compartments. This tends to reduce fire hazard and limits disturbances to a single point.

The stationary member of the removable truck switchboard carries current and potential buses with their disconnecting switch studs and barriers between the current studs to prevent accidental contact by any one who enters the compartment. The rear end of the current disconnecting switch studs runs to buses and incoming or outgoing leads; the potential bus wires to small contact studs near the top of the compartment. The side walls are provided with hand holes, so that the busbars and bus wires can be continued from unit to unit. On the exposed walls of the end units these openings can be closed by removable covers. Access to the rear of a compartment can be had by means of hinged sheet-steel doors provided with means for padlocking in the closed position.

The removable truck is mounted on wheels. The forepart carries a sheet-steel panel on which is mounted the instruments, meters, oil switches or other appliances usually employed on the ordinary slate switchboard panel. The current transformers are mounted on steel brackets back of the instrument panel. The rear of the truck carries the movable parts of the disconnecting switches, the potential transformers and small wire accessories. To center the truck and to assist in placing it in or removing it from a compartment, rails fastened to the side of the compartments are furnished. The oil switches, instruments, meters, transformers, etc., are removed from the installation by wheeling out the truck.

In order to remove or replace a switch unit, the oil switch must be opened and therefore the load disconnected. This is provided for by an interlock attached to the oil switch operating toggle, which engages cast lugs on the walls of the stationary unit. With the oil



REMOVABLE TRUCK SWITCHBOARD UNITS

switch closed it is impossible to remove or insert the truck. The value of this feature is self-evident.

These panels are being regularly manufactured in a variety of styles and capacities and vary in capacity from the smallest up to and including 1200 amp. They are designed to operate at voltages up to 15,000. In the larger sizes the housings are usually of reinforced concrete, and all capacities are designed for use with either solenoid or manually-operated oil circuit breakers. These units are made by the General Electric Co.

New Type of Mine Motor

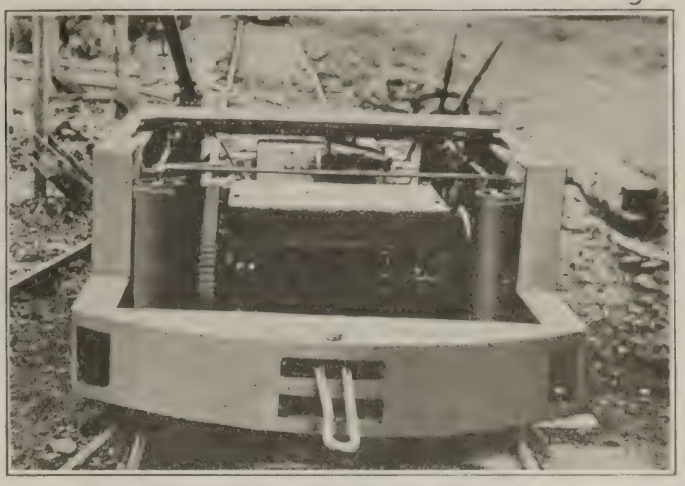
By D. I. Wheeler
Cleveland, Ohio

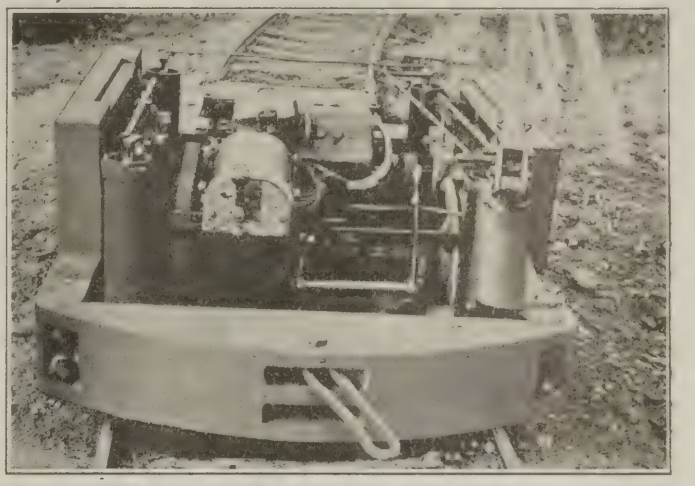
A novel type of coal-hauling motor has been developed and is now being started toward quantity production by the Nelsonville Electric Co., of Nelsonville, Ohio. The striking feature of this locomotive, which is shown in the accompanying photographs, is its extreme lowness, the total height over the rails, exclusive of trolley, being only 29½ in. The same dimension as to height is to be maintained on all motors of from three to ten tons, the point being, of course, that this tractor can be used in many low-vein drifts where a larger type could not gain access. The hauling capacity is equal to or greater than that of more cumbersome machines, which are often useless where the headroom is low.

In eliminating height, the Nelsonville people have gained in simplicity of construction and efficiency of operation. The motive power consists of an especially designed Western Electric type motor built by the General Electric Co. The maximum speed of this motor is 600 r.p.m. It is operated by a compact G. E. controller mounted horizontally on the frame. The motor is mounted exactly over the center of the wheelbase and the power is transmitted directly to each axle by a symmetrical arrangement of two Morse rocker joint silent chain drives, one being at each end of the armature shaft. The advantage of this type of transmission is that a driving efficiency of 99 per cent. is attained and the noise and friction of gear trains are eliminated.

This arrangement also cuts down the number of parts. The machine is therefore subject to much less trouble, and is more durable. The wheels are 20 in. in diameter, with a wheelbase of about 24 in. This short wheelbase further carries out the idea of reducing room necessary for operation in small rooms or short turns. The maximum speed of the machine is governed by a three to one reduction through the chain transmission, and is between 11 and 12 miles per hour.

In addition to the advantages named above, other distinguishing features of this locomotive are the extremely simple oiling device for the axle, by means of which oil and waste can be easily replaced; accessibility of working parts; and a simple and easily operated braking device.



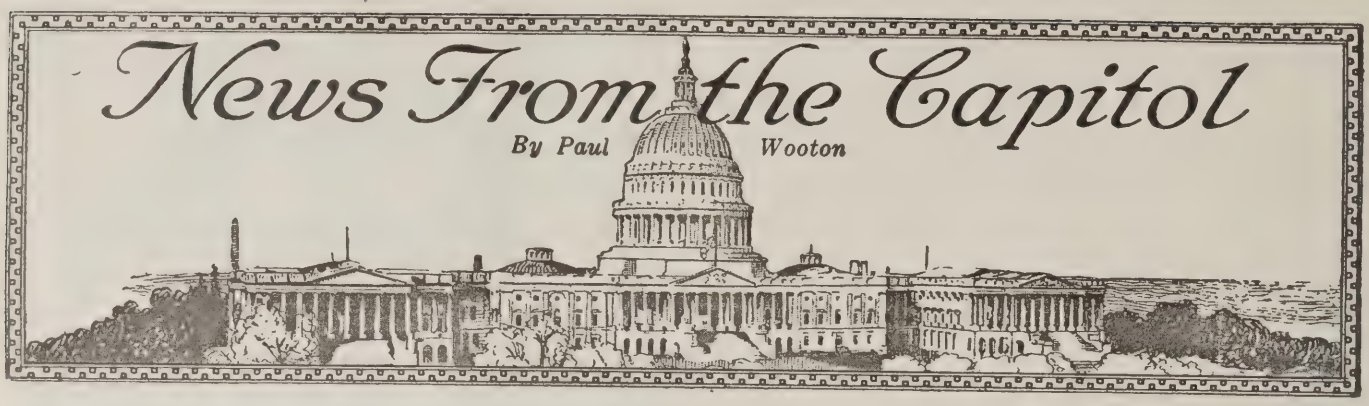


TWO VIEWS OF MOTOR MOUNTED ON MINE HAULING CAR

It would seem that this new locomotive has such merit that the manufacturer is justified in the extensive plans which are rapidly being carried out for the production of these low-type motors on a large scale.



NOTE THE EXTREME LOWNESS OF THIS NEW TYPE OF COAL-HAULING MOTOR



United States Had Huge Mineral Output in 1917

The value of the minerals produced in the United States in 1917, according to the United States Geological Survey, Department of the Interior, was $5,010,948,000, an increase of $1,496,976,000, or about 43 per cent. over the former record—$3,513,972,000—established in 1916. The blast-furnace products (pig iron and ferroalloys), copper, coal and petroleum contributed 74 per cent. of the total value of minerals produced and 88 per cent. of the increase in 1917.

The metals established a new record in 1917, being valued at nearly $2,092,000,000 and representing 42 per cent. of the total value of the mineral product. They showed an increase of about $471,316,000, or 29 per cent. over the $1,620,508,000 reported for 1916. The blast-furnace products contributed nearly 90 per cent. of the total increase. Increases were also made in the value of aluminum, copper, lead and silver, but decreases were recorded in the value of gold and zinc.

The value of the nonmetallic products in 1917 was 58 per cent. of the value of all minerals produced, increasing $1,010,459,000, or nearly 54 per cent., from the former record of $1,878,464,000 in 1916 to $2,888,923,000 in 1917. Of this total increase coal alone represented nearly 66 per cent., and coal and petroleum combined contributed about 85 per cent.

Fuel Administration's Work Slowing Up

Visitors to the Fuel Administration these days are reminded that the war is over. The building which only a few weeks ago was a veritable beehive is strangely quiet. Half of the rooms apparently are not in use. The mildness of the winter and the unimportance of production and transportation problems, as compared with those of a year ago, have been important factors in the falling off of the administration's work. Even anthracite seems to be overcoming its difficulties, and the men who were being held to handle that situation have little to do.

While there is no shortage of bituminous coal reported from any point, it is the intention of the distributing section to continue work through the winter as distribution problems continue to arise in large number.

It is stated that in the United States there are known deposits of lignite aggregating 150,000 square miles in extent, containing about 100 billion tons of this fuel.

Railroad Administration Would Abolish Garfield Coal Prices

A determined effort is being made by the Railroad Administration, it is understood, to secure the abandonment of the coal price schedule. While most of the officials at the Fuel Administration believe it would be a great mistake to abandon prices before the end of the coal year, there is uncertainty as to what Dr. Garfield will do in this regard. Dr. Garfield has the reputation of listening patiently to all that his lieutenants have to say and then going ahead according to his own ideas. As it is possible that he may handle the price schedule in that way, few would be surprised to see the prices abandoned Feb. 1, and some think that such action may be taken even as early as Jan. 1. No explanation is forthcoming, however, as to how justice would be done to those whom the Government has forced to stock up on inferior coal, which would be a drug in their bins.

Upholds Rates on Pea and Slack

Rates on pea and slack coal from the Walsenburg district, Colorado, to points in Kansas, on the Atchison, Topeka and Santa Fe Railway, have been upheld by the Interstate Commerce Commission. The rates were attacked by the Alliance Coal and Coke Company.

Warrior River Coal Transportation

An official statement regarding the Warrior River barge line which will engage entirely in the transportation of coal from the Alabama fields to tidewater at New Orleans and Mobile, was issued Dec. 14 by the Railroad Administration. It reads as follows:

"Plans have been completed for providing new equipment under the jurisdiction of the United States Railroad Administration for service on the Black Warrior River.

"There are two distinct services: One from Cordova (near Birmingham, Ala.) to New Orleans, and the other from Cordova to Mobile, Ala. The Cordova-New Orleans route is partly river and partly sheltered Gulf operation. To provide for the New Orleans service self-propelled steel barges 275 ft. long, 49 ft. extreme beam, and 10 ft. depth, with triple expansion engines (2) 400 hp. each, and water tube boilers of the express type, are proposed. Such boats will carry 1800 tons of coal on a 7½ ft. draft, and the proposed design contemplates a cubic capacity of about 500 tons for merchandise freight. The estimated cost of such a self-propelled steel barge is about $250,000, and in its construction

about 500 tons of steel will be required. Four such vessels, with annual capacity of 175,000 tons, will be provided.

"For the enlarged Mobile service, it is proposed to construct 20 wooden barges of approximately the type now used on the river, and three steel towboats with approximately 400 hp. each. The estimated cost of each towboat is $160,000 and the 20 wooden barges can be constructed for $120,000.

"This represents a total expenditure of $1,600,000 for the Warrior River system to provide an increased annual coal movement of 375,000 tons.

Lignite Bill Not To Receive Immediate Consideration in House

An effort to bring up the lignite bill in the House for immediate consideration has failed. The rules committee agreed to order its immediate consideration, provided the committee on mines and mining should make a unanimous request to that effect. A single member of the committee on mines and mining refused to concur, thereby making it necessary for the bill to take its regular place, which is far down on the congested calendar.

Questions Fuel Administrator's Power

An interesting question has been raised by the following resolution, which has been passed by the Senate:

"Resolved, That the fuel administrator for the District of Columbia be directed to inform the Senate what steps he is taking to enforce the order made fixing the maximum charge for putting in or storing coal at 75c. a ton in the District of Columbia, and if no steps are being taken to enforce said order to inform the Senate why this is not being done and by what authority of law was said order issued."

The resolution was introduced by Senator Jones, of Washington. It brought forth the following comment from Senator Reed, of Missouri:

"I have no objection to asking for the information, if it is done in a form which does not appear to involve the sanction of the Senate to this order. The fuel administrator in Washington, of course, has just as much authority to fix the price for putting in coal as he has to fix the price of any man's wages, and it is time that this assumption of arbitrary power should cease everywhere in the United States."

Praises Volunteers Who Manned Coalers

Certificates of honor have been issued by the Shipping Board to the volunteers who stepped into the breach last spring and made it possible to man the vessels in the New England coal trade. An official statement in regard to the matter is as follows:

When the great German drive of last spring was in full swing, and the war industries of New England were clamoring for coal, in order that clothing and blankets and bullets for the American forces in France might be turned out on schedule, the U. S. Shipping Board called for volunteers to serve in the fireroom and deck crews of the steamers carrying coal from Virginia to New England ports.

Numbers of young men who had entered the Merchant Marine training service with the hope of getting into the crews of ships going overseas, put their personal wishes aside and volunteered to help man the coalers. It was hard, cold, disagreeable work, but it was done so effectively by these volunteers that records of efficiency were made by the coal-carrying ships, and the New England war industries were enabled to keep their fires and their production up to the limit necessary to maintain an uninterrupted output.

The Shipping Board announces that it has recognized the spirit of patriotic self-sacrifice shown by the Merchant Marine volunteers who manned the coalers in that period of stress, and has ordered that certificates of honor be issued to them. Every man who has served three months on board a New England coaler will get one of these marks of distinction.

Zone M-2 Has Been Enlarged

Coal produced in the Logan and Kanawha districts may now move to tidewater via the Chesapeake & Ohio R.R. This was made possible by the enlargement of consuming zone M-2. Previous modifications affecting these districts have allowed for westward shipments only.

Increased Output of Domestic Sizes of Anthracite

Production of prepared sizes of anthracite, during the week ended Dec. 14, exceeded the production of any week since that ended Oct. 5. The output of that character of coal was 1,197,079 tons. Total production for the week of Dec. 14 was 1,923,625 tons, an increase of nearly 7 per cent. over that of the week preceding.

Coal Loadings Ahead of Last Year

Including the week ended Dec. 14, the loading of coal cars exceeded the performance during the same period of 1917 by 546,766 cars. During the week ended Dec. 14, the number of cars loaded, as well as those during the corresponding week of 1917, are shown as follows:

	1918	1917
Total cars bituminous	181,823	147,631
Total cars anthracite	36,401	31,656
Total cars lignite	4,094	4,653
Grand total all cars coal	222,318	183,940

Brief Washington Notes

Exporters of coal and coke no longer are required to file Form X-6 with the War Trade Board.

Russell Hastings, of Boston, who has been in charge for the Fuel Administration of bituminous coal distribution, as related to public utilities, has resigned.

Lake shipments of cargo coal in 1918 were 28,153,317 tons, according to the Geological Survey. The tonnage is the greatest ever carried in one season.

One of the war accomplishments of the Bureau of Mines, which will be a peace-time asset to the country, is a change in the design of marine boilers, so that the coal heretofore necessary to propel the ships for six miles is now sufficient to carry them seven miles.

Coal exported during the fiscal year ended June 30, totaled 25,894,166 tons. The growth in the amount of coal exported is shown by comparing it with the exports of the corresponding period ended June 30, 1914, when exports were 19,664,080 tons.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The recent United Mine Workers election is the principal matter of interest. Rumors have spread that John Walker of Illinois has carried the anthracite field against Frank J. Hayes, the past president of the United Mine Workers. Ellis Searles, the editor of the *United Mine Workers' Journal*, recently stated that Frank J. Hayes had a majority of more than 40,000 votes and so would be reëlected by a majority of 50,000 to 60,000.

An announcement has been made at the office of District No. 1, United Mine Workers of America, that John T. Dempsey, former president of the district since 1911, who, two months ago, resigned has been appointed as a representative of the international body throughout the anthracite region. His work will be the organization of new locals and the building up of those now in existence, and his new office will take him into his old district, No. 1, as well as Nos. 7 and 9.

WANT THEM TO WORK EVERY DAY BUT CHRISTMAS

The Fuel Administration on Dec. 21 issued an appeal to the anthracite mine workers to work industriously every week-day this week except Christmas Day, so as to make amends for the loss of output naturally arising from the outbreak of influenza and the time lost for jollification over the armistice.

For the first time Mexicans have been imported into the Hazleton region. Their introduction into the northern anthracite field at Carbondale made a great deal of trouble. A similar complaint to that made in the northern field will probably be made at Hazleton. On Dec. 17 the George B. Markle Coal Co., unable to maintain production, brought 100 Mexican laborers into the district to work in its mines.

From West Virginia comes the information that the coal operators of northern West Virginia and the United Mine Workers of the same area reached an agreement Tuesday week, Dec. 17, which is said to be satisfactory to all concerned. It has been ratified by the directors of the Northern West Virginia Coal Operators' Association.

FAIRMONTERS MAKE SETTLEMENT OF DIFFERENCES

At the first conference of the operating committee of the association the following representatives of operating concerns were present: A. C. Beeson, chairman, C. H. Tarleton, J. M. Wolfe, Brooks Fleming, Jr., J. A. Clark, Jr., of Fairmont; C. J. Ryan, of Hepzibah; Everett Drennen, of Elkins; J. M. Orr, of Clarksburg; A. L. Hamilton, of Pittsburgh, and L. J. Sandridge, of Meriden. The representatives of the United Mine Workers of America were: Robert H. Harlin, an international representative, of Indianapolis; C. F. Kenney and Fred Mooney, of Charleston, president and secretary respectively of District No. 17; Francis Drumm and William J. Trickett, of Cumberland, president and secretary respectively of District No. 16; Joe Loftis, of Cumberland, and Sam Ballentyne, of Albion, Iowa, members of the international board. The agreement follows:

Memorandum of agreement entered into at Fairmont, W. Va., Dec. 17, 1918, by the coal operators of the territory covered by the Northern West Virginia Coal Operators' Association and by the United Mine Workers of America of District No. 17.

It is specifically and mutually agreed that the agreement entered into by the operators and the United Mine Workers of America at Fairmont on Aug. 31, 1918, shall be the basic thick-seam agreement for the territory embraced by the Northern West Virginia Coal Operators' Association; and that the agreement entered into by the operators and the United Mine Workers of America at Fairmont on Sept. 7, 1918, shall be the basic thin-seam agreement for the same territory, and further that no other agreement shall be agreed to by the organization and any individual operator in the above specified territory during the period of the above-mentioned agreements.

At mines where the mining or day-wage rates prevailing are higher than those prescribed in these present basic scales, such rates shall exist during the period of the present basic agreement, unless both operator and miners agree to a change in such rates in harmony with basic rates.

It is further agreed that at the termination of the present agreement, a basic uniform scale for the thick and thin seams respectively, and for day rates will be adopted for all operations in the above-specified districts.

MONTHLY MEN GET THEIR $1.40 A DAY RISE

The 2000 employees of the New River Co. reached an understanding with that concern on Dec. 12 and, in consequence, the strike which has interfered with production since Dec. 3 was declared off and the men returned to work.

The terms of the agreement reached may be summarized as follows:

1. Monthly men, except those exempted by the United States Fuel Administration, shall be paid the $1.40 per day increase on the basis of 25 days per month, when employed full time, and the claim for the difference between 25 and 30 days shall be subject to review and to the decision of a special umpire.
2. The decision of the special umpire with reference to trappers' wages shall be accepted.
3. The decision of the special umpire on Sam Oliver's case shall be accepted as decided and shall apply to men employed previous to Apr. 16, 1917.
4. The car-pushing case shall be reopened by joint request of the operators and members' representatives.
5. Inasmuch as the decision of the special umpire in the 60c. case does not apply to monthly men, it is agreed that any monthly man feeling himself aggrieved in this matter may have his question submitted to the special umpire for decision.

The decision regarding those monthly men, who are not exempted by the United States Fuel Administration is as follows:

"The contention of the miners that the Washington wage advance should be applied to day and monthly men in the New River field is sustained, and all day and monthly men, except mine managers, top and bottom bosses, weigh bosses, firebosses and head mechanics shall be given the increase provided for in the Washington agreement; namely, $1.40 per day. The coal operators who have received since Nov. 1, 45c. a ton increase in the selling price of their coal for the purpose of absorbing the Washington advance, will be required under this decision to pay all back money due the men affected as herein defined."

MEN OF ROARING CREEK FIELD GO BACK TO WORK

After being on strike for about 10 days the striking miners of the Roaring Creek field were induced to return to work by John P. White, former international president of the United Mine Workers, who visited the headquarters of District 16 at Cumberland on Dec. 8. White urged the miners to return to work pending an adjustment of their grievances, which had to do with a construction of the terms of the Freeport scale agreement.

Short time in the bituminous mines is a rapidly spreading epidemic. The most recent report of the Geological Survey appears 19 days earlier than the date of our publication and so does not represent the conditions of the date of issue. The percentage of loss of time due to no market had 19 days ago risen to 6.0. The week before it was 5.7. The strike and labor shortage loss had risen to 7.2 per cent., having been 6.1 the week before. Doubtless next week's report, which will cover up to Dec. 14, will show more mines out of work for lack of orders.

A NEW YEAR'S GREETING



FATHER TIME :- TAKE THESE BONDS. PART OF THEM WERE LEFT ME BY MY FATHER. 1917, AND PART I HAVE BOUGHT MYSELF. KEEP THEM AND ADD TO THEM, FOR SHOULD YOU NEED A FRIEND YOU COULD NOT FIND A BETTER.

Friends and Fellow Workers:

I wish you a Happy New Year! Many Happy New Years, each happier than the one before.

During the past two years we have all been buying Liberty Bonds, so we have something put aside for a rainy day. Let us keep our Government bonds till we really need to use them; at any time we may have sickness at home, or a hunting accident or even a slack run at the mine.

Let us buy more bonds when they are offered to us, or even before a new issue is offered—for bonds of previous issues are always obtainable.

Remember, it is always patriotic to furnish the capital by which necessary and permanent work is done, whether the completed work takes the form of railroads, mines, factories, ships or houses. But the man with small funds can rarely run the risk that goes with such an investment. Only a well-to-do man can afford to risk his money in that way, trusting to balance his heavy losses by great gains. So when you invest your money, stick to savings stamps and national, state or city bonds, or put your money in banks where you will be sure of both capital and interest.

By such savings you will secure a happy future and growing prosperity year by year. Again wishing you a Happy New Year, I remain,

Yours cordially,

EDITORIALS

Railroads Should Deliver Clean Cars

GOVERNMENT ownership has one advantage. When the Government runs a plant it can appeal to patriotism to get its behests attended to. It can bring pressure which, applied by any other agency, would be resisted.

The railroads for years have been imposed upon by those shippers who, receiving low-grade material, were indifferent as to whether they unloaded it all or left a percentage in the car. Especially is the temptation strong during the winter, when much of the material is received frozen and men are hard to find.

The shipper would rather leave frozen sand, ashes, gravel, manure, sawdust or low-grade clay in the car than diligently dig it out. The railroad, of course, could see to it that the cars were cleaned did not a fall of snow cover up the floor of the car. Frequently no one knows the condition of the car till the trimmers at the tipple get busy with their shovels and brooms.

Then the cry goes out loud and persistently for the mine foreman: "Shall we clean this car and meanwhile shut down the mine or let it through or even load it up without cleaning?" If cars are badly needed and the railroad pressing for the use of all equipment, then there is a great likelihood that the car will be filled without cleaning or, if too dirty, cleaned at much trouble, delay and expense.

Sometimes several men are busy at such work, the tipple force discovering the offending car long before it is run down under the loading chute, or to some point where the closeness of the tracks makes cleaning impossible. If the car is run below the tipple, the railroad has much trouble switching it out of the train to some place where the local section gang can in its few spare hours find time to clean it out.

Why should not the United States Railroad Administration memorialize the shipper of low-grade material and make him cease his abuse of the rights of the railroad and other shippers? The opportunity to bring the shipper to a better habit and conscience in this matter is right now, when the railroads and the nation are one, and he who inconveniences the one directly defrauds the other.

The railroad itself is often somewhat to blame, for its own men are sometimes careless in unloading cars of ballast and leave much material in the bottom of the car. The exigencies of railroad operation sometimes furnish an insufficient excuse for neglect of this kind.

Coal May Oust Gasoline for Motor Cars

OPERATORS of coal mines can look forward to large changes in the coal industry in a few years. The British *Daily Review of the Foreign Press* gives a brief notice based on an article that appeared in the well-known Swiss paper, the *Schweizerische Bauzeitung*. Superficially it does not seem to concern the coal operator, headed as it is "Acetylene as a Substitute for Benzol," followed by the statement of Dr. Grossmann, of Zurich, who in 1915 and the year following pointed out that "acetylene might be used as a substitute for benzene (and therefore for gasoline) in driving motor cars."

When we remember that calcium carbide, the recognized source of acetylene, is made by subjecting coke and lime to the high temperature of an electric furnace, we begin dimly to see where the coal industry enters into the problem; for acetylene is, speaking broadly, a byproduct of coal. It may well prove to be an important after-product of the coke output of the byproduct coke oven.

But always it must be remembered, as Dr. Grossmann points out, that acetylene explodes somewhat too rapidly to be a suitable source of power; that alone, and in its mixture with air, it will explode at a pressure of 30 pounds per square inch and that, when the combustion in the motor is imperfect, soot and acid combustion products will rapidly form. To lengthen the period of explosion water, steam, benzene, benzol, gasoline, pitch and naphthalene may be added, but the two first—water and steam—give no energy and will absorb some of the power. The explosibility under pressure can be cured by the introduction of acetone in the storage tank. Of course, the difficulty about inefficient combustion can readily be cured. Acetylene may be either stored in cylinders or generated on the car.

The problem is interesting. At present it seems visonary, but who can deny that coal may conceivably take over most of the work now done by petroleum? Kerosene and paraffin are rapidly losing their character as illuminants. Acetylene, coal gas and electricity are ousting them from their former place as sources of light, all these three illuminants being manufactured with the aid of coal. Maybe the power use of petroleum byproducts will also come to an end, and then little will be left as *rôle* for petroleum other than to serve as a lubricant; and even that function seems threatened by a substitute made from coal—namely, anthracene oil.

Tithing America for the World's Benefit

ONE OF our contemporaries is urging that as "the productive capacity of the United States is 10 per cent. in excess of its consumption requirements, 10 per cent. of our total production must be sold in foreign markets to provide continuous employment for all our productive agencies." If we are going to sell 10 per cent. more than we buy we must extend credit for that 10 per cent., and as interest will accrue on that credit we must not only give a credit of 10 per cent. of each output yearly, should we supply so much to foreign buyers, but extend a credit also that will allow

the foreigner to pay his interest indebtedness by new credits instead of with goods.

We produce, at present, roughly 40 billion dollars worth of goods yearly. If we send 10 per cent. of our product abroad, that will be four billion dollars of produce per annum. If we will not receive in products either the capital or interest on this impressive sum, how long will it take to pile up a bill which, to pay, will bankrupt the world?

We cannot sell, sell, sell and never buy. We cannot work for the world unless we take our pay in the work of the world. Thoughtless Americans urge on us an independent America that buys nothing. How can such an America be, except it is a self-contained America that not only buys nothing but also sells nothing? The sign of export trade is foreign goods in our market, just as much as it is our goods in a foreign market.

We shall for a while sell Europe more than we buy, because of her present necessities. We shall continue for a few years to add to the indebtedness of the non-American population of the world. Well and good. But the process before long must end. The lender must soon get more than he gives to the borrower or lose at least the interest on his loan.

He who works for the foreigner slaves for the foreigner unless the foreigner pays him with labor and goods for his services. Why are we so keen to ship abroad? That which we can produce with a minimum of labor we can profitably ship; that which it perplexes us to produce, and which the foreigner can manufacture easily, let us buy from him unless we fear there will sooner or later be a war between us. Then it is best not to be dependent in any way on our opponent.

Some day we may be as ready to buy of France as Pennsylvania is willing to buy of New York. What does it profit us to keep up these national lines unless thereby the safety of our homes and our hearths is inperilled?

Isolated Plant Versus Purchased Power

REAMS OF discussion have been printed on the subject of the relative profit in the purchase or generation of power, all based on conditions as they are. We are going to be bold and discuss them on conditions as they ought to be. Most of the isolated plants are using good coal under their boilers. They ought not to be. The bony coal, pyrite and slack should be used for that purpose, but many plants have no provision for crushing and burning the bone and the pyrite. Many operators have planned the use of fine coal and have been obliged to use the coarser material because the equipment provided would not burn fine coal to the best advantage.

For these reasons the isolated plant at the mine is apt to burn coal which is distinctly superior to that furnished to the central power station.

It should take advantage of the fact that the poorer coal produced at the mine will net the operator little or nothing and can be profitably used to make steam if it is utilized at the point of origin.

If the refuse of the seam is large and is to be used, it must be used at the isolated plant. It will not do to ship it a long distance, for it is not worth the freightage. The isolated plant will therefore be an economizer of fuel whenever we have arrived at the point that will make us disposed to use these mine wastes.

Some operators already use such coal and find the use pays. The great difficulty of the isolated plant is that it costs too much money to run because of the cost of engaging a competent mechanical engineer, but there is no question that if power is generated out of the mine waste the engineer will justify his salary in a saving of coal used, in the maintenance of the line work and conductors inside and outside, and in the running of the machinery.

In this way eventually the question "Isolated Plants Versus Purchased Power" will take on a new phase. But still greater will be the difference if we make coke or semi-coke at the mines and obtain heat and power from the gases thus formed. For years boilers have been operated by heat from beehive coke ovens. Engines may be run from power generated by the gas from by-product ovens or from steam raised in boilers that are heated by byproduct-oven gas. In these cases we are, or shall be, faced with the problem of wasting the gas or using it in an isolated plant or at a central station plant located at the mines.

It must be remembered, however, that in low-temperature distillation as it has quite usually been conducted there has been no heat available for other uses. It may be expected that in the future the losses of heat in the low-temperature distillation process will be so reduced that there will be a disposable balance of which an isolated plant could make good use.

Effect of War on Labor

THE war just ended will not in itself promote the real interests of laboring men. It has made many cripples. These men will not have the productive ability that they enjoyed before the war, yet they must be permitted to consume as much, and most of us feel they should be so provided for that they will be able to consume a great deal more than they did before the war commenced. Consumption cannot safely be brought too close to production, and as the consumption of some individuals will not be balanced by their own production, every one is bound to receive less in values even though expressed in money they will doubtless receive more.

There is a disposition to believe that there will be a shortage of labor because many men have died from influenza or been killed by bullets and shrapnel; but concurrently the consumption of the products of labor will be less because of the mortality, and that will reduce the productive demand.

The only hope to be derived from the war is that it will stimulate reactions in the public mind which will increase production and thus make an increased consumption of products possible. If the labor records made in the bellum days are continued in the post-bellum days, we may look for a general increase in prosperity. The more we make, the more we have to distribute or to use for the facilitating of further production.

It is possible that the abilities of the worker and of the managements of our plants have been stretched by the war to such a point as to give the stretch a permanent set. If we, each and all, produce a little more than before, we shall more than overcome the handicap that the war has placed on us.

DISCUSSION BY READERS

Iron vs. Wood Mine Cars

Letter No. 6—Three years' experience with an allsteel car, enables me to compare this with my previous experience with wooden cars, and prompts me to say that I very much prefer the old-style wooden car for mine use.

In the first place, the iron car is expensive to install and to operate. The use of iron cars in mines also increases the cost of upkeep of the track. When an iron car jumps the track it generally breaks two or three ties and, perhaps, bends or breaks the rails.

A small company seldom possesses the kind of equipment required to repair iron cars that are damaged in a wreck. There is no arc-welding apparatus; and, without these extra appliances, the work of repair is slow and the car remains out of service too long.

On the other hand, wooden cars are less expensive to build, and the necessary material can generally be secured near at hand. Most mines are located where good white-oak timber can be obtained at a reasonable cost. Wooden cars are more pliable and, for that reason, are not so hard on the track. The repair of wooden cars is a comparatively simple matter and requires no apparatus except what is ordinarily found in a blacksmith or machine shop at mines. Finally, the time required to repair a wooden car is less than for an iron one.

———, Utah. MINE FOREMAN.

Cost of Upkeep of Mine Cars

Letter No. 1—I was glad to see the suggestion of a correspondent in *Coal Age*, Nov. 14, p. 918, in regard to the need of keeping an accurate account of the cost of repairs on mine cars. He drew particular attention to the difference, in cost, between haphazard and systematic methods of making such repairs.

To my mind, cost-accounting is a very important item in the operation of a mine and one that has been too long neglected. Many coal operators view the making of repairs as a necessary evil. Sometimes repairs are needed so often that they are an unnecessary evil. The frequency of repairs may be due to a poor type of mechanical construction.

ECONOMY IN SELECTING RIGHT KIND OF CAR

Today, when there are many different types of mine cars manufactured, the importance of ascertaining what types are more economical in actual use is greater than ever before. It is my experience that most coal operators pay large repair bills as a matter of necessity, without investigating the saving that might be effected by a change of equipment.

One notable exception to this rule that came to my notice, recently, is that of a large concern operating about a thousand cars in their mines. They concluded that it cost them $5000 a year to make the necessary repairs due to the breaking of end-gates alone, and not considering other breakage resulting from the inherent weakness of the type of car they were using. Judging from the condition of the cars I have seen in that mine, the average cost of $5 per car, per annum, for repairs appears to me as being reasonably low. I shall be glad to learn of other operators who have kept an accurate account of this item.

Manufacturers are now putting on the market several styles of dumps and cages for turning a solid car completely over in dumping, similar to the method of handling railroad cars on the big coal piers. A number of large operators, in various parts of the country, have installed these cars and dumps at their mines. They appear to be firmly convinced that this is an easy method of handling mine cars on the tipple. The car is handled much more gently when being dumped. The elimination of the end-gate, in a solid car, provides a type of construction that is stronger and more durable, and the cost of repairs is greatly reduced, being next to nothing. SHELDON SMILLIE.

Pittsburgh, Penn.

Letter No. 2—Referring to the matter of keeping cost-sheets, showing the amount paid for repairs to mine cars, permit me to say that these sheets mean nothing if they are not kept accurately and made to show in detail what repairs are made and how often.

The matter of cost accounting, in repair work at our mine, has been a careful study with me for some time past. I have found that, in order to get results, one needs a large ledger, having the pages so ruled that the cost of labor and material expended on each car will appear in its proper column. Every car in the mine should be branded with its number, and the repairs made on each car should be entered against that number, in the ledger.

NATURE OF REPAIRS MADE SHOULD BE NOTED

In addition to noting the cost of labor and material and the date of repairs made on each car, there should be room to specify the nature of the repairs. One would be surprised to see how simple this data is to keep, when it is properly arranged, and to realize its importance in determining what improvements can be made in different features that will reduce the cost of future repairs. In other words, the weak points in the construction of cars are clearly shown by studying the ledger.

There is another feature of this cost accounting that is worthy of note. Repair men take more pains to do their work thoroughly. They realize that it looks bad to have a car returned too often to the shop for repairs. The natural conclusion is that the work was not thoroughly done, and they naturally want to avoid such a showing.

Wagon repairs should only be analyzed from a study of the ledger once a year. As mentioned previously, the

showing on the ledger will indicate clearly the style or kind of equipment that is most economical in service. This information is of particular importance in showing the advantage of certian kinds of car wheels, in respect to their size, bearings and lubrication.

Once every month there should be a competent man stationed on the tipple, with instructions to inspect each car as it comes out of the mine. All defective cars should be promptly turned in to the shop for repairs, before being again sent into the mine. This practice will be found to avoid many wrecks that would otherwise occur. There is no economy in postponing the making of needed repairs. Every practical mining man will agree with this statement. It is simply following out the old adage, "a stitch in time saves nine."

PENNSYLVANIA SUPERINTENDENT.

Uniontown, Penn.

Cost Accounting in Mine Haulage

Letter No. 2—Referring to the suggestion of "Progressive," *Coal Age*, Nov. 7, p. 876, in regard to motor-haulage costs, I regret being unable to give definite figures, or to furnish a chart for estimating the costs in this branch of coal mining. I will, however, consider briefly the items that enter into the operating costs of haulage by motor. In all mine haulage, the items of cost fall under two general heads; namely, Operating Costs and Costs of Maintenance. I will attempt to specify these items and classify them under these heads.

Whether the power, in mine haulage, is supplied by a local branch or a public service company, it appears as a monthly operating charge, estimated as kilowatt hours, based on the horsepower, consumed in the operation of the mine. Where the power is furnished by a private or local plant, the charge for the same is based on the operating expenses and overhead charges of the power plant.

In other words, the power plant furnishing the power to the mine is an entirely separate and distinct operation, and performs this service at a reasonable charge, which is estimated in the same manner as a public service plant. It is, of course, the duty of a power plant to deliver power to the mine and, therefore, all transmission lines from the plant to the mine entrance belong to and must be maintained by the power plant. Transmission lines within the mine are the property of the mine owner and installed and maintained at his expense.

HAULAGE EQUIPMENT RECKONED ON COST-SHEET

Turning now to the mine, it is clear that the mine-haulage system consists of the entire equipment, including motors, cars, rails, track material, transmission lines, switches, etc. This haulage equipment is inventoried and valued at a specific sum. The expense of maintenance of such equipment, which includes a proportionate sinking fund, must be charged to the operating account as a monthly rental. By so doing, a new man coming to the mine will have no advantage over his predecessor in office, but will be subject to the same continuous charge and rental for the haulage equipment.

To complete the operating charges, in addition to the cost for power consumed and rental of equipment, must appear the wages of the motormen and helpers, the time for this service being charged according to the number of hours actually engaged in hauling. To these operating expenses must also be added costs for lubrication, repairs of motors and cars, which items would seem to belong particularly to the haulage account, while the upkeep of transmission lines and tracks belongs more properly to the equipment for which the haulage account is charged a monthly rental. My claim is that the charge for motor haulage, to be strictly fair, should be based upon the wages used and the material and current consumed. The last named item should be measured by a meter at the mine entrance.

Jeddo, Penn. J. KENVIN.

Freezing of Shafts in Winter

Letter No. 4—As zero weather approaches, managers of shaft mines are naturally concerned over the problem of keeping the shaft clear of ice in the colder months to come. The freezing of a shaft presents a trying proposition, and one that can only be successfully solved after a series of experiments to determine the effectiveness of seemingly practicable schemes.

In exceptionally cold winters, it has happened that an air shaft has been closed completely by the accumulation of ice; and where the hoisting shaft is the intake or downcast the mine has been forced, at times, to temporarily suspend operations, from the same cause. Before suggesting a remedy for this condition, allow me to cite one or two instances in my own experience.

AN INSTANCE OF A FROZEN HOISTING SHAFT

The first instance occurred in a 300-ft. shaft, where the hoisting compartments were the main intake for the mine. The shaft was timbered with wood and the seepage of water was excessive. A few days of freezing weather would make it necessary to employ a force of men working in relays to remove the ice sufficiently to permit the cages to pass. Two, and sometimes four men, were on the cage at once cutting ice, the cage being hoisted 2 or 3 ft. at a time. Much of the ice cut fell to the bottom of the shaft and had to be cleared from the sump and hauled away into some abandoned portions of the mine.

In severe weather, the cage would freeze fast to the guides in a few minutes; and it would be necessary for the engineer to use slack rope to jerk it loose. I recall one instance where it was necessary to hoist the men out of the shaft with a rope when it was impossible to free the cage.

One can understand the danger of these undertakings when it is explained that the hoisting engine was a duplex 18 x 32 in., operating under 100 lb. gage pressure, the hoisting drum being 7 ft. in diameter. The cages were of the self-dumping type and weighed between 4 and 5 tons, while the hoisting rope was 1⅛ in. in diameter. Many times, a full drum (22 ft.) of slack rope and a full head of steam was used to get the cage loose from where it was frozen in the shaft.

When running the cages at night, during freezing weather, the usual practice was to hit one bottom and one gooseneck and catch the cages on the rebound with a full head of steam. One can imagine the enormous strain thrown on the hoisting machinery, cables, head-

frames, sheavewheels and cages, under such conditions; but these crude methods were the only ones known at that time. I have cited these instances to show the seriousness of the situation, and will now explain the simple manner in which these conditions were changed.

In the left hoisting compartment, an uncovered 2½-in. steam line supplied the steam to operate two pumps. As a result, there was but half the trouble from ice on that side of the shaft, the principal trouble being experienced in the right compartment where there was no steam pipe.

Freezing Prevented by Small Steam Line

By the plan now adopted, a ½-in. pipe was tapped into the steam supply line at the top of the shaft, and from this a ⅜-in. line was run 50 ft. down the left compartment, and two ⅜-in. lines were extended down the right compartment for the same distance. These were put in diagonally opposite corners of the shaft. A ½-in. valve controlled the flow of steam in these three pipe lines, under a pressure of about 90 lb. per sq.in. When hoisting coal, only a small amount of steam was admitted to the shaft, owing to the dense fog created.

A little difficulty was yet experienced by the formation of ice on the extreme right guide. This was overcome, however, by securing a can on the top of the cage and connecting two ¼-in. pipes in such a manner as to conduct the strong brine solution in the can and distribute it equally over the guide.

In January, 1918, the thermometer registered from 10 to 24 deg. below zero nearly the entire month. During that time the services of two men were required at night. The worked from two to four ours each night, clearing the cage seats and bottom landing so that hoisting operations would not be hampered the next morning. There is, now, practically no trouble with ice at this mine.

Another instance that I will mention occurred at the mine where the air shaft was the downcast. On several occasions, this shaft froze nearly solid at the bottom. The usual procedure, at such times, was to work men in relays and pay them double time for cutting and hauling the ice away from the bottom of the shaft. Owing to the exposure to the severe cold, men refused to work at any price until milder weather set in. It was, then, a case of shutting down the mine, which generated a great deal of gas. It is needless to say that these conditions entailed a large expense item.

In this second instance, the difficulty was overcome completely by connecting a ½-in. steam line to the steam supply for the fan engine. This was run down the shaft about 50 or 60 ft. No shutdowns have occurred by reason of the formation of ice in the shaft since; and, to the best of my knowledge, not a single man has worked on the shaft bottom for the purpose of clearing it of ice.

Jack L. Ball.

Amsterdam, Ohio.

Waste of Coal

Letter No. 1—When reading the short article regarding the alleged waste of 150,000,000 tons of coal in the United States, each year, as published in *Coal Age*, Nov. 28, p. 973, I was deeply impressed with the illustration, showing this amount of coal as a solid cube 1785 ft. on a side. It seemed to me that I must be dreaming and I pinched myself to make sure that I was awake and had all my senses.

It was my desire, at once, to flatten out this cube so as to represent a 6-ft. seam of coal, and I started to calculate the number of acres it would cover. The article states that the cubic contents of 150,000 tons of coal is, practically, 5,700,000,000 cu.ft. There are 43,560 sq.ft. in an acre, and the cubic contents of a 6-ft. seam covering 1 acre would be, therefore, $6 \times 43.560 = 261{,}360$ cu.ft. From these asumed data, 150,000,000 tons of coal, in a 6-ft. seam, would cover $5{,}700{,}000{,}000 \div 261{,}360 = 21{,}809$ acres.

Let me assume, now, 10 mines, each hoisting 2000 tons of coal per day and working 300 days in a year. On that basis, the time required for these 10 mines to work out such a tract would be $150{,}000{,}000 \div (10 \times 300 \times 2000) = 25$ years.

Waste Estimated in Labor Required to Mine

Again, let us estimate the number of men that would be required to mine out this coal in 25 years, each man working 300 days in a year and mining an average of 10 tons of coal a day. The number of men required, in that case, would be $150{,}000{,}000 \div (25 \times 300 \times 10) = 2000$ men.

Further, if these men were paid 61c. per ton for loading this coal, the wages paid for loading alone would be $150{,}000{,}000 \times 0.61 = \$91{,}500{,}000$. Or estimating the coal burned by a single family, in a year, as 15 tons, the amount of coal represented by this waste would be sufficient to warm 10,000,000 families. The average consumption of coal in a year, by a single family, however, is considerably less than this estimate.

These figures impress us with the importance of conserving the fuel supply. The question comes home to us, How is this tremendous waste to be eliminated in the mining of coal. Let this proposition be discussed from a practical standpoint.

Russell Exline.

Sullivan, Ind.

Perplexities of Mine Foremen

Letter No. 5—I have been particularly interested in reading the letter of "Mine Foreman," *Coal Age*, Oct. 24, p. 793, in which he describes a difficulty that arose by reason of a coal cutter leaving 4 or 5 in. of bottom coal, in cutting a man's place. The coal cutter explained that it was necessary to raise his machine so as to avoid a roll in the floor.

Being well acquainted with the miner who worked in that place, I am informed that the machinerunner left 9 in. of bottom coal, which is a considerable proportion in a seam 3 ft. 9 in. in thickness. However, from my knowledge of the circumstances, I have no hesitancy in saying that the trouble could have been adjusted in a few minutes if the foreman had used his head.

The fact that the superintendent adjusted the matter without any trouble, later, shows that I am warranted in making this statement. In the conference that the superintendent had with the miner, I am told by one who overheard the conversation that the superintendent admitted that the miner was right. It will be remembered, also, that the Miners' Committee came to the same conclusion.

It is quite true that a mine foreman is frequently troubled and perplexed by small matters that are brought to him when they should be passed over quietly by the miner. It may also be true that the miner, in this case, went a little further than he was justified. Some would say that he should have fixed his place up himself and then demanded pay for his trouble. However, miners cannot be blamed for wanting to get their share and profit by the increased demand for coal and the general boom in the coal industry, today.

One does not have to look back many years to observe the great change that has taken place in mining conditions. Formerly, the miner was confronted with bad air, water in his place that he must bail out before he can go to work, while the scarcity of cars, timber and other supplies caused him much delay and loss of time. Notwithstanding the present improved conditions, it often happens that miners expect too much, and the mine foreman's patience is sorely taxed. On the other hand, we find many foremen who feel themselves above the miner and use their authority to deny what is the miner's just rights.

Advice to Mine Foremen

Let me urge, here, that every foreman should be careful and know he is right before taking a stand against his men. Even then, it is not well for a foreman to "flatly refuse" a miner's request. Not long ago, I heard Mine Inspector Elias Phillips advise a mine foreman, who had stood out against a request of his miners and was, himself, in the wrong, about as follows: "There is one advice I want to give you. Be sure you are right before you take a stand against your men. If they are right and you are wrong, you might as well quit; but if you are right, they will soon find it out and you have gained a point."

While it is difficult to deal with some men, good judgment and careful study of human nature will go far to lessen the perplexities of mine foremen. A machinerunner, in attempting to avoid a roll, may leave more bottom coal than is necessary, but the foreman should be able to see when this is the case and allow the miner what is right. It is poor policy on the part of a foreman to allow such a matter to go before the Miners' Committee and even then refuse to abide by their judgment. He had better fix it up quietly with the man and do what is right if it is possible to satisfy him, in reason. MINER.

Homer City, Penn.

The Miner and Safety

Letter No. 3—It is with the deepest interest that I read the letter signed M. H. G., *Coal Age*, Oct. 10, p. 707. I feel justified in stating that there is no more important work with which mine officials are charged than looking after the safety of their men. At the present time particularly, it is the official's duty in any industry to use every possible means of conserving the man power, which is so important an item to the nation, in its need of increased production.

In my opinion, the fact seems to be well established that most of the accidents that happen to miners could be avoided with a little foresight and by taking proper precautions. The same is not true of other classes of labor in the mine where men fall victims to accidents wholly beyond their power to avert.

It is my belief that safety should be taught universally, not only in coal mining but in every industry throughout the country. It would seem that there is no better way to show the need of workers taking the necessary precautions for their own safety than to illustrate, by pictures, how accidents happen and how they may be prevented. A campaign in the interest of safety, similar to the recent meeting of the National Safety Council at St. Louis, cannot fail to have a noticeable effect in reducing the number of accidents in mines, and causing men to heed the warning of "safety first."

Money spent in conducting such campaigns will always prove a good investment to any community. The large amounts now paid in compensation for fatalities would realize a greater gain if used to conduct a much needed safety campaign. It would pay for all the posters and advertisements necessary to impress lessons of safety in a way that would reduce avoidable accidents.

Permit me to say that there is nothing more effective in keeping a man from taking unnecessary chances while at his work than to have thoughts of his family who are depending upon him for support brought before him by such sympathetic pictures as were used to illustrate the letter of M. H. G. to which I referred previously. The leavetaking of the wife and baby in the morning, as shown in the first picture, when the miner is cautioned to be careful for the baby's sake, is a sad contrast to the scene described in the third and last picture, where the lifeless body of the uncautious miner is being brought to his desolated home. What more could be asked to induce miners to take these necessary precautions, not only for their own safety, but for the welfare of others dependent on them? Pictures impress themselves on the brain and cannot be effaced, while words of caution are quickly forgotten.

Foremen Must See Their Orders Are Obeyed

As stated in the letter of Lewis R. Thomas, Nov. 7, p. 877, it is the experienced miner who is the most frequent victim of serious accident. He is the one who is the most prone to take chances, depending on his long experience and freedom from harm. But, exemption from injury in the past is no guarantee of a like experience in the future.

For a foreman to order a miner to take down a bad piece of roof, or set a needed post for his protection, is not enough; but he should see that the work is done at once. Where a place is found to be dangerous and the miner is instructed to make it safe before proceeding to work, the driver should be told to set no cars in the place until the work is done. In the morning, drivers should be given a list of places that are dangerous, and forbidden to set cars there until further orders.

To show the need of taking every precaution, let me recite briefly a serious accident that happened to a car runner who was not informed as to what places were dangerous. The fireboss had marked a dangerous place in the morning, and fenced off the entrance on the haulage road so as to prevent anyone from going into the place unwarned; but did not consider it necessary or think of placing a similar warning at the crosscut leading from the adjoining room. It was through this lat-

ter opening that the driver entered the place just in time to be caught by the falling slate. It was his good fortune at the time, however, to be standing at the side of a car, which broke the fall of the slate and saved his life. In this position he was found a little later and rescued.

The incident just cited shows how a fireboss will seemingly comply with the requirements of the law and, yet, an accident may follow. In this instance, the car runner was accustomed to travel through the crosscuts from room to room, and had he been given a list of those rooms that were dangerous, he would have been warned and the accident might not have happened.

Inspect the Timbering of All Working Places

Mr. Thomas suggests, at the close of his letter, the careful inspection of miners' places to see that they comply with regulations in regard to setting posts a specified distance apart along the face. Miners should not be permitted to exceed this distance. Another condition that is dangerous occurs in low seams where roof slate or rock must be taken down to make headroom for the car, so that it can be brought near enough to the face for loading. I see no reason why a miner should be permitted to mine under such rock for a distance of 10 or 15 ft., for the purpose of saving a little powder and extra work. In doing this he invites an accident.

In mines where it is necessary to lift bottom in order to get headroom for the cars, I have sometimes seen miners advance 30 ft. or more before doing the work of lifting the bottom. While advancing beneath such rock, only temporary timbers are set, and these are very liable to be discharged in blasting the coal. The permanent double timbers are only set after the bottom rock has been lifted. To prevent such a dangerous condition, the working places should be carefully watched by the foreman and his assistants.

In closing, I want to say again that safety should be taught universally and harder and more rigid rules made and enforced for the safety of the miner, who is too often prone to take his life in his hands and assume unwarranted chances. Safety, in coal mining, should not be treated as a cold business proposition, but should receive the hearty coöperation of every mine official and mine worker, whatever his position. All are alike responsible.

Joseph R. Thomas

Plymouth, Penn.

Letter No. 4—I was deeply interested in reading the letter of Lewis R. Thomas, *Coal Age*, Nov. 7, p. 877, and quite agree with him in all that he has stated concerning the attitude of the experienced miner when he is questioned regarding the condition of his working place. More miners are killed by falls of rock and coal who claimed to be more experienced than those who make no such claim. The reason for this is that the man who claims to be experienced in mining coal is very apt to be careless in regard to timbering his place, whether the roof is good or bad. It seems to be his desire to show his experience by his seeming disregard of danger.

In the State of Colorado, conditions in the mine vary so continually that there are hardly two mines having like conditions of roof. In one mine, the coal will be overlaid with a hard sandstone roof and, again, this will be replaced by a drawslate above the coal. In places, there is a slate roof with numerous slips running in all directions. In some of the mines, the roof is full of "pots," or "Mexican hats," as we call them.

Only the truly experienced miner knows how to cope with these varying conditions and protect himself from danger. In order to make the mining of coal safe, in these mines, the state mining law requires that such a method of timbering the roof and spragging the coal shall be adopted, in each mine, that shall securely hold the roof, sides and face and meet with the written approval of the chief inspector of coal mines.

Chief Mine Inspector James Dalrymple insists that where coal is mined by machinery, props shall be set not more than 6 ft. from the face nor more than 5 ft. apart, with cap-pieces not less than 12 in. long. He also requires that all drawslate between the face of the coal and the timbers shall be taken down where such slate exists above the coal.

Mr. Dalrymple claims that the present method of timbering, by setting posts at stated distances apart regardless of conditions in the roof, is far safer than the old method of timbering where the miner relied on the sounding of the roof. He claims that roof conditions change when there is no change in the sound, and the method of timbering adopted protects the miner against these changes in roof conditions.

Mine Officials Urged To "Get on the Job"

Not only is the fireboss, in Colorado, required to examine the roof in each working place, to see that it is safe for work, when making his morning rounds, but the mine foreman or his assistant must visit each working place every day and see that it is timbered as the law requires. The foreman or his assistant must see that this is done before he leaves the place. Instead of enlarging, further, on the many conditions that lead to accidents, let me urge that it is the duty of every mine official to get on the job and see that each miner complies with the mining law and the mine rules and regulations in force at each mine.

Everyone familiar with mining knows that a miner's chief aim, in going into a mine, is to load every ton of coal possible and it makes little difference whether the man is an experienced miner or not; his only thought is the almighty dollar. Therefore, as long as the miner is paid for every ton of coal he can load, it is useless to depend on his individual regard for safety. Someone else must look after that. While we boast of our years of experience in mining, it is a fact that many of us would not be alive today had it not been for our interest in the other fellow's safety rather than in our own.

I recall a sad accident that happened to a mine foreman who found two men working in a place that was unsafe. After ordering the men out of the place and sending them home, the foreman returned to examine the roof more closely and was caught by the fall, which occurred suddenly, and killed him. He saved the lives of two of his men; but, relying on his experience, risked his own life and lost it.

In closing, let me impress on the minds of all mining officials that the safety of the miner is in their hands. Compel strict compliance with the mining laws and regulations and satisfy yourself that every man is working in safety, which is your duty.

Farr, Colo. Robert A. Marshall.

INQUIRIES OF GENERAL INTEREST

Blow Struck by Steam Hammer

Will you kindly give, in the columns of *Coal Age*, a formula for calculating the blow struck by a steam hammer? SUBSCRIBER.

Upper Lehigh, Penn.

As was explained in *Coal Age* a short time ago (Vol. 13, p. 984), it is only possible to calculate the energy stored in a hammer at the moment the blow is struck. This energy is expressed in foot-pounds, being the product of two factors, namely, the force of the blow and the distance in which the hammer is brought to rest. It is clear, therefore that the force of the blow, in pounds, can only be ascertained when the distance is known through which the hammer is brought to rest and this distance will vary with the density of the material struck.

To illustrate, a block of lead or other soft pliable substance, under a steam hammer, will develop a much less force than would result when a block of iron or steel is struck the same blow. For example, assuming that a blow of an energy of 1000 ft.-lb., or 12,000 in.-lb., falls on a block of lead, compressing it, say $\frac{1}{4}$ in. The force of the blow is then $12{,}000 \div \frac{1}{4} = 48{,}000$ lb., or 2 tons.

Again, assume the same blow falls on a block of malleable iron, causing a compression of, say $\frac{1}{16}$ in. The force of the blow, in this case, is $12{,}000 \div \frac{1}{16} = 192{,}000$ lb., or 96 tons.

The question of the force of a blow struck by a hammer is of little practical value, being only relatively suggestive.

Steam Boilers at Coal Mines

Give briefly the more common causes of boiler explosions, and state the types of steam boilers in most general use at small coal mines.

———, Ky. SMALL OPERATOR.

The more common causes of boiler explosions, as they occur in coal-mining practice are the following: (1) Low water in the boiler and the consequent overheating of the boiler plates and tubes when in charge of an incompetent fireman. (2) Lack of proper inspection and cleaning of the boiler at regular intervals. (3) The use of impure feedwater, resulting in the undue incrustation of the interior surface of the boiler, necessitating forcing the boiler and burning and blistering the fire plates. (4) Improper setting of the boiler, or settlement of the foundations, thereby bringing undue and harmful strains on the joints and other parts which become weakened and give way without warning.

Except in large power plants, the type of boiler commonly found at coal mines is either that known as the flue boiler or the return-tubular boiler. The former is a cylindrical boiler 5 or 6 ft. in diameter and, perhaps, 30 ft. long, having two flues 10 or 12 in. in diameter and extending the length of the boiler. The boiler is heated by a furnace placed under the front end, the flame passing over a firewall to the rear and returning through the flues is conducted by the breeching to the stack.

The return-tubular boiler is of practically the same construction, except that it is generally shorter and the flues are replaced by a large number of small tubes 2 to 4 in. in diameter. More up-to-date power plants employ a type known as the water-tube boiler, which consists of a series of inclined tubes surmounted by a horizontal drum, with which the tubes are connected in a manner to permit of the free circulation of the water through the entire system. By means of baffle-plates the flame and hot gases of the furnace are made to circulate up and down among the tubes before reaching the stack. The chief advantage of water-tube boilers is that they are more highly efficient and less liable to explosion.

Frogs and Latches in Mines

Kindly explain what is meant by the number of the frog, in a mine switch; and how to find the number of any frog that is on hand. For example, the frog I have here measures 3 ft. long, from the point of frog to the end of the two rails, which have a spread of 8 in. in that distance. Also, please explain what should be the length of the latch, in a mine switch.

Steubenville, Ohio. DAYMAN.

These questions have been thoroughly answered in the reply to the inquiry on "Mine Switch Calculations," *Coal Age*, Nov. 21, p. 961. A frog having a spread of 8 in. in 3 ft., or 36 in., would be a $4\frac{1}{2}$ frog. The number is found by dividing the length of frog by the spread; thus, $36 \div 8 = 4\frac{1}{2}$, the number of the frog. It is more common, however, to measure the entire length of the frog, end to end, and divide this length by the sum of the spread, measured at each end, as explained and illustrated by the figure, on page 961.

As there explained, also, the length of a switch latch, in coal mining, will depend on the radius of the curvature of the switch rails, and the desired clearance between the latch and the main rail at the hinge or pivot on which the latch swings. The length of the latch is found by multiplying twice the radius of the curve by the desired clearance, both expressed in feet, and finding the square root of the product.

For example, using a $4\frac{1}{2}$ frog and a track gage of 3 ft., the length of lead rail is $l = 2gn = 2 \times 3 \times 4\frac{1}{2} = 27$ ft. The length of the radius of curvature is then $R = nl = 4\frac{1}{2} \times 27 = 121\frac{1}{2}$ ft. Then, assuming a clearance between the latch and the main rail at the hinge of, say 4 in., or $\frac{1}{3}$ ft., the length of latch is $x = \sqrt{2Rd} = \sqrt{2 \times 121\frac{1}{2} \times \frac{1}{3}} = 9$ ft.

EXAMINATION QUESTIONS

Miscellaneous Questions

(Answered by Request)

Ques.—A column pipe 100 ft. in height is full of water. A hole is bored in the pipe at the bottom and another hole halfway down. With what velocities will the water issue from these two holes?

Ans.—The jet of water that issues from the bottom hole has a velocity due to the height of the column pipe. In other words, the theoretical velocity of efflux is that due to a head of $h = 100$ ft., which gives

$$v = \sqrt{2gh} = \sqrt{2 \times 32.16 \times 100} = \sqrt{6432} = 80.2 \text{ ft. per sec.}$$

Some authorities give a coefficient of efflux as 0.97, which makes the actual velocity of efflux $0.97 \times 80.2 = 77.8$ ft. per sec.

The flow from the hole halfway up the pipe has a velocity due to a head of 50 ft., which makes the theoretical velocity of efflux

$$v = \sqrt{2gh} = \sqrt{2 \times 32.16 \times 50} = \sqrt{3216} = 56.7 \text{ ft. per sec.}$$

Using the same coefficient of efflux gives, for the actual velocity, $0.97 \times 56.7 =$ say 55 ft. per sec.

Ques.—Suppose that, in a gassy mine, the quantity of air is 175,000 cu.ft. per min., measured in the return, and it contains 4 per cent. of firedamp, when the barometer is 30 in. (a) What quantity of firedamp is given off in the mine? (b) What is the least decrease of the quantity of air that will render the return air explosive? (c) What increase of gas will render the return air explosive?

Ans.—The question evidently means to state that the return current contains 4 per cent. of *methane* or *marsh gas*, as the term "firedamp" relates to any inflammable or explosive mixture of this gas and air, which would make the question quite indefinite. (a) The quantity of methane contained in the return current, on this assumed basis, is $0.04 \times 175{,}000 = 7000$ cu.ft. per min., which is the quantity of the gas given off in this mine.

(b) The lower explosive limit of pure methane is reached when the proportion of air to gas is 1:13. In other words, the gas forms then 1/14 of the firedamp mixture. To reach this condition by increasing the quantity of air would make the entire volume of air and gas in circulation, in the return airway, $14 \times 7000 = 98{,}000$ cu.ft. per min. This would show a decrease in the quantity of air entering the mine of $175{,}000 - 98{,}000 = 77{,}000$ cu.ft. per min.

(c) To reach the same condition by an increase in the flow of gas into the mine would require a quantity of gas equal to 1/13 of the quantity of air now entering the mine. The quantity of air in circulation is $175{,}000 - 7000 = 168{,}000$ cu.ft. per min. Therefore, the quantity of gas required to be generated, in this case, is $168{,}000 \div 13 = 12{,}923$ cu.ft. per min. This would mean an increase, in the quantity of gas generated in the mine, of $12{,}923 - 7000 = 5923$ cu.ft. per min.

Ques.—At what point in the mine would you expect firedamp to be standing, and how does firedamp appear in a safety lamp?

Ans.—A firedamp mixture being lighter than air may be expected to accumulate in rise workings, or at the head of steep pitches where the circulation is not sufficient to sweep it away. Firedamp will also be found where it is generated in sufficient quantity, in dip workings, where the air passing is not able to keep the place clear of gas. In such a case, however, the gas does not accumulate in the place, but the quantity generated is greater than the air current can remove.

Assuming that "firedamp" is an inflammable or explosive mixture of marsh gas and air, its presence in the lamp will cause the lamp to fill with flame and, at times, the mixture will explode within the lamp. If the percentage of gas present is below the inflammable limit, the mixture is not properly termed *firedamp*, but merely a mixture of marsh gas and air. The appearance in the lamp will then be manifest by the formation of a flame cap, the height of which will vary with the percentage of gas present.

Ques.—Is there a disadvantage or loss in having the air travel at a high velocity, and why?

Ans.—A high velocity of the air current circulating in a mine is a disadvantage, for several reasons. Greater power is required to produce the circulation than where the air current is divided into two or more splits and the velocity decreased proportionately. A high velocity of an air current is a source of annoyance and danger. Men cannot work in a high velocity of the air passing the working face, with any degree of comfort, and there is danger of igniting the gas generated at the face by the flame of the lamp being blown through the gauze.

Ques.—Describe what, in your judgment, you consider the best method of conducting the air current to and along the faces of the working places.

Ans.—The main air current in a mine should be divided so as to ventilate each district with a separate split of air. The air should be conducted to the farthest point inby, before being deflected into the rooms on its return. By this arrangement, the greatest pressure is made effective at the inby end of the workings. The air current should be made to sweep the coal face in each working place.

Ques.—What will be the pressure per square inch at the bottom of a column pipe on a slope 450 ft. long and pitching 42 degrees?

Ans.—The vertical rise of this column pipe, laid on a pitch of 42 deg. is $450 \times \sin 42° = 450 \times 0.66913 = 301.11$ ft. Assuming that the pipe is full of water, the static pressure, at the bottom of the pipe, due to this head, or the pressure when the pump is not in operation is $p = 301.11 \times 0.434 = 130.68$ *lb. per sq.in.*

COAL AND COKE NEWS

Harrisburg, Penn.

The United Mine Workers of America have outlined the following proposed amendments to the Pennsylvania Workmen's Compensation law, which will be submitted to the Legislature by the mine workers' organization at the coming session in January, 1919.

1. The waiting period of fourteen days now provided in the act should be eliminated and compensation begin from the date of injury.

2. The injured employee should have the right to select his own physician.

3. Payment of compensation for the loss of members of the body, such as an eye, a hand, an arm, a foot, or a leg, should be doubled in amount and length of time of payment.

4. Compensation should be paid for the loss of fingers and toes.

5. Compensation should be paid for all disfigurement.

6. Where sons in families meet with fatal accidents, parents should be compensated without the necessity of proving dependency.

7. Compensation should be paid to invalid brothers and sisters, regardless of age.

8. Compensation should be paid to a widow or wife or until she remarried.

9. The basis of payments of compensation should be 70 per cent. instead of 50 per cent. of the weekly earnings.

During the 1917 session of the Legislature no important changes were made in the compensation law, as the Governor of the Commonwealth of Pennsylvania stated he would not agree to any changes for two years, so that the law would have a fair test. It is thought that during the 1919 session organized labor will make great efforts to have changes made, and it is very evident that much opposition will be made to the proposed changes. Another fight is contemplated on the proposed "Old Age Pension Bill."

Refusal of the Pennsylvania Railroad Co. to permit the loading of coal into cars from wagons is declared by the Public Service Commission, in deciding the case of McPhilomy & McPhilomy, trading as the Franklin Coal Mining Co., of Brisbin, Clearfield County, to have been unjust, unreasonable and discriminatory, and the company is ordered to pay damages amounting to $500. The Commission, however, finds that the claim of the company that the railroad by failure to deliver cars prevented opening of a new seam of coal is not well found, and that the failure of the railroad to construct a siding was cause for damages aggregating $18,000.

Uniontown, Penn.

Influenza is slowly giving way in the Connellsville coke region. Production for the week ended Dec. 7 is 600,581 tons as against 574,729 tons for the week ended Nov. 30. Fuel officials and operators generally see in the increase not only the waning of the influenza epidemic but the results of the transition of the coke region from a war to a peace basis. The coming of peace found production at its lowest point since the war, and the week following showed another drop of 50,000 tons caused principally by the relaxation of the workmen to celebrate the event. Since then production has risen slowly and it is believed that production throughout the winter will hover around a weekly average of 600,000 tons' coal.

With a rating of 10,584 cars, a total of 5092 cars were lost by reason of labor shortage. Car shortage itself was held responsible for 782 cars. The cars shipped from the region loaded were recorded as 9942.

Coke showed an encouraging increase of 15,866 tons for the week, but an increase of only 2053 tons was noted in the shipment of byproduct coal. The aggregate production of 660,581 tons was divided into 270,993 tons of coke and 194,091 tons of byproduct coal.

Charleston, W. Va.

The year is being wound up in West Virginia insofar as the coal industry of the state is concerned, by what may be termed a stagnant market and with producers waiting to see what the new year will bring forth. Unless it does bring at least a few months of coal weather, West Virginia operators do not look for anything but a dull winter. So far there has been absolutely no such weather as might have been expected at this time of the year, and this has had a detrimental effect on the industry, some mines partly suspending operations and others shutting down. Such cases, however, are the exception rather than the rule.

The railroads—large consumers of coal—are trying to force prices down and have the extremely warm weather as an aid. Some coal from the state is going to the South American trade. Production may be a little larger than usual before Christmas, in order to supply consumers over the holiday period, when the output will fall short of requirements because of the usual holiday absences of miners.

Production, generally speaking, showed an improvement during the second week of the month with miners returning from military service and with certain labor troubles adjusted. Various factors combined to restrict the output of the Fairmont region during the week ending Dec. 14, a shortage of cars being the chief impediment to normal production. Further trouble was experienced in getting prompt placement of cars, and while the health situation was gradually improving yet many mines are still short of their entire complement of men owing to cases of influenza.

As a result of lack of motive power, and contributing trouble, the Baltimore & Ohio was unable to furnish empties anywhere approaching ordinary requirements, as it has been able to do during November. Some encouragement was lent to the market situation by an influx of orders for shipment to South America. Railroads are still using rather large quantities of steam coal in the East.

Fairmont, W. Va.

Labor conditions and the discussion of possible legislation occupied the time of the Northern West Virginia Coal Operators' Association at a meeting held here on Saturday, Dec. 14, attended by more than 100 members from Clarksburg, Elkins, Philippi, Morgantown, Kingwood and many other points.

A report made by Secretary F. J. Patton disclosed that the membership had grown from 77 operating companies having 147 mines to 154 operating companies with 238 mines.

A report was submitted by Chairman A. C. Beeson, of the Four States Coal Co., for the transportation committee dealing with such matters as compensation for "deadwork," etc.

Improvements being made by the Baltimore & Ohio Ry. in an effort to better transportaion facilities and the general improvement in the car situation were related by S. D. Brady for the committee on transportation.

It was suggested that the coal companies should maintain the Department of Mines and that the inspection forces should be increased because of the large number of new mines established in the last year. Mr. Isner declared the legislative committee was of the opinion that in one respect the mining laws should be amended, since under the present statute if an operator does not drain his mine he may be prosecuted, and if he does drain it into a stream he runs the risk of being prosecuted for polluting the stream.

The afternoon session was largely devoted to a discussion of future prospects and present conditions of the industry. Various labor questions also received a share of attention.

Secretary F. J. Patton stated that the association had received definite promises that there would be no discrimination in the car supply and other forms of transportation service against the Fairmont district as there had been in the past. One of the features of the afternoon session was an address by A. W. Calloway, director of bituminous distribution for the United States Fuel Administration.

Birmingham, Ala.

Coal production in the Birmingham district during the week ending Dec. 7 shows an increase of nearly 60,000 tons over the figures for the week ending Nov. 30. The week the output was 381,065 tons against 322,591 tons for the last week in November. The output for the week ending Dec. 14, according to the majority of the operators' unofficial figures, will show an increase over these figures also.

The shipping of coal into North Georgia by Kentucky operators will not be affected appreciably by the removal of the zone system, as that district has been part of the Kentucky and Tennessee zone for some time. Every ton that can possibly be mined is badly needed by manufacturers throughout the districts supplied by Alabama mines. Miners and operators are being urged to hang up record production marks by Government officials and the larger consumers of fuel.

Reports are current to the effect that the Woodward Iron Co. will announce plans for expansion in the Bessemer district shortly, whereby sixty new Koppers byproduct coke ovens will be built by that corporation in the near future. There is also much speculation in the district as to other expansion of the company, and it would not be surprising, expert authorities say, to see that company branch out into the steel producing business.

At present there are four of the company's five furnaces in operation. The big byproduct oven plant at Woodward is undergoing considerable repair work. The company owns thousands of acres of coal lands, which are being steadily developed. A new mine, a short distance from Dolomite, is now ready to produce coal.

Contracts for coke are being offered practically every concern of this nature in the entire district, but few are being accepted, as the district is suffering from under-production of the product. Foreign countries, particularly Mexico, are clamoring for the fuel to be used in smelter work.

The announcement that Director General of Railroads McAdoo had approved the expenditure of $1,600,000 for additional equipment to be used in the operation of the Warrior River barge transportation system was hailed with joy throughout the Birmingham district.

Victoria, B. C.

Experiments have been at progress at the collieries of the Canadian Western Fuel Co., Nanaimo, B. C., for the last two months in the effort to arrive at a solution of the problem of rendering impossible (or reducing the possibility to a minimum) a repitition of such an accident as that of last September, when the rope used in the Protection Island shaft broke, causing considerable loss of life.

The ingenuity of Thomas Price, master mechanic for the company, has resulted in an arrangement which seems to come close to meeting requirements. He has devised, and demonstrated its practicability in actual operation, a working model of a four-rope hoisting system. George Wilkinson, chief inspector of mines, describes the arrangement as follows:

"There are four complete hoisting ropes, an overwind rope and an underwind rope on each compartment of the drum. Four pulley wheels are used, two of them being set some distance above the other two to avoid fouling of the ropes.

"The ropes on the two upper pulleys cross. A drum of the usual dimensions is used and having an overwind and underwind rope on each compartment, the one rope is being unwound while the other is being wound.

"As the under rope is being wound on the drum and the cage is hoisted an overwound rope is being unwound and descends with the cage in the opposite compartment. The

operation is the same on the other side of the drum. The whole operation is made feasible by simply crossing the two ropes that lead to the two upper pulleys."

Mr. Wilkinson asserts that this is one of the simplest and most practical arrangements he has seen in use on safety ropes. He points out that everything is under control of the engineer, the same hoisting speeds being used on all ropes. Any possibility of slipping is avoided because all ropes are fastened to the drum.

Preparations are being made by the Western Fuel Co. for the installation of this double-rope system at its new mine, the Wakesiah, near Nanaimo, B. C.

PENNSYLVANIA

Anthracite

Drifton—Gambling on the prospect for an open winter, the Lehigh Valley Coal Co. has cancelled orders, effective at once, for the suspension of the Woodside coal banks operations, and these will be continued indefinitely. The fuel was dumped out as unsalable 65 years ago. The coal will be prepared at Drifton No. 1 breaker.

Wilkes-Barre—The Lehigh Valley Co. has filed a blanket appeal with the Luzerne County courts against the assessments on its anthracite bearing tracts within the Hazleton city limits. There is a general move on foot to advance the valuation of coal lands and to force anthracite operators to pay more taxes in the communities where they dig their commodity. Hazleton's assessment of the coal lands is over $3,500,000.

Edwardsville—The steel framework of the new Woodward breaker of the Delaware, Lackawanna & Western R.R., coal department, has been completed and work on the roof and installation of machinery is under way. The structure will cost over $2,000,000 and is said to be the first all-steel breaker built. It is 200 ft. high and about 15,000 tons of steel will be required. The work is being done by the bridge and construction department of the coal department, which will complete its task early in 1920.

Eckley—Mrs. Eckley B. Coxe, whose benefactions to the families of the miners in the Coxe mining villages have won her the title of "the angel of the hard-coal fields," has come to the rescue of the influenza stricken population of Eckley, named after her late husband. More than 10 per cent. of the town is down with the plague, and there have been many deaths. Mrs. Coxe organized a corps of doctors and nurses and sent them to take charge of the situation and supplement the efforts of the welfare department of the Lehigh Valley Coal Co.

Bituminous

Dawson—T. Robb Deyarmon has sold the 140-acre farm known as the John A. Fisher estate in Westmoreland County, to Millers Brothers. The farm is underlaid with coal.

Pittsburgh—The Crucible Fuel Co. has acquired the mine of the Cornell Coal Co. This is a slope mine in the Freeport seam of coal in the Allegheny Valley in Allegheny County, on the Conemaugh division of the Pennsylvania Railroad.

Heilwood—Ten more houses have been completed for the Penn-Mary Coal Co. at Clement, where Nos. 11 and 12 mines were opened recently. The second floor of the store building here of the Heilwood Co. is being remodeled and equipped as a clubroom for the coal company employees. Among the amusements will be pool and billiard rooms and a reading room.

Brownsville—Fire early Thursday morning, Dec. 19, destroyed the motor house, stockroom and office of the Pike mine, which is owned by the Diamond Coal and Coke Co. The loss was placed at $30,000. It is said that the fire was of incendiary origin. Within the last four years the company lost four tipples, one barn and a large store at West Brownsville.

Waynesburg—J. H. Strawn, receiver of the Farmers' and Drovers' National Bank of Waynesburg, has sold to Thomas M. Ingram and Frances I. Baily, of Cumberland township, two tracts of coal in Franklin and Center townships, with a total acreage of 283. The same purchasers have bought the J. B. F. Rinehart tract of 47 acres. The total consideration is said to be $40,000.

WEST VIRGINIA

Page—The Loup Creek Colliery Co. at its plant here, in the New River field, has installed and has in operation a new 200-kw. rotary converter.

Beckley—Among recent improvements made at the plant of the Boone Smokeless Coal Co., in the Raleigh field, has been the construction of a new substation, which was put in operation on Dec. 17.

Sand—With the completion of a siding at its operation at this place, the Brady-Thacker Coal Co., of which D. A. McDevitt is general manager, expects to begin the shipment of coal by the first of the year.

Logan—Latest improvements to be made by the Main Island Creek Coal Co. at its Omar plant, in Logan County, include the installation of two 200-kw. rotary converters, under the direction of the West Virginia Engineering Co., of Charleston.

KENTUCKY

Madisonville—Two men were killed by a premature shot in the Robert Forsythe mine near Providence, Ky., on Dec. 19. The men failed to come out at night, and a search was made, the bodies being found at 1 o'clock in the morning. The men were shotfirers.

ILLINOIS

Edwardsville—The Donk Brothers' mine here was closed down last week on account of two boilers at the power plant giving way.

Plainview—A new coal development is being promoted in this vicinity by A. W. and A. M. Crawford, who have successfully promoted a number of operations in Macoupin County. Drills have been ordered in and it is announced that prospecting will begin at once. Options are held on many hundreds of acres of land.

Witt—The two mines at this place have closed down, throwing 800 to 1000 men out of work. Many of them are seeking work elsewhere. Some have gone to the Kortkamp mine and some to Taylor Springs. The closing of the Witt mines came suddenly and without explanation. Most of the miners had bought Liberty Bonds, which were only partly paid for.

Taylorville—The Taylorville mine has been put out of commission temporarily by the fall of a cage on which six tons of coal was being hoisted. The axle of the sheave wheel broke at the top of the tipple and the weight of the coal tore away the automatic safety catches. The cage fell 200 feet to the bottom. Nobody was hurt. The 475 miners in the mine had to climb 600 feet up the airshaft stairs.

Carlinville—Coal was reached last week in the new mine promoted by Carlinville men, and the first load was sold on the public square for the benefit of the Red Cross. The sinking of the shaft was necessitated by the sale of the Carlinville mine several months ago to the Standard Oil Co., followed by the announcement that the new owners would not supply the local trade. The shaft has been cemented as it was dug, and as soon as screening equipment arrives the mine will supply all the needs of the community. In the meantime mine-run is being sold.

Hillsboro—One of the largest transactions in coal lands in the history of the trade is about to take place at Farmerville in this, Montgomery County. The Elly coal lands, in the north and west part of the county, which were taken over by the custodian of alien property, are to be sold. The lands contain extensive deposits of coal, some of the veins being 10 to 14 ft. thick. The lands, comprising several hundred acres, were held by the Elly Coal Co., which was organized in Germany, where most if not all of the stock is held. The principal offices of the company are at Girard, Ill.

Foreign News

Sydney, N. S.—It is stated here that the Dominion Coal Co. has made a formal offer to Fuel Controller Magrath to lease or purchase the Florence mine of the Nova Scotia Steel and Coal Co. Under the offer, it is understood, the value of the property would be fixed by arbitrators, to be appointed by the Government. It is also announced that the Dominion Coal Co. will develop and operate its extensive submarine areas in the Florence district.

Paris, France—Soft coal is $20 a ton in Paris. A family of from one to five persons gets 132 lb. of coal a month for cooking if the family does not have gas, and 132 lb. for heating. Similarly, a family of six persons is allowed 198 lb. of coal for cooking and as much more for heating. In England coal is rationed in proportion to the number of rooms in the house. In France a family of two persons occupying a large house of 15 to 20 rooms gets no more coal than the family of two living in a two-room flat. Paris does not expect to shiver as it did last winter, as the municipal authorities will draw upon the 80,000 tons of dry wood that have been stored in warehouses for use in emergencies. Other French cities have similar wood stores.

Ottawa, Ont.—The Lignite Utilization Board, of which R. A. Ross, consulting engineer, of Montreal, is chairman, reports that the large plant which is to be established in Saskatchewan for briquetting the lignite coal of that province will not be in operation until the spring of 1920. Before proceding with the work of construction the board will devote six or eight months to preliminary researches with which object in view Edgar Stansfield and R. de L. French, mining and chemical engineers, have been commissioned to make a comprehensive inspection and study of the carbonizing and briqueting plants in operation in the United States, and are now engaged in that work. Six months more will be required for the construction of the plant and the installation of machinery, in addition to the time necessitated for commercial adjustments, so that the spring of 1920 is the earliest date at which the plant can be put in steady operation. The capacity will be 30,000 tons yearly, but this production is a comparatively small consideration as the chief object of its establishment is to demonstrate the commercial feasibility of the process and to induce private capital to engage in the briquetting of lignites, in order to replace the anthracite now imported into the Canadian West with the domestic product.

Personals

Samuel T. McMillen has resigned as superintendent the Fulton Run shaft of the Jefferson and Clearfield Coal and Iron Co. at Ernest, Penn.

Benjamin Bish has been made superintendent of the Loash Coal Co. mines at Knoxdale, Penn., to succeed W. B. McInch, who recently died of influenza.

Carel Robinson, of Russelton, Allegheny County, Pennsylvania, has resigned as general manager of the Superior Fuel Co., effective Dec. 31, to take charge of the mines of the Boone County Coal Corporation at Clothier, W. Va.

H. T. Booker has been appointed general superintendent of the United Coal Corporation, Pittsburgh, Penn., vice **Edward H. Coxe**, resigned. Mr. Booker's appointment takes effect as of Dec. 15. He will be in charge of the operation of the corporation's mines and all matters incident thereto.

Lieutenant Paul T. Norton, Jr., who resigned his position as division engineer of the Somerset division of the United Coal Corporation of Pittsburgh, Penn., about a year ago to enter the army, has returned from overseas aviation service. Lieutenant Norton expects to return to work, probably in his former position.

Charles M. Means, of Pittsburgh, Penn., head of the United States Fuel Administration division of bituminous coal inspection, has sent his resignation to Dr. Garfield, to take effect Jan. 1. Mr. Means, who is an engineer with offices in the Henry W. Oliver Building, began his duties in Washington on Apr. 12 last.

Captain John Gibson, Jr., of Pittsburgh, Penn., returned on Dec. 14 from Camp Humphreys, near Washington, D. C., where he has been in charge of training an engineer company for overseas service. Captain Gibson has received his discharge from the service and will at once resume his duties as general manager of the Penn Smokeless Coal Co. in the Union Bank Building, at Pittsburgh.

A. C. Callen, professor of mining engineering and head of the department of mining extension of the West Virginia University, Morgantown, W. Va., has been granted a four months' leave of absence, beginning Jan. 1, 1919, to make a survey and study of the various mining regions of the United States. **R. Z. Virgin**, who for some time has had charge of mine extension work, will take charge of Professor Callen's classes at the university during his absence.

Obituary

James Long, aged 76 years, of Hazle Brook, Penn., formerly superintendent of the Silver Brook, Black Ridge, Hazle Brook and Eckley collieries of the J. S. Wentz Coal Co., and a leading anthracite authority, died on Dec. 15 of pneumonia.

Trade Catalogs

Giant Semi-Diesel Fuel Oil Engine. Chicago Pneumatic Tool Co., Chicago and New York. Bulletin 34-W. Pp. 32, 6 x 9 in., illustrated. Gives the vital points in oil engine design and describes the details of construction, fuel requirements and general characteristics of the concern's fuel oil engine.

Green Materials Transfer and Storage Hopper. Green Engineering Co., East Chicago, Ind. Pp. 15, 8 x 10 in., illustrated. A booklet intended to show those who have materials to handle and to store the pictorial story of the Green hopper. Information is given concerning the erection of the hopper.

Economical Handling of Coal and Ashes and Reserve Coal Storage. Link-Belt Co., Philadelphia. Book No. 353. Pp. 52, 6 x 9 in., illustrated. Reprinted from a series of articles by Henry J. Edsall, M. E., which appeared in *Steam*, 1917-1918. Contains much valuable data, and is in effect a treatise on coal storing and coal-handling machinery.

Space and Speed in Steel Buildings. Milliken Brothers Manufacturing Co., New York, N. Y. Booklet, pp. 24, 6¼ x 9¼ in., illustrated. Describes the Standardized truss unit system of building construction, designed and manufactured by this company. Hundreds of buildings of this type have been erected for the Government in different parts of the country.

Jeffrey Standard Bucket Elevators. Jeffrey Manufacturing Co., Columbus, Ohio. Catalog No. 244. Pp. 71, 8½ x 11 in., illustrated. A well printed catalog, profusely illustrated, describing the advantages of using this company's elevators. Capacities of standardized elevators are given, and among other data that of how to select elevators and the general arrangement of the standard track hopper. Typical installations are shown, along with complete layouts and specifications.

Tool Steels. Carnegie Steel Co., Pittsburgh, Penn. Pp. 24; 5 x 7¾ in.: illustrated. Gives valuable data and tables appertaining to electric tool steels. The heat colors shown on page 12 and the temper colors on page 15 are really remarkable. The heat colors shown range from dark red to bright yellow, while the tempers range from normal steel to gray green. The different grades of steel produced by the Carnegie Company are listed and the uses to which each may be put.

Industrial News

Snoqualmie, Wash.—The Niblock coal mine is to be extensively developed by its Seattle owners.

Astoria, Ore.—The Port of Astoria Commission is giving serious consideration to the matter of the construction of a half a million dollar coal bunkers and dock in this city.

Gray's Landing, Penn.—The Consolidated Coke Co. is rebuilding its Donald washery at this place and has awarded Roberts & Schaefer Co., engineers, of Chicago, a contract for the reconstruction work.

Louisville, Ky.—After being out of commission due to fire for a period of nearly two years, the big plant of the Kentucky Public Elevator Co., grain handlers, will start operations within a few days. This concern operates a large steam plant and is located on the Illinois Central terminals.

Seattle, Wash.—The 23d annual winter mining session of the University of Washington, College of Mines, will begin Jan. 2, 1919, and last for three months. Full courses of studies will be given in quartz mining, coal mining and metallurgy, etc. The session is open without examination to all who are interested in mining.

Salt Lake City, Utah—Frank Waterhouse & Co., of Seattle, have closed a contract for large quantities of coal from the Peerless Coal Co., of this city. Waterhouse & Co. will act as distributors for Washington, Oregon, northern Idaho, California and the Hawaiian Islands. The Peerless Coal Co. is headed by James D. Murdoch and Ezra Thompson.

Columbus, Ohio—Federal Manager Connors of the Hocking Valley Railway Co., says that plans to spend $6,000,000 in double-tracking the road between Columbus and Toledo, and the making of other improvements during the coming two years, will go forward. One-half of the amount is to be expended in 1919 and the remainder in 1920.

Charleston, W. Va.—The damage suit of the Breamer Red Ash Coal Co. against the Sandy Ridge Coal and Coke Co. found its way to the Supreme Court, which a few days ago awarded a writ of error on the petition of the plaintiff company from the action of the Mercer Circuit Court in setting aside a jury verdict which gave the plaintiff damages.

Des Moines, Iowa—H. L. Stevens & Co., of Chicago, construction engineers, while excavating for a boiler room at the Brown Hotel, uncovered a good seam of coal. After 23 ft. of earth had been taken out the coal, which is said to be 4 to 5 ft. thick, was discovered by the excavators. The Brown Hotel is located at the edge of the business district of Des Moines.

Wilmington, N. C.—The Cement Products Co., manufacturers of the "Sanisep" portable sewerage disposal systems that have met with such large favor in many coal-mining communities, announces that effective Jan. 1, 1919, J. B. Shatzer will assume control of its sales department as sales manager. On the same date C. E. McKee, former sales manager, will cease to represent the company in any capacity.

Toledo, Ohio—The Kanawha & Michigan Railroad Co. pleaded guilty to nine counts in a twenty-count indictment charging rebating, in the Federal Court at this place. The company was charged with rebating to the Kellys Creek Colliery Co. The railroad company was fined $5000 and the coal company was fined $1000. The Tennessee & Ohio Central Railroad Co. pleaded guilty and was fined $1000 for failure to notify a consignee for 39 days of the arrival of a car of coal.

St. Louis, Mo.—The St.. Louis Fuel Committee has granted the request of the Breese-Trenton Coal Co. for a reclassification of the output of its mines at Breese and Beckemeier, changing it from Standard to Mt. Olive. The effect is to enable dealers to charge 25c. a ton more for the output of these mines than has heretofore been charged. A number of other Standard operators, in view of action in the Breese-Trenton case, are demanding the reclassification of their output.

Charleston, W. Va.—At the West Virginia Coal Association meeting here on Wednesday, Dec. 18, the executive committee formulated a plan to secure the weighing of coal near the eastern border of the state instead of at Tidewater, as is now the case, coal not being weighed until after it is dumped, causing serious delays in settlements. Realizing that a market will have to be found for excess production after peace is fully restored, the executive committee also gave serious attention to the future of the export trade.

Louisville, Ky.—A concern which will shortly be a considerable consumer of coal in the Louisville district is the Standard Oil Co. of Kentucky, which is erecting a million dollar refinery at Louisville, with rail and water connections via the Ohio River. This plant is designed on big lines, and is equipped to burn a tremendous amount of coal, having automatic stokers of the Illinois type throughout, both in the steam plant and for refining or distilling oils. The company's office is at Fourth and Bloom Sts., Louisville.

New York, N. Y.—The Byproduct Coke Producers' Association, which held a two-day session in this city last week, voted to divide its work into two groups—the Atlantic and Middle West. These groups will be presided over by a vice president of the parent organization and will hold separate meetings, but will meet as a national body frequently. The officers chosen were: President, W. H. Ball, of Syracuse; vice president for the Eastern group, Nils Anderson, of New York; vice president for the Middle West group, J. A. Galligan, of Chicago, and secretary, Parker H. Woods, of St. Louis. Mr. Anderson is the president of the Debevoise-Anderson Co., of 56 Liberty St., this city.

Charleston, W. Va.—There were fewer deaths in the mining industry of West Virginia through accident during November than has been the case for some time, the casualty list containing the names of 29 men, nine of whom were crushed under falling coal, etc., and 11 of whom met death on or under mining cars. Four men met death in connection with the operation of motors, this making a total of 25 deaths inside the mines, including a miner who was electrocuted. One man was killed in the machinery on a tipple and the other fell from a tipple. Two died from miscellaneous causes. The greatest number of deaths—seven—were in McDowell County, Logan being second with five and Wyoming with 4.

McAlester, Okla.—Spirited bidding and heavy purchases by the leading coal companies marked the sale of the segregated coal and asphalt deposits underlying the Choctaw and Chickasaw Indian Nations at McAlester on Dec. 11-14. Of coal and asphalt deposits, with an appraised valuation of nearly $14,000,000, more than $3,000,000 worth were sold outright. The Rock Island Coal and Mining Co., which furnishes much of the coal burned by the Rock Island Ry. lines, purchased these deposits to the value of more than $1,000,000. The Folsom-Morris Coal Co. also purchased deposits valued at about $1,000,000. Numerous smaller companies and individuals made purchases. The purchasers in most instances will begin at once to develop their properties.

Portland, Ore.—Shipments of coal from Alaska to Portland may become a real fact next year, providing sufficient tonnage can be obtained, according to the purport of a letter received by the Portland Chamber of Commerce from the Anchorage Chamber of Commerce. The coaling situation in the city is becoming a vital one in view of the increase of port affairs, and the recent organization of the West Coast Coal and Dock Co. is taken as an indication of activity of the coal question. This concern has been formed by Max Hauser, grain merchant, and several other prominent men of the city. It has leased the O. & C. dock on the east side of the Willamette River and it will immediately install the latest coal-handling equipment. The dock is capable of handling 50 cars at one time and will take vessels up to 650 ft. long. It is the intention of the company, which has been capitalized for $100,000, to handle Utah, Wyoming, Washington and foreign coal, and in addition to caring for the export and shipping needs it is planned to sell fuel to dealers at home. The wholesale trade only will be catered to.

San Francisco, Cal.—Plans and specifications have been completed by Beckman & Linden Engineering Corporation for the installation of a 20,000-kw. steam turbine generating plant on the Tesla coal mining property, recently purchased by that concern from the receiver of the California Safe Deposit and Trust Co. The steam plant is to burn powdered lignite from the Tesla mines and the power is to be sold commercially to assist in meeting the power shortage in the San Francisco bay district. Researches by Beckman & Linden indicate that one ton of powdered lignite will give the same efficiency as five barrels of fuel oil. With fuel oil at $1.67 a barrel and the powdered lignite selling at about $4 a ton, a saving of more than 50 per cent. in fuel costs is indicated. The investment for apparatus to burn the powdered lignite is not any greater than the investment required to install oil-burning equipment, Linden explains. Oil burners can be converted for this use at a low expense, he said. It is the intention of the company to market the lignite in powdered or unpowdered form, so that purchasers may powder it for their own use. Tests have been made here by the United States Fuel Administration which demonstrates the feasibility of using powdered lignite under a 50-hp. boiler.

New York, N. Y.—The demands of the marine workers of New York harbor will be submitted to arbitration, according to the decision of the National War Labor Board, of which former President Taft and Basil M. Manly are the joint chairmen. For the past few weeks it has been feared that the marine workers would stop work because of the refusal of the New York Boat Owners' Association, the Tow Boat Exchange and the Lighterage Association to accede certain demands, which included an increase in wages and an eight-hour day. The workers contended that the matter should be submitted to the Board of Arbitration, New York Harbor Wage Adjustment, for adjudication under an agreement signed several months ago. The boat owners held that the Board of Arbitration ceased to exist when the Railroad Administration withdrew from the arbitration agreement. Several times, pending the negotiations, the marine workers threatened to stop work, which would have resulted in tying up shipping in this harbor and in throwing about 60,000 men out of employment. The matter was finally taken up by the Washington authorities and on Saturday last a hearing of the grievances was held in the City Hall with the result that both parties were ordered to submit their claims to the Board of Arbitration for adjustment.

MARKET DEPARTMENT

Weekly Review

Coal Industry Hopeful for Future—Demand at End of Calendar Year Falls Off Considerably—No Tone to Coal Market—Anthracite Situation Improved—Bituminous Being Offered Freely—Low Grades Selling Below Government Maximum

WITH the close of the calendar year we find the coal industry turning hopefully toward the future. During the last twelvemonth the accomplishments of the anthracite and bituminous mines have been recorded with no uncertain hand. It has been a momentous year for coal. But what a contrast is presented between the fuel situation today and that which existed at the beginning of the year! Then the country was working at feverish haste. Plants occupied in the manufacture of war necessities knew no idle moment. The national smithy was engaged in the task of forging the links of a chain that was to bind militarism hard and fast. Uncle Sam kept calling for more and more coal as he worked the bellows. Today finds the task completed. Militarism has been shackled, never to free itself, we hope, and the embers under the national forge are no longer glowing with their former intensity. The need for coal is no longer urgent.

The present lull in the demand for fuel, however, is somewhat in the nature of a breathing spell. There is a great deal of uncertainty, a great deal of questioning. During the war the Government has had its controlling hand on practically every industry. This control is gradually being relinquished. During the war the Government was the largest purchaser of the output of our plants. Gradually the industries are being permitted to resume their normal relations with each other, and soon the coal industry will come into its own again.

At the immediate moment there is a decided lack of tone to the coal market. Anthracite demand is dull, owing to the unusually mild weather, and some shippers have received orders to discontinue the delivery of egg and pea sizes, as these coals are plentiful. The steam trade, too, continues to display evidences of inactivity. Many operators are unable to dispose of their tonnage of rice and barley, and some of the smaller shippers have been compelled to store their output of these sizes on the banks. The production of anthracite from Apr. 1 to Dec. 14 inclusive is estimated at 70,702,000 net tons, 1,474,000 net tons behind the output of the corresponding period of 1917.

With the exception of the high-volatile coals, there is sufficient bituminous to meet all demands. Some of the largest producers of high-grade coals report curtailed production on account of a recurrence of influenza, together with a short car supply. Illinois and Indiana mines are losing an average of one day a week due to no market. Ordinary grades of soft coal are being offered freely, and it is reported that quite a little tonnage is being sold below the Government maximum. At tidewater there continues to be a dearth of the good grades of bituminous for bunkering. The output of soft coal for the coal year to date is 431,242,000 net tons, an increase of 39,341,000 net tons over 1917.

WEEKLY COAL PRODUCTION

The improvement in production of bituminous coal reported during the week of Dec. 7 failed to continue during the week of Dec. 14, the estimate during that week placing production at 10,636,000 net tons, a decrease of 346,000 net tons, or 3.2 per cent. The production during the week of Dec. 14 for the first time since Oct. 26 exceeded the output of the corresponding week of 1917, such increase amounting to 1,443,000 net tons, or 15.6 per cent. Reports from the carriers show in central and western Pennsylvania, where the greatest demand for bituminous coal exists, that considerable improvement occurred during the week of Dec. 14 in car loading, while on the contrary in Illinois and Indiana, where approximately one day a week is lost by the mines due to lack of demand, the decrease in cars loaded was the greatest that occurred in any district during the week, amounting to 14 per cent and reaching the low level of the corresponding week of 1917.

For the coal year to date the production of bituminous coal is estimated at 431,242,000 net tons as compared with 391,901,000 net tons during the period Apr. 1 to Dec. 14, 1917, a gain of 39,341,000 net tons, or 10 per cent.

The production of anthracite during the week ended Dec. 14, estimated at 1,924,000 net tons, not only exceeded the week preceding by 117,000 net tons, or 6.4 per cent, but exceeded the corresponding week of 1917 by 146,000 net tons, or 8.2 per cent, and recorded the largest weekly production since Oct. 12. The daily average during the current week of 321,000 net tons was but slightly below the average for the coal year to date, and was 9000 net tons, or 3 per cent. below the daily average for the similar period of 1917. The total production for the coal year to date is estimated at 70,702,000 net tons, and falls below the production during the period Apr. 1 to Dec. 14, 1917, by 1,474,000 net tons, or 2 per cent.

Reports from the carriers show increased loading during the week of Dec. 14 in the central and western Pennsylvania districts and a considerable decrease from the central and southwest states. During the corresponding week of 1917 storms cut production to the low mark of slightly over 9,000,000 net tons, the loading during that week being considerably below that of the present week in all districts with the exception of the central and western states. The storm occurred mainly in Ohio, where the increase in weekly loading this year over last amounted to 9304 carloads or 72 per cent. All districts continue to report, for the coal year to date, an increase in cars loaded over the same period of 1917.

Bituminous coal to New England, during the week ended Dec. 14, is estimated at 326,497 net tons and is approximately the same tonnage as shipped during the week preceding. The rail tonnage during the week increased slightly, while the water shipments show a slight decline. The three northern harbors, New York, Philadelphia and Baltimore, report a falling off in tonnage loaded, while bituminous coal shipped from Hampton Roads increased approximately 18,000 net tons, or 15 per cent. While shipments during the last few weeks to New England were equal to not more than two-thirds of the weekly average for the coal year to date, total shipments for the coal year to date, amounting to 20,363,914 net tons, are in excess of the budget outlined by the United States Fuel Administration by 49,884 net tons.

Tidewater shipments of bituminous coal during the week of Dec. 14, while lower by approximately 23,000 net tons, or 3 per cent, than shipments during the week of Dec. 7, are holding up extremely well, and during the past few weeks have amounted to approximately 80 per cent of the weekly average for the coal year to date. The total shipments from the North Atlantic harbors and Hampton Roads for the coal year to date are estimated at 32,345,952 net tons, exceeding the requirements as originally outlined by the Fuel Administration by 2,780,976 net tons, or 9.4 per cent.

The production of beehive coke in the United States during the week ended Dec. 14 is estimated at 553,000 net tons, an increase of 10,000 net tons or approximately 2 per cent over the week preceding and a decrease of 21,000 net tons or approximately 4 per cent compared with the corresponding week of 1917. The daily average during the week of Dec. 14 is estimated at 92,000 net tons as against 96,000 net tons produced during the week of Dec. 14 of last year.

In the Connellsville, Greensburg and Latrobe districts of Pennsylvania production of beehive coke during the week of Dec. 14 amounted to 313,967 net tons. This production was brought about by the operation of the ovens at 70.2 per cent of full time as against 66.6 per cent during the week of Dec. 7, the improvement being attributed to better labor conditions. The same operators produced 180,900 net tons of coal during the current week as compared with 159,700 net tons of coal during the week of Dec. 7.

Byproduct coke production in the United States during the week ended Dec. 14, estimated at 578,871 net tons, while approximately the same as produced during the week preceding, exceeded the production of the corresponding week of 1917 by 150,000 net tons, or approximately 35 per cent.

The operation of the mine plants during the current week for the country as a whole was reported by the operators as 88.8 per cent of capacity. Out of a total loss of 11.2 per cent of full time, 5.5 per cent is attributed to repairs to plants, 2.1 per cent to lack of market and the balance to shortage of coal, labor troubles and other causes. Losses of full time on account of no market continued to exist in Massachusetts and Pennsylvania, the operators in these two states reporting approximately the same losses as during the week of Dec. 7. During the week, the supply of byproduct coal brought about improvement in operating conditions in New York and better labor conditions brought about increased production in Maryland.

BUSINESS OPINIONS

Marshall Field & Co.—Current wholesale distribution of dry goods is still running about the same as for the corresponding week of 1917. Road sales for both immediate and future delivery were less than for the same week of last year. Customers were in the market in greater numbers. Retail business in holiday merchandise has been excellent. Collections continue good.

American Wool and Cotton Reporter—The increased estimate of the cotton crop was a surprise to many, but it was not considered of any particular importance in so far as prices are concerned. Very high prices for cotton undoubtedly will be noted eventually on the basis of supply and demand because even a single moderate American crop would not be large enough to solve the world's problem.

Dry Goods Economist—In textile circles the interest switched this week from cotton to wool. Two big auction sales were the attraction, one of woolen and worsted fabrics by a leading producer, the other of raw material. Bidding was spirited during the first three days. Prices were from 12 to 40 per cent. below those on the date the goods were opened for last fall, according to the desirability of the merchandise. In cotton circles there has been a softening of prices for print cloths to the extent of 3 per cent. No reductions have been made, however, in quotations for fine-yarn cotton fabrics.

Bradstreet's—Animation flowing from holiday buying sharply contrasts with the slow movements evidenced in wholesale lines, with the effects of cancellations, with downward revisions of some prices, and with uncertainty created either by the divergent views as to the future expressed by prominent personages or by concern over the fact that the government has large supplies of unused materials to market. Inventorying is under way, traveling salesmen are in for the holidays, small-lot filling orders conveyed by mail are the rule, and in cases where unexpectedly large stocks have been revealed, the policy is to clear decks. In fact the general attitude as to manufactured goods is to reduce prices in order to hasten readjustments and make a market.

The Iron Age—An open market for steel products has come in the past week, various forms of finished steel having sold at from $4 to $6 a ton below the Government maximum prices established for the fourth quarter of the year. Among pig-iron producers, those who have chafed under the fixing of pig-iron prices by steel makers now feel that as the demand for their product is relatively greater than that for finished steel they will be able to get the old prices. On the other hand, many foundries are well stocked with iron. But Southern furnaces have declined to take on 50,000 tons of basic iron for England, and Japan is inquiring for 20,000 tons. It is to be said that the reduced prices have brought out no large amount of new business. In the East a 6000-ton plate contract was put through at 3c., the new figure, though some producers quoted the Government price. Now that the market is open, the possibility of further reductions is distinctly a factor.

Atlantic Seaboard

BOSTON

Little change in situation. Almost no buying in any quarter. Railroads send empties west in better volume. Coal movement east still further reduced and some railroads still trying to buy. Rumors of low prices for inferior coal, but nothing significant as to prices on quality grades. Scattering inquiries, but not so easy to get prompt shipment. Still hard to dispose of coal at destination. Large surplus of coal at Hampton Roads. Only restricted market over New York piers. Problem to furnish cargoes for barges and steamers in the trade. Anthracite looks easier. Rail movement about the same, but marked improvement looked for. "Storrow coal" reduced more than 50 per cent. Stove and chestnut still scarce. Difficulties over allotments and figures being cleared up gradually.

Bituminous—There are no marked indications of change in the general situation. The same disparity in cost between rail and water coal is much in evidence, and it can be said flatly that at the end of the calendar year there is no buying interest whatever. And beyond that there is no near prospect of any. Consumers will not make purchases until they have used the mongrel assortments now on hand, and when there is again anything like an open market the trade is sure to meet with some very discriminating buying. Apparently there will be a lot of insistence upon quality and that will have a strong stabilizing influence as to price. Production now curtailed because of influenza and a disposition on the part of labor to take things easy is quite likely to be close-hauled for months to come, and there is small chance of coal being mined much faster than the market will absorb. This, together with the certainty that a lot of consumers ordinarily dependent upon water-borne coal will try to line up for shipments all-rail, will lead the trade to watch developments very closely the next few months. It will be interesting to see the situation unfold as the present heavy reserve stocks become gradually depleted.

Today there is a minimum of buying in every direction. The distribution inland of tidewater coal has dropped off nearly 75 per cent, and for Pocahontas and New River in cargo lots there is practically no sale whatever. Consignees having deliveries due on contract are suspending shipments because their stocks are so large and their consumption has decreased to such extent. This is true of a great number of plants. Cotton mills, for instance, are curtailing more and more rigidly as their goods pile up awaiting renewed buying. Other textiles and producers of many different staple lines are having the same experience.

One of the few recent developments is the demand for empty coal cars by railroads serving mines, particularly in the Pittsburgh region. Railroad executives here have been plied with urgent telegrams to return such empties promptly, and the fact that eastbound movement with coal has lately been so light makes such inquiry all the more pressing. A surplus of cars is reported as still the prevailing situation in central Pennsylvania, and certain of the railroads continue in arrears on their receipts of supply fuel. The Boston & Maine, for instance, is still making purchases at Government prices and has difficulty getting sufficient for current supply. The fact remains, however, that this road is among those with a heavy reserve; not as heavy as in some years, but sufficient for ordinary requirements.

All-rail movement through the five New England gateways continues to slump with the advancing season, although apparently this time the season has little to do with it. The average for six days, ending Dec. 18, was only slightly over 200 cars daily of commercial bituminous. The daily average for the first 16 days of December, railroad fuel included, was but 278 cars. Latterly, railroad fuel alone has averaged only 50 cars per day, as compared with the 150 cars that were the usual mark in September. This has a bearing on the efforts of certain of the roads to arrange for coal in the open market. Certain large groups of mines regularly furnishing these supplies have suffered severely from the influenza and other causes affecting labor.

Prices as low as $2.20 have been quoted for inferior grades from Pennsylvania, but on investigation such offers appear to be based largely on expectation. It is questionable practice to exploit such proposals, for even low prices would not induce any substantial buying at this time, and they only add to the confused state in which the market finds itself at this juncture. Were the lower quotations followed far enough it would be found they applied to coal already mined, of doubtful character, and in the hands of people looking for ready money. On the quality coals there has been nothing a cent lower than the Government figure. Shippers of these grades have ample business for their present output, and notwithstanding their New England consignees are not taking their quota there is ample outlet for the coal in other directions, at least for the present. No significant change is noted in this respect, and it is quite possible there will be no considerable tonnage available for this market all-rail until buyers here are again ready to take on supply. Today there are only scattering inquiries, and while for these coal is readily found and for reasonably prompt shipment, yet it is plain that no comprehensive orders could be taken care of on anything like the same basis.

On the other hand, this territory is so plugged with coal in most directions that coal arriving at destination, undisposed of, is extremely hard to get rid of. Fuel authorities have had several cases on their hands lately where car service and reforwarding charges have piled up to a large figure. In Connecticut recently it was even seriously urged that coal awaiting disposition should be sold by the railroad for the freight, but this, of course, was an extreme case. None the less it shows that some parts of New England are fairly glutted with coal.

At Hampton Roads the excess of coal over bottoms reporting to load is mounting daily. The tonnage dumped for commercial purposes is as constantly decreasing, and were it not for Government requisitions and bunker trade, together with export tonnage, there would be actual congestion at the piers with a record low movement of empties back to the fields. Agencies in this market are imploring their principals to send the coal west or along the line, anywhere but for New England disposition, and the few loadings coastwise show the extent to which these prayers have been answered. Water-borne coal on the basis of the current marine freights is extremely hard to sell.

Shippers generally are getting alive to the very large tonnage of barges and steamers available for the coastwise trade the coming year. The figures give some reason for alarm, for there seems small prospect now of placing all that tonnage from tidewater ports until buyers shall have had a season-long try to get their supplies all-rail. This will mean a slow-starting year, with all the buying interest most reluctant to tie itself to water-borne coal. There have been intimations that the Shipping Board would reduce coastwise freights, but apparently no move has yet been made nor will be made until it is demonstrated either that the colliers now in use are not suitable for other trades or there is less inquiry for steam tonnage in other directions. As it is, the Hampton Roads shippers, in particular, have reason for being disturbed over the outlook.

Anthracite—The fact that Government requisitions are gradually being reduced, that the Anthracite Committee is not making so many demands on behalf of alleged suffering communities, and the further fact that shipments all-rail the past week have taken a slight spurt, have all caused the trade to realize that anthracite conditions are really much easier. The continued mild weather has its great effect on current consumption, and many cases there are where the householder will not need that "last third" about which there was so much worry just a few short months ago. An increasing number of retailers in widely separated parts of New England have been reporting comfortable stocks for the present, and there have even been whispers of cancellations on the part of those who were most vehement in their denunciation of "independents" who were refusing to ship a few weeks ago. These shippers will of course feel the effect first of easier conditions and in this market, if the truth were known, there will not be many hands turned to help them when they have their surplus sizes to market during the coming months.

Rail receipts show a slight improvement. Through the five gateways the average movement of domestic sizes for the first 16 days of December was about the same as for the first week, although recent days have shown quite an improvement. It is likely that in another week the movement will reach 400 cars daily.

Instead of 100 cars per day the New England Fuel Administrator is now having shipped to his order but 46 cars, and it is understood this will shortly be further reduced, if not wiped out altogether. The opinion in the trade is very strong against further emergency shipments, for the effect they have on efforts in regular channels to move sizes in proportion as they are produced. The fuel authorities should never have been allowed to consult the fastidious preferences of certain retailers quick to raise the cry of "famine" when their stove coal is depleted.

Sundry difficulties over allotments and tonnage figures are gradually being straightened out, in most cases, however, because it is realized that regulation will be short-lived and shippers are more and more taking situations into their own hands. In some cases to wait for fuel authorities to act would mean serious inconvenience to communities where there are large populations.

NEW YORK

Anthracite situation looks brighter, but shortage of the domestic coals continues. Demand for egg, stove and chestnut is strong, and consumers refuse to accept substitutes. Plenty of the smaller coals are available. Retail deliveries are almost at standstill. High-grade bituminous hard to buy at the mines and the demand at tidewater is slow. Cheap grades plentiful. Bunker demand heavy.

Anthracite—Conditions in this market have a brighter appearance. Reports indicate that more coal is coming here, but it does not include the sizes mostly in demand for household consumption. Weather

conditions have been in vast contrast to what they were a year ago, when those with good memories can recall that New York was in the grip of the bitterest winter it had ever had and the coal supply was down to rock bottom.

How much benefit New York City will receive now from the increased production reported from the coal fields remains to be seen. It has been learned that orders have been issued to producers and distributors that more than 350,000 tons of anthracite is to be sent to this tidewater during December and January for shipment to New England points. With this tonnage available it is believed New England will be provided for during the winter. Meantime New York dealers who are now, and have been, short of the needed domestic sizes for some weeks will have to continue to assure their customers that there will be plenty of coal available later on.

Producers report an improvement in conditions throughout the coal fields. Operations have been interrupted by new outbreaks of influenza, but the authorities believe it has about run its course. With the return to the mines of those who have been discharged from camps and from various of the war industries, operators expect the output this month will be close to normal. They point out that even with the lack of labor the output for eight months of the 1918-19 coal year shows a decrease of but 1,139,712 tons as compared with the corresponding period of last year.

Dumpings at the local docks for the week ended Dec. 20 were 6381 cars as compared with 6098 cars the previous week.

Shippers are not able to take care of their customer's wants for egg, stove and chestnut coals. There is a good supply of broken, pea and No. 1 buckwheat. Rice and barley are free enough to cause salesmen, who have but recently started to visit dealers for the first time in nearly two years, some worry.

Retail yards are piled high with these two small sizes, but the dealers would be willing to increase these piles if they could be assured of a supply of the larger coals either now or in the near future. This promise the salesmen cannot make, and as a consequence rice and barley continue to be troublesome, although many houses are reported to be making concessions.

Retail dealers' business is practically at a standstill. Consumers who in most cases have been fortunate enough to secure two-thirds of their winter's supply are refusing the remaining one-third, rather than accept substitutes. As a result deliveries are slow and no improvement is expected until much of the coal now in the consumers' bins has been used.

The dealers have been presented with demands for increased wages by the drivers and engineers employed by them, but as yet no reply has been made by the employers. The dealers contend that if the increases are allowed it will mean that the price of coal will have to be advanced to the consumer.

Bituminous—The market is confusing. High-grade coals are practically unpurchasable at the mines and stray cargoes available here are almost unsalable. There is no demand. Consumers either have their bins filled or are existing on their reserve stocks until such time as they are forced to go into the market. In most cases they look for a break in prices as soon as the Government relinquishes its supervision.

The situation in the mining fields can be summed up in the words of an operator who has just returned from a visit to his properties, and who said he had found there was no demand for coal, production was held back, by the "flu," and there were petty labor troubles. Others who have been in the coal fields report considerable uneasiness among the workers, who they say cannot get over the jealousy existing between them and their fellow union members in the hard coal fields, and who continue to believe they were discriminated against in the recent wage readjustment. Fear is expressed that this jealousy may yet lead to serious trouble and possibly strikes.

Local dumpings during the week ended Dec. 20 show that 6413 cars were handled at the tidewater docks as compared with 5250 cars the previous week.

Supplies of the cheaper grades of bituminous are plentiful, but not sufficient to cause a general shaving of prices, although it is reported some slight concessions have been made. As a rule buyers are not willing to take any of these grades unless they are compelled to do so to tide them over a possible shortage of the high-grade coals.

The final shipment of the so-called "Storrow" coal for New England was made this week, and it is expected that the accounts will be closed within the next week or ten days.

Bunker demand continues to be strong with plenty of ships to take all available coals.

PHILADELPHIA

Anthracite retail trade dull. Holding of egg and pea orders grows. Companies making better shipments of stove and nut. Consumers excess orders cause trouble. Dealers feeling better over situation. Suburbs in greatest need for fuel. Anxiety as to stocks on hand in spring. Flat retail price talked of. Bituminous trade lacks tone. Best coals scarce, but ordinary plentiful. Some price shading.

Anthracite—The retail business in this city is undeniably dull. There can be no doubt about it, and if coal were free there are many dealers who would be compelled to suspend shipments. As it is shippers report they are receiving numerous requests to hold up on egg and pea sizes.

Some of the smaller dealers are becoming anxious as to what they will do with their product, especially at their present prices, in the near future. It is not at all general as yet, but we hear of individual coal being offered to dealers far in excess of the amount purchased during the basic year of 1916-17, and in some cases where no coal is actually due them from the house offering it.

Local business in normal years is always poor around the holidays, and the unusually mild weather to date has had its effect; but no one looked for the slump this winter under any conditions. One representative retailer attributes the lack of eagerness on the part of the public to buy to the disappearance of all coal news from the front pages of the daily papers. While the papers were carrying "scareheads" everybody seemed to want coal, whether they needed it or not, but for the past few weeks, where the dealers know their customers have coal in their cellars they are afraid to deliver more, notwithstanding they hold unfilled orders. They fear it will be returned, and experience is teaching them to first notify the customer of the intended delivery.

One dealer reports having sent out sixty-five tons in one day, thirty of which were not accepted by the original consignee. The dealers are now becoming aware that the orders placed in the spring called for more coal than will be required by the householders. This means added expense to the dealers, for when the orders were filed with the fuel administrator they attached hundreds of stamps at 2c. per ton on these excess requirements, all of which is a total loss to the retailers. Efforts to collect this cost from the consumer almost invariably meets with disdain, so much so that few dealers are willing to ask for reimbursement.

It is now thought by some that the larger operators consented to increased allotments to various dealers as requested by the fuel authorities because they were all along satisfied that the whole situation was exaggerated. A number of dealers have admitted to us that they do not expect to sell before spring all the coal apportioned to them, and for which they made unusual efforts to get into stock in case of necessity, and should there be a still further increase in shipments to any great extent, some dealers will actually be compelled to hold their orders, especially in the absence of seasonal weather conditions.

Despite the fact that the consumers are pressing the dealers hard for stove and nut, the retailers themselves have lost much of the anxiety for coal that they possessed a few weeks since. Most of them now are fearful that they will be caught with a yard full of coal when spring comes, especially those handling the higher-priced individual coal, and with it the usual reduction in wholesale prices.

While egg and pea are rather plentiful there are many dealers short of stove and nut. Strange to say, the greatest scarcity appears to be in the suburbs, which is just the section of the city that it was proposed by the fuel authorities to care for early in the season. Mr. Lewis realizes the conditions under which coal is delivered in the outlying localities in bad weather, and he did all in his power to care for them first. No one will say why his wishes in the matter have not been fulfilled.

This week an advertisement appeared in the daily papers explaining the 75c. differential and why the dealers prices are at variance. The advertisement bears the signature of the fuel administrator, but like others this season the space was contributed by the Philadelphia Coal Exchange and was inserted to "square" with the public the retailer who buys individual coal and is compelled to charge higher rates than those who handle either company coal exclusively or both company and individual.

At a meeting of the West Philadelphia dealers this week a movement was started that is causing much interest and is now being considered by the retail trade in other sections of the city. It is proposed to make a flat retail price for all dealers. The idea seems to be to have the dealers who buy the cheaper coal raise their rates and the buyers of the higher priced coal lower theirs. Then in some way the dealers who advance their prices are to pool their excess profits in favor of those who reduce. Little has been said about the scheme, and while it is known that some dealers are unusually enthusiastic over the proposition the details are not yet obtainable.

The steam trade continues without any particular activity. It is true that all the heavy tonnage of buckwheat is being taken by the consumers, with the size at times becoming a little draggy, as we have heard of stray instances where individual shippers have offered an occasional car or so for domestic use. There continues to be plenty of rice and barley in the market and the big companies are unable to place all of their production, and some of the smaller shippers are compelled to store on the banks in the region.

The prices per gross ton c.o.d. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.25	Buckwheat	$3.40	$4.45
Egg	4.80	6.15	Rice	2.90	3.80
Stove	5.05	6.40	Boiler	2.70	3.70
Nut	5.15	6.50	Barley	2.40	3.30
Pea	3.75	5.00	Culm	1.25	2.15

Bituminous—There is a lack of tone to the soft-coal trade. Outside of the high-volatile coals there is sufficient coal coming in to meet the needs of the market. Some of the larger producers of high-grade coals report curtailed production on account of a recurrence of influenza, together with short car supply. There is plenty of ordinary coal being offered, and we have reason to believe that quite a little tonnage is being sold below the fixed price. We know a specific instance where a cut of 50c. was offered. The softness of the market is shown by the number of letters being received by consumers from operators and brokers offering coal. At tide there also continues to be a dearth of the good grades for bunkering.

BALTIMORE

Supply of all but best soft coals on market liberal, and purchasing comparatively light. First inclination toward price cutting seems overcome. Hard-coal supply at last flows in in good shape. Small lot sale prices fixed.

Bituminous—As one after another the mines which formerly supplied this section are reëntering the open market to some extent, and as the Government holdings of soft coal are now almost entirely confined here to the best selected fuels, a selling condition more nearly approximating that before the war, with the exception of prices, is being established. The inflow of coal is now liberal, while the demand from business here is comparatively light. Most of the larger industries seem pretty well stocked, although some that were not on the preferential list in war time are now casting about to get better grade coals to mix with stocks they now have, or coals still running on contracts with mines that were accepted as emergency sources.

There is a feeling in the coal trade that there will be plenty of market for the more desirable coals, although more care in preparation will undoubtedly be forced on some operations that have been able to ship anything at all in the past and get the Government price. This feeling has apparently had a strong hand in stopping an early inclination to begin to shade the Government maximum. The past week, while supply was as liberal as the week previous, there was little talk of offerings for any coal really worth while below the Government figures. At tide here the Government was only holding on to Pool No. 9.

Anthracite—The hard-coal situation has become active for the dealers here through heavy arrivals during the past ten days. For the first time in months the equipment for delivery of the dealers was taxed. It was reported that some 900 cars of hard coal were received here in a week period. The best part of it is that a considerable part was of stove and nut sizes, which had been rare.

A number of dealers joined the class of a full delivery of the two-thirds program for their customers, and started on a new round-up on the remaining one-third for customers. The mild winter so far, and the incoming receipts, largely from one big concern that had been far back on proportionate shipping, has saved the situation here for hundreds of homes that had been without coal on Nov. 1.

The local fuel administration is gradually reducing forces and will probably pass in the main from active work some time in February. In the meantime it has just set

a price for small sales of bushel, peck and 16½-lb. bags, which had remained constant for more than a year despite the increases in both wholesale and retail prices of ton lots. The new prices make an increase of 5c. on pea and nut coal on bushel sales and proportionately on smaller lots. The bag prices are advanced 1c. a bag of 16½ pounds.

Lake Markets

PITTSBURGH

Market softened somewhat, but best grades remain at full prices. Production increased. No shortage of miners.

The Pittsburgh district coal market has softened somewhat, but not nearly as much as Ohio markets as a whole, and the softening is confined to steam coal and the less desirable grades at that. Gas coal is very scarce and is difficult to buy even at the full Government limit of $2.60 for ¾-inch. Some producers are offering contracts for gas coal at the Government limit for a year and would be indisposed to sell at the price merely for a period that would carry the consumer over the winter.

Pittsburgh district operators insist that quality considered the Government price has been low relative to prices fixed for other districts, and that Pittsburgh coal is therefore worth the full limit price. They point out also that the season has been unprecedentedly mild and the fact that no very serious weakness has developed in the market is conclusive proof that there will be a very strong market the moment real winter weather develops.

The weekly production has crossed the million mark again, and last week probably amounted to fully 1,100,000 tons, against 1,065,000 tons produced the week before. A curious report that western Pennsylvania is experiencing a shortage of miners to the extent of 10,000 is flatly denied. Distribution of byproduct coal is now quite satisfactory, and the production manager has had practically no requests for additional supplies for ten days past.

Coal consumers who had accumulated stocks are now drawing upon them, but predictions are made that on the advent of bad weather this will cease, on account of the expense, and that the consumers will come into the market again.

There is no definite word as to when the Fuel Administration will relinquish its control of prices. All that is known is that the formerly expressed intention of removing control by about Dec. 15 has expired by limitation. While there is some softness in the market, the best grades of steam coal and all passable grades of gas coal are quotable at the full Government limits: Slack, $2.10; mine-run, $2.35; screened, $2.60, per net ton at mine, Pittsburgh district. Brokers are now unable to obtain any brokerage from buyers, above the set figures, but can sometimes obtain a brokerage from the seller.

TORONTO

Anthracite coming forward freely. Dealers taking orders for small lots. Market overstocked with bituminous and prices unsettled.

Coal shipments have been coming forward freely since the close of navigation and dealers are overtaking delayed deliveries. Orders are now being taken for all grades of anthracite in ton lots. The continued mildness of the weather has considerably relieved the situation, and as there is now plenty of labor to be had, it is believed that the crisis, which recently threatened to be serious, has been safely tided over. The market is still considerably overstocked with bituminous coal, for which the demand continues light and is likely to remain so until the munition plants, now closed down, have been reorganized for other lines of industry. This has tended to unsettle prices, and sales in car lots are being made in some cases at from 25c to 50c per ton below the Government rate.

BUFFALO

Big surplus of bituminous. Anthracite increasing fast. If weather conditions last, coal will be plenty. Consumers of bituminous buying of operators direct.

Bituminous—The market is becoming more inactive every day. Operators and jobbers are trying to work together in order to move the output promptly, but they are getting small support from the consumers, who see plenty of coal ahead and will hold off for a while. The holiday season, with its small output, may hold the market awhile, but it is not likely that anything will save it long unless the winter becomes severe. At the most there has been a long period of mild weather, with only a small consumption, no matter what the rest of the winter may be.

The car situation is not good. A great number of empties are crowding into the yards here, and it is feared that certain branches of shipping will have to be shut off to enable the rest to move at all. There is complaint also of a shortage of men.

At the same time consumers as a rule are indifferent. Some of the jobbers are trying to tell them that it is a mistake to allow their supply to run down, even if there is a chance of breaking the market. A stoppage for want of coal would more than neutralize any advantage gained from a decline in the price.

Anthracite—The local situation is improving fast. Distributors report that they are getting more coal in a week than they did in all November. Retailers are working hard to keep up with the supply, and the best of it all is that the local fuel administration sees scarcely anyone asking for coal, in place of the long row of pleaders that was there a year ago. It is predicted that ten days or so of this sort of thing will make the whole situation quite easy, if it does not soon drive the fuel office out of existence.

All this flow of coal here is due to the close of the lake trade, and it is supposed that the other all-rail points in this direction from the mines have been supplied in the same liberal manner as is the case with Buffalo. Natural gas is scant, but as a rule it is sufficient where it is allowed to be used. No increase of it is promised.

CLEVELAND

Stagnation in the steam coal and domestic market is having its complement in curtailed operations in the No. 8 district, where disaffection among the miners and their protestations that the wage scale question be now opened have become much more pronounced. Not in months has the local market been so stagnant. Many operators are fast approaching the point where they feel they should shade government prices if it will bring business to help offset high costs.

Bituminous—Practically the last vestige of optimism has disappeared from the local steam-coal and domestic markets. The tonnage now moving into Cleveland and northern Ohio has shrunk almost to the zero point. Continued open weather has brought the retail trading down to a mere shadow of its normal self. With all war contracts in this district cancelled many large steam-coal users have shut down, while others have taken advantage of the lull to make repairs that war's exigencies compelled the postponement of for several years. Inventory time also has contributed its slowing up of business, and industrial prospects now appear the worst since the war's end.

As a result, No. 8 district mines are being closed daily and those that are being worked are only on half time. Restlessness among the miners over the end of the war and the question of higher wages has spread from the Pomeroy district to the No. 8. As yet no open demands have been made, but the men are making no efforts to conceal their belief that the signing of the armistice ended the war and that they are entitled to higher wages because of their efforts during the war. Operators claim that union officials are with them, and declare they will not consider wages at this time. No market and disgruntled labor combine to make eastern and southern Ohio's coal output not more than 40 per cent. of normal, if that much.

In the past week several small brokers have offered what they described as No. 8 mine-run at $2.10 or 25c. below the maximum. It is believed that this is not standard No. 8 coal. The larger operators reaffirm their inability to make any concession at the present prices and their intention of closing down entirely if necessary. Seventy-five more days will see No. 8 coal moving toward the lower lake docks, they point out, and they can afford to bide their time. Stripping coal continues to flood the market, but there is no more demand for it at a marked concession than there is for the better grades.

The Pittsburgh Vein Operators' Association of Ohio reports that car service accorded its members in the week of Dec. 7 averaged 17.84 per cent. short. Lost production accordingly was 71,350 tons. Shipments in the week of Dec. 7 totaled 5213 cars, which compares with 5264 cars the first week preceding and 4742 the second.

Anthracite—Receipts are a trifle heavier, but not yet enough to make possible anything resembling a market. Demand has fallen off to rock bottom, and efforts to produce additional shipments have been abandoned.

DETROIT

With an over-plentiful supply of bituminous in many retail yards and in stock piles of steam plants, new business in Detroit is greatly curtailed.

Bituminous—Complaints are still being made by Detroit jobbers and wholesalers that business is greatly restricted by the presence of unusually large stocks of bituminous coal in the reserve piles of the steam plants and in the yards of retail dealers. The inactive state of the market is to a considerable degree the result of unseasonably high temperatures.

Because of the weather, the market has lacked an important stimulating factor. Consumption has been of smaller volume both in the steam and domestic branches of the trade. Manufacturing plants which are numbered among the largest buyers of steam coal are in many cases holding reserves almost out of proportion to their needs, while a large number of the retailers have so much bituminous coal on hand that their yards afford no space for further stocks.

A plan to relieve the retail dealers by negotiating the sale of 25,000 tons or so of the excess stock to the City of Detroit has failed of realization. The Detroit common council, after considering the proposition made by the retailers, voted against its acceptance. This action doubtless was influenced by the fact that the city is now receiving all the coal it requires direct from the mines, and at a price from 25 to 35c. a ton cheaper than the retailers could afford to sell. The higher cost of the dealers' coal is accounted for by the 7 per cent. tax on freight charges and the extra expense involved in rehandling the coal now in their yards.

Anthracite—While little increase in receipts of anthracite is reported, the weather has made possible a substantial reduction in consumption, easing the pressure on dealers. The state fuel administration has announced modifications of earlier restrictions. Under the new rules all chestnut is reserved for baseburner users, other consumers are permitted to receive up to 50 per cent. of their fuel requirements of stove or egg sizes and all restrictions are removed from other sizes of anthracite, and from bituminous coal and coke. Considerable coke has been made available for domestic use by diversion from industrial plants that have been relieved of war contracts. Household consumers may now buy either gas or byproduct coke up to the full limit of their fuel requirements.

COLUMBUS

The coal trade in Ohio continues quiet to the extreme. There is little demand for either steam or domestic grades, and purchasers are paying a waiting game. Warm weather continues to hamper the retail business.

Because of the prevalence of balmy weather, and also because of the fact that a large percentage of householders have stored their coal, there is little retail demand. It will require a cold spell to bring consumers in the market. Retailers have rather large stocks and are thus not disposed to buy until they have moved some of their surplus. Pocahontas is now coming into the local market and practically all dealers have taken on a small supply. Retail prices are being cut for the first time since the increase in prices several years ago. This is done in order to keep teams and trucks busy. The cut is not sufficient to demoralize the market and amounts to about 50 to 65c. on the ton. Rural dealers are expecting a fair trade shortly after the holidays as farmers have been too busy to haul their fuel supply.

The steam trade is absolutely quiet. Only a few scattering orders are received, and cancellations of standing orders are frequent. Consumers are loath to buy under present unsettled conditions, and they are using up their surplus stocks. Many consumers had stored fuel to last from three to five months. Manufacturing plants in non-war work are rather slow to resume operations, but it is expected that quite a few will start up after the first of the year. War plants are gradually shutting off and their fuel requirements are being reduced accordingly. Railroads are not taking any great amount, as the freight movement is somewhat reduced. Taking it all in all, the steam trade is the most quiet in years and operators as well as shippers believe it will continue slow for some time.

Production is being curtailed to a large degree by lack of orders. Then, again, the influenza epidemic is still prevalent and that is reducing the output in all fields. Lack of orders and cancellations are cutting into the amount mined, and it is estimated at about 35 to 45 per cent. in the Hocking Valley.

CINCINNATI

Somewhat cooler weather has stimulated domestic demand, but steam market is still quiet, and production is ample for all departments.

The coldest weather of the season was experienced during the past week, but this did not mean anything much below freezing, and that only during the night. The days have remained very mild for so late in the winter, and the forced consumption of fuel, for heating purposes, remains at an astonishingly low level, everything considered. Domestic consumers in a few instances seem to have come into the market as a result of the mild cold snap, but for the most part the summer storage is taking care of the situation without difficulty.

Consumption up to this time has probably been the lightest of any winter season in years, and it seems reasonable to conclude that in all probability consumers who placed coal in storage will have very nearly enough to run them through the winter, unless January and February should bring some extremely cold weather. The quiet condition of various manufacturing lines is contributing, as for several weeks past, to a quiet market for steam fuel, and as the usual dullness of the holiday season is accentuated this year by the uncertainty and cancellation of orders resulting from the war, no improvement in the demand in this quarter can be expected soon. In short, the coal trade ate a good-sized slice of its cake in the summer, and that bids fair to be about all it will get, unless conditions both as to weather and industrial demand change very emphatically soon.

LOUISVILLE

Market on better grades of coal slightly stronger, due to lower production. River coal feared by rail operators. Wagon mines on last legs. General demand for coal light.

Many large producing mines in the eastern as well as western Kentucky fields are beginning to close down for the holiday season, being short of orders, while miners are better fixed than usual, and anxious to lay aside work and take things easy after a strenuous production season. Some of the smaller mines are being forced to quit, or work on a two- or three-day basis for lack of business. Such mines as will operate throughout the month and early January expect to produce only about 40 per cent. of the usual tonnage. This lighter production is resulting in the market being a little firmer on good grades of coal, although some producers are absorbing the brokerage, and selling at 15c. a ton under Government prices.

At the present time the retail as well as steam demand is dull. Good domestic coals have not been cut in price to any extent, as stocks are not overly large, many retailers being stocked on low grades and endeavoring to cut these down before again entering the market. Low-grade domestic is hard to sell, and practically all grades of steam need a marketing organization of merit in order to get moved.

Producers in the eastern Kentucky sections handling coal into Louisville, Cincinnati and other river towns, are now feeling that river coal movement may be a menace to business, due to the fact that freight rates for rail coal are at least 25 per cent. higher than they were, whereas the river coal companies can transport coal at probably only 10c. a ton over former costs, as the increased cost will represent labor and barges only. Now that the West Virginia mines, and some in the Pittsburgh fields, are short of business, it is feared that a considerable quantity of river coal will come south on good boating stages.

Wagon mines are having a hard fight to maintain themselves, as they have no selling organizations; the jobbers and large consumers are not going to them for coal, and the poorer quality coal is not in much demand. Some of these mines have been reported to have cut prices as much as 50c. a ton in order to get business. However, many of them are closing down, and labor is drifting to the tipple mines.

The car supply has been generally good, although the distribution has not been what it should. Whereas long lines of empties are on sidings waiting demand at mines, some mines have been forced to lay off while awaiting deliveries of empties, especially on the lines of the Southern.

Railroads in Kentucky and neighboring states have been buying coal a little more freely, there being a fair demand for coal for railroad consumption. The Southern R.R. and the Louisville & Nashville have been buying engine coal in fair lots during the past few days.

BIRMINGHAM

Active buying and scarcity of coal feature local trade conditions. Production improved to some extent but output not adequate to present needs.

There is little or no steam coal available for the spot trade. Contract consumers have been in the market the past week endeavoring to supplement the tonnage being received from regular shippers, who, for several weeks past, have been unable to supply the tonnage called for by contract buyers. On account of the shortage in supply, industries, public utilities, railroads and furnace companies are not making much headway in stocking for the holidays, but on the contrary have been forced in many instances to resort to stockpiles to meet current requirements.

No improvement is noted in the receipts of domestic coal, and the scarcity of this grade is more pronounced than in the case of steam fuel. It is a common sight to see yards which in normal times carried several thousand tons at all times, which are now perfectly bare.

Coal production for the week ending Dec. 7, showed an increase of about 60,000 net tons over the previous week, but a heavy decline in output is being anticipated around the holidays.

Coke

CONNELLSVILLE

Coke is scarce. Uncertain prospects as to continuance of price control. Holidays and bad weather promise curtailment in output.

Coke continues very scarce, furnace being hardly obtainable at all in the open market, while foundry coke is only in moderate supply and commands the Government limit except that many producers are willing to allow a brokerage to middlemen. Production of coke by byproduct ovens is approximately up to normal, the byproduct ovens being fairly well supplied with coal, and in many cases with coal of better grade than they were forced to use during the war. Connellsville coke production has increased a trifle, but is still between 50,000 and 75,000 tons a week below the rate of last September. Furnace requirements seem to be as heavy as ever, scarcely any furnaces having been blown out.

There is still nothing definite as to what the Fuel Administration will do in the matter of relinquishing control of prices. The program adopted seems to have been to close up the entire work by Dec. 31, but furnaces continue to importune the Fuel Administration to continue functioning, in view of the present scarcity of coke and the prospect that prices would advance if the control were taken off. The furnaces represent that in accordance with the general program of the steel trade prices are to be readjusted downward, and the steel producers have already accepted the reductions suggested for them; but as the blast furnaces have not reduced their pig-iron prices according to the suggestion, their claim for lower coke prices has correspondingly less standing.

Production of Connellsville coke in Christmas week is expected to show a great decrease, and winter weather, already long overdue, would effect a decrease of its own besides. It remains to be seen whether, in the event of removal of Government control and a tendency of the coke market to advance, furnaces would pay higher prices or would bank their stacks as a demonstration against the coke producers. The market remains quotable firm at the Government limits: Furnace, $6; foundry, 72-hour selected, $7; crushed, over 3-in., $7.30; clean screenings over ½-in., $5.50, per net ton at ovens.

The "Courier" reports coke production in the Connellsville and Lower Connellsville region in the week ended Dec. 14 at 283,865 tons, an increase of 11,215 tons, and raw coal shipments at 213,900 tons, an increase of 19,809 tons.

Buffalo—The scarcity reported lately continues, which means that labor is hard to get and the car situation is not of the best. The local byproduct plants are running at full capacity, and with fairly good coal supply it is likely that the beehive output will come back to normal in time to keep the furnaces running on good time. All ore by lake is now in, but the final figures have not been made up. The amount is considerably more than in any former season, at this port as well as generally. Fuel coke suffers from the slackness of soft coal, but sells well where competing with anthracite.

Middle Western

MILWAUKEE

Anthracite grades, except buckwheat, advanced 90c. per ton. Soft coal unchanged in price; supply abundant, but demand slow, owing to weather conditions.

Milwaukee coal dealers have been authorized by the fuel administration to advance anthracite grades, with the exception of buckwheat, 90c. per ton. The schedule now calls for $12.77 for nut, $12.68 for stove, $12.46 for egg, $11.30 for pea and $10 for buckwheat. An extra charge of 50c. per ton is allowed when coal is carried in to bins. Coal received by rail is allowed a premium of over and above these rates.

The soft-coal market is dull, but prices have undergone no change. Hocking, Youghiogheny and Pittsburgh No. 6 sell for $7.95, delivered, and splints and West Virginia egg and lump at $8.45. Coke also commands the old price, $12 per ton. Mild weather has checked the demand for soft coal.

The foregoing price schedule will probably hold throughout the winter, unless heavy snows should increase the cost of delivery, as was the case last season.

The closing days of the season of lake navigation were characterized by a heavy run of anthracite coal, receipts during the first 14 days of December exceeding in amount those of any full month during the entire season. When it became apparent that Milwaukee was liable to go into the winter minus her full quota of hard coal, State Fuel Administrator Fitzgerald and others hurried to Washington and secured an order for prompt shipment of the needed balance. Ten large cargoes of anthracite reached port during the last week of the season. December's receipts aggregated 126,417 tons of anthracite and 29,500 tons of bituminous, making the season's cargo receipts 802,265 tons of the former and 3,432,383 tons of the latter. This shows a loss, as against last year's record, of 120,273 tons of anthracite and a gain of 286,552 tons of bituminous.

The supply of anthracite will soon be exhausted, and unless additional consignments are permitted to come by rail, many consumers will be compelled to resort to soft coal before the winter is over.

Twenty-six emergency coal stations have been opened at as many points in Milwaukee by the County Council of Defense, where fuel will be supplied to the poor in quantities of from 50 to 300 lb., on the cash-and-carry plan. The rules of the Federal Fuel Administration will be strictly adhered to. Investigation developed the fact that small dealers who peddle coal in bushel lots were getting about $20 per ton for anthracite.

General Statistics

NORFOLK & WESTERN

Following is a statement of the coal tonnage from mines on the Norfolk & Western and from other railroads, for the month of October, 1918:

From	Net Tons
Pocahontas field	1,523,691
Tug River district	307,430
Thacker district	222,125
Kenova district	61,535
Clinch Valley district	132,267
Other Norfolk and Western fields	9,552
Total Norfolk and Western fields	2,256,600
Williamson & Pond Creek R. R.	184,156
Tug River & Kentucky R. R.	54,978
All other railroads	86,836
Grand Total	2,582,570

RECORD COAL SHIPMENTS ON LAKES

A record for soft coal shipments on the Great Lakes was set during the season which has just closed. The vessels of the Lakes loaded 28,153,317 tons. This is an increase of more than one million tons over 1917. Shipments from the different ports for the season, according to reports received by the Ore and Coal Exchange, are as follows:

Port	Tons
Toledo	10,074,787
Sandusky	2,389,150
Huron	2,094,324
Lorain	3,342,681
Cleveland	3,217,801
Fairport	271,148
Ashtabula	3,405,365
Conneaut	2,212,947
Erie	1,145,114
Total	28,153,317

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